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EDITORIAL

Connected and safe

et me begin by saying, Thank you Hon'ble Minister, Shri Gadkari ji and The Road Safety Cell of Maharashtra. For the first time, we are seeing 'Road Safety', reaching the masses; which other wise has been limited to those either working in road safety or promoting road safety or somehow associated with it. When a sport which has biggest following gets associated with road safety, it is bound to become a household word. The "2020-21 Road Safety World Series", which has cricketing legends participating from all across the world, has helped connect the masses with road safety.

The Road Safety would continue to stick with the larger audience and masses in days and months to come, and the benefits, however residual it maybe, carry the road safety message to individuals across the country.

The highways being build have increased to nearly 34km/day, which is significant jump from what we were having earlier. With improved roads and highways in India, and more to come in coming years(roads will have investment of over Rs 25 lakhs crores or ~US\$325 Billion), more and more vehicles are going to hit the road. Goods transport vehicle would connect the remote corners of country with the consumption hubs- metros and big cities. But, the euphoria of good road and long distance travel or goods transport would come to a naught if we do not improve on the road safety. Our road accidents and resulting loss of lives is very high compared to similar economies.

Ministry of Road Transport and Highways and particularly Shri Gadkari ji has been working on multi pronged approach to road safety. They have identified black spots of accidents on highways across the country. The ministry is working with state government to remove them. Advocating use ADAS, steeper fine for violating traffic rule, encouraging transport industry to set-up hubs for good transport drivers on highways, continued road safety public programmes to raise awareness etc could possibly reduce the accidents by fifty percent(As targeted by MoRTH).

The ministry should also look at the connected vehicle for improving road safety. What has connected vehicle to do with road accidents? Surely it can contribute a lot.

MoRTH could widen the horizon of its road safety to create awareness and campaign on use of new technologies which would use the connected vehicle platform. Be it in-cab coaching, vehicle monitoring, remote diagnostics and preventive maintenance. Apps and devices which can assess driver fatigue using either video/image analytics to monitor the pupil and eye of driver to monitoring the driver's grip on vehicle steering using haptic control, can prevent thousands of accidents.

While the same driving license is issues based on Motor Vehicle Act 1988, the driving habit varies if not with dialect, which changes every 20 Km, at least with type of town/city- metro, tier 1, tier 2 town etc. A person who has been driving vehicle in my home town of Giridih(Jharkhand) would be at complete unease, driving a cab here in Delhi NCR. We can have 'App' which can help drivers learn the nuances of driving in metros. With the shared mobility there has been substantial migration of drivers from tier2 towns to metro cities and they can benefit through improved driving habit. Not only this, app for coaching on good driving habit to a person who is born and bought up in metro is also needed. App for coaching the driver on how to drive based on analysis of his driving, will help him overcome the gaps faster. Many a times, it the tips and tricks of his 'ustad' or trainer which sticks with him all along.

The connected vehicle ecosystem which is now having apps in their in-vehcle infotainment system, will be helpful in improving road safety. Need to connect the driver with the larger ecosystem and make him aware of roads and black spots is also quite feasible. Kind of 'Talking Tom' of yesteryear, if made available through an app on mobile or 'touch screen' (IVI), can coax the driver to take a break, if the drive has been longer than safe driving limit. The vibrant start-up ecosystem is waiting to flood the possible users with apps for improved driving habit; let there be some pull to demonstrate the economic feasibility or intent of government to push such road safety apps.

Namuch.



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CONNECTED MOBILITY ECOSYSTEM

🚈 SACHIN SANGHI

SIEMENS DIGITAL INDUSTRIES SOFTWARE

he topic of connected vehicle is well aligned with the automotive trend CASE, which is connectivity, autonomous vehicles, vehicle electrification and smart mobility.

Automotive Industry Trends → C.A.S.E.

vehicle offering called "OnStar", some of you may be familiar with it. This was a factory fitted telematics unit and it came with factory provided connectivity. The way the architecture worked is some of these cars would be connected vehicles and they would essentially connect with



Unrestrict

This is causing a massive disruption in the classical sense of the automotive industry that we all know about. But, if you look back how it all started, the connected vehicle has been available for the past 25 years. Back in 1996 when Google Maps was not even launched.

General Motors had a connected

the mobile tower and give the driver hands free voice interface. Once the driver called, who was on the other side was a call center representative and this call center representative would be able to provide certain services to the drivers. This was one of the first commercial offerings of connected vehicle and the kind of



For example, if the airbag went off, the police, hospital and the fire department was notified. It also had ability to carry out remote diagnostics and alert the driver of any critical faults. Concierge services were also provided like get flowers delivered, book cinema tickets, book a hotel room and other things like that. But 25 years is a long time, while the genesis was like that, when we come to 2021 this particular domain has seen or continues to see a lot of innovation. Today, while talking about connected vehicles, is it is it is very difficult to not consider the entire connected mobility ecosystem. This is because of the various

services offered were essentially location

tracking and emergency management.

advancements that have happened in sensors, edge computing technologies and cloud computing. I will just give you one view, this is by no means the only view or the broadest view but I'll give you one of the views about what are the different things that need to be considered in the mobility ecosystem architecture. In the center of course you have your vehicles, whether it is 2 Wheelers commercial vehicles, passenger vehicles. There are various ways that they are connected which is through telematics, but these vehicles need to be serviced, they need to be repaired, they may be part of a garage or a fleet, they may be part of shared mobility. These assets need to go back to the depots and that also needs to become part of the connected mobility ecosystem. A lot of these vehicles are going to run on alternative fuels and even if they run on diesel or CNG and in the future electric, that infrastructure management needs to be done for these vehicles. There will be a need for an integrated payment gateway for the users that will be using these vehicles. Also, there is a Vehicle to Infrastructure (V2X) which is vehicle

Connected Mobility Ecosystem in 2021



Connected Infrastructure

If we consider just one portion of

the mobility ecosystem architecture

which is V2X you can see that one needs

to think in broader terms. The vehicle is not necessarily the individual vehicle that you own and is sitting in the garage or the vehicle is not necessarily a fleet of vehicles owned by a radio cab provider. When we're talking about vehicles, these public are transport vehicles, these could be air transportation vehicles water transportation vehicles. These vehicles

to other infrastructure which can help arrive at things right like intelligent traffic management. There are advanced analytics, vehicle diagnostics, predictive maintenance, alerting the driver, assisting the driver, analyzing driver behavior, There is also managing the battery for electric vehicles. At Siemens we also have the concept of digital twin and we have advanced software technology that helps conceptualize vehicle designs in the first place, do their analysis and validation for manufacturing. These technologies also enable to virtually manufacture them in factories and before they actually get manufactured. Once manufactured and in operation, these vehicles will now be connected, the data that they are generating will be fed back to these design digital twins and engineering and digital twins. Each one of these topic in itself is a vast topic and it's a very very exciting

V2X is still evolving



topic.

will need to be provided with intersection assistance, autonomous driving, urban mobility solutions, parking solutions, etc. There is a lot that connected vehicle really needs to do. The connected vehicle in the future is really going to work very hard and all that hard work is going to make all our lives easier, they're going to make our environment better, they're going to help us consume a lot more services, make our time more productive that we spend in the vehicle commuting from one place to another place.

If we move on to the connected infrastructure, while this article is about connected vehicles, but just to take a more aggregated view, in the electric vehicle infrastructure, really the vehicle is just a part of a larger mobility ecosystem. Starting right from the non renewable sources which is the majority of the power

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Connected Vehicle in India – Where do we stand

Regulations - While AIS 140, introduced in 2018 is an excellent start, further advancement is required.

Not just be ready to utilize the existing 4G technology for connectivity, but keep an eye for 5G.

The opportunity is massive - There are over 300 million vehicles on Indian roads.

The ecosystem is complete and flourishing.

Just providing tracking, tracing may not be a commercial successful model anymore.

Additional digital services are required.

Strategic partnerships between the ecosystem will be necessary.

Open, extensible solutions are most likely to grow and survive.

In terms of use cases, we are still at the tip of the iceberg, there are many possibilities.

grid that comes in, to the renewable power generation, to scheduling your vehicles to the battery chargers while making sure that at that most of the charging is happening when electricity is at the cheapest rate at that time keeping the fleet running up 100% of the time. Such solutions can be enabled today if you have a connected infrastructure, there are ready made solutions available to manage such fleets, such depots and such charger management infrastructure.

Connected Vehicle in India, where do we stand with respect to that? In 2018 as we are all aware of there was an excellent start with the AIS 140 regulation coming in and we've seen some fantastic adoption. If anyone looks at the sheer number of startups which provide the track and trace service in India it's very exciting. However we have had an excellent start but we definitely need further regulations. We as a country, we've got a lot of exciting things coming out of in this particular domain but we need to be ready not just utilized the existing 4G technology but also keep an eye for the 5G technology. The opportunity here is massive there are over 300 million vehicles on Indian roads we have a complete ecosystem and it is flourishing. If you are a fleet operator today you can look at very innovative solutions on how to optimize your costs, optimize your trips, use predictive maintenance solutions and extend the life of your assets. If you are telematics service provider today, you have a lot of opportunity to integrate your offering with various other offerings to complete the connected mobility ecosystem. Just providing tracking and tracing may not be a successful commercial model anymore. You need to provide additional digital services in terms of optimizing the routes and other things discussed earlier. Strategic partnerships between the ecosystems will become necessary and I certainly see that there will be some very interesting partnerships that may come out with relatively smaller startups with a larger technology providers. Siemens provides various cloud platforms like MindSphere, which is Industrial IoT as a service and Mendix, the complete low code/no code application platform. Startup telematics service providers can join us and enjoy the industrial connectivity that we offer across the board in our markets. There could be longstanding older OEMs

having partnerships with more newer age companies. These solutions however will need to be open then it will need to be extensible and those technologies within this domain which are open and extensible, they are most likely to grow and even survive. Lastly I believe in terms of use cases we're still just at the tip of the iceberg there are many more possibilities that we're going to see. Some exciting solutions are already available in terms of public transport systems that have been designed. There is a very high uptake of innovation in connecting users with their mobility to their environment. There are several solutions available, we at Siemens have got very comprehensive solutions available which can monitor connected vehicles, reduced service costs, maximizer utilization and improve your customer satisfaction.

AUTHOR



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"DURING THE PANDEMIC DRIVERS GOT USED TO THE REMOTE SERVICE"



Global vendor of Connected Cars services, Bright Box celebrates 10 years of operations in the international automotive market this year. CEO and co-founder Ivan Mishanin, who has been managing the company all this time, told us about the development of the beginning of the company and the search for a strategic partner, development in the post-pandemic time and 5G for the car market.

How was the idea of Bright Box born?

At the end of 2010, when I was working at Incadea, one of its customers, KIA, asked us to develop a mobile app for their dealers' customers with a feature to enable them sign up for service and obtain marketing information from the distributor. The project was successfully completed in 2011. We thought it was a very interesting niche. Unfortunately, my partners and I did not find support within Incadea. So we decided to leave the company and engage in the development of mobile applications for car dealers and distributors, which would enable them to communicate directly with customers digitally.

Once we started developing such a marketing platform, we realized that we needed to increase user retention in the mobile app. After consumer surveys, we concluded that information about the health of the car was most in demand. To do this, we needed to collect data from the car itself. That is when the idea of the Remoto platform came about.

What's your vision behind the company?

Bright Box, as one of the leaders and pioneers of Connected Cars services, has enormous potential. The company's success in the international market in 30 countries of operation is proof of this. The large number of customers who have trusted the company and concluded contracts with it shows that the technology and development of Bright Box are absolutely innovative and state-of-the-art.

How did you come to the acquisition by Zurich? And how do you rate the work as part of Zurich?

At the beginning of 2017, we realized that the company was growing superfast and had already started to reach a level where we already needed the support of a stronger partner than we had before. We needed a partner with a strong brand to be able to get big contracts and provide more sophisticated solutions for automakers and dealers. In 2017, we began the process of finding such a partner. We didn't have a final decision on what stake in the company we wanted to sell. We were absolutely open to all options. But we were looking for a more active partnership in the form of equity participation. By the end of 2017, we came to an agreement with Zurich Insurance Group.

How will the trend towards connectivity influence your business?

Connecting TCU to the car as a mandatory element will greatly increase the number of our customers. The main limiting factor was that we had to equip the car with a device that would connect it to our cloud. So the cheaper cost of distribution and connectivity inside the car will lead to the fact that companies will connect more and more cars, and on the other hand there will be hybrid models of using our technology in partnership with automakers.

What will happen to the car market in the post-Covid time?

In the post-Covid period, the market will see the development of digital technologies primarily in the area of remote services, remote car sales and remote servicing. This is because people are now beginning to get used to the fact that not all services can be obtained at the moment. Dealers can be closed, and customers, fearing Covid, want services remotely. This will increase demand, and manufacturers will be forced to adapt.

I also expect that direct sales by automakers to customers will expand more, and the Tesla business model will gain traction with other automakers.

What other promising and innovative trends do you see in the automotive market today? And outside of it?

There is no doubt that the much anticipated 5G technology right now will have a significant impact on innovation in the automotive industry. This applies in terms of transferring more information from and to the car, which will be extremely beneficial for digitization and the number of services that the customer can receive, both inside and outside the car. It will also allow automakers to better understand their customers' needs. On the other hand, it should be understood that 5G will have an impact on the car's communication with other infrastructure participants, thereby making the car smarter, more technologically advanced, and more integrated into the world. At the moment, a car interacts with the world unilaterally. It communicates nothing to other cars nearby. That will change for sure.

Transform into a Green Logistics Business by Managing Fuel Consumption

🚈 TUSHAR BHAGAT

DIRECTOR, UFFIZIO INDIA

Preserving our environment, health, and resources is each individual's responsibility. Supply chain businesses are opting for 'Green' logistics to support the larger cause of saving our planet's future. The concept aims at optimizing logistics across all touchpoints. It involves integrating technology at warehouses, transport terminals, packaging centers, material handling, transportation, and last-mile distribution.

The green logistics approach is fast, cost-effective, and reduces wastage. Fuel consumption is the main cost center for all supply chain businesses. Fuel monitoring software helps in the effective management of fuel by capitalizing on information flow.

Managing Fuel Consumption

Managing fuel consumption is crucial for your logistics business as it maximizes profitability and reduces the environmental impact of your business. You can improve the operational efficiency of your business and cut down fuel expenditure through:

1. Efficient driving techniques: Thoughtful driving improves road safety and helps you reduce fuel consumption. Train your drivers to manage speed and anticipate the road ahead. Accelerating gently, maintaining a steady speed, and slowing down instead of braking each time can help you save around 7 to 10% on fuel costs.

2. Preventive maintenance of vehicles: Prioritizing maintenance of all your vehicles optimizes the performance of your fleet. Invest in a scheduled maintenance program to ensure routine care of tires, engines, and other critical components. Improve your fuel economy by opting for the latest 'green' features in your vehicles like aerodynamic shape optimization, automated direct-drive transmission, and weight-saving vehicle designs.

3. Optimizing processes through technology: Leverage telematics and real-time tracking systems to streamline business operations. Monitor your inventory in the warehouse to avoid repeat trips and move it systematically through strategic route planning. Observe idling, check off-hours driving, and monitor speeding or hard accelerations through advanced telematics to reduce fuel costs.

A route optimization software can save the route history for routes taken frequently so that the driver can follow the same route and save on time and fuel. Typically, delivery schedules are created by the software to reduce the time and miles taken to complete deliveries. The result is saving of fuel.

4. Investing in Fuel Monitoring Systems: Mitigate rising fuel costs through advanced Fuel Monitoring Systems. It monitors fuel levels in realtime, tracks cost per mile, and alerts about every drain or refill. You can authorize fuel purchases to avoid fuel theft. Monitor fuel usage per trip and get detailed reports to analyze operational costs. It also allows you to detect unusual activity like harsh driving, AC misuse, or unnecessary idling by the drivers.

Benefits of Fuel Monitoring

Fuel monitoring software gives you an insight into your actual fuel consumption and wastage. You can analyze the reports and identify areas for transforming into a green logistics business by:

1. Saving costs: Fuel spends is a large value-driver of your logistics business. Using fuel monitoring software helps you reduce consumption and save costs. 2. Reducing your Carbon Footprint: Climate change is a real problem and needs immediate attention globally. You can do your part by reducing the emission of greenhouse gases (GHG) from your vehicles. Department of Energy (DOE) reports state that a vehicle emits 20 pounds of CO2 for each gallon of gasoline consumed. By reducing carbon dioxide (CO2) emissions from burning fuel, you can reduce the carbon footprint of your logistics business. Contribute to conserving the global climate by optimizing fuel consumption.

3. Conserving Fossil Fuels: There are proposals for using renewable fuels such as ethanol and biodiesel or natural gas to meet our energy needs. But most of these are still under research and haven't yet been commercially adopted. It is advisable to use petroleum, gasoline, and diesel wisely to allow researchers time to develop large scale usage models of alternative fuels.

4. Promoting energy sustainability: Developing renewable and cleaner energy to power heavy vehicles on the highway is still cost-intensive. As you continue to use non-renewable oil derived fuel for your fleet, a fuel monitoring system reduces wastage and promotes sustainable usage.

Way Forward

Green logistics is the need of the hour, and efficient fuel monitoring software can support the cause while improving your bottom line. This sustainable approach is quickly gaining attention in the logistics industry. From large supply chain owners to 3PLs or even small fleet owners are lured by the twin-fold benefit of cutting down costs and contributing to preserving the environment. They are aligning their mainstream operations through technology to tap the benefits of green logistics.



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ACCELERATING AUTOMOTIVE CONNECTED TECHNOLOGY IN INDIA

ARTIKEYA JOSHI MINDA INDUSTRIES

arious industry forecast suggests that the global market of connected devices will go to \$ 1.6 trillion by year 2030. The value will be realized with approximately 24 billion connected devices. Compared to 2021 we are looking at 11% - 12% CAGR to attain this number. The staggering growth will come from consumer IoT devices which will still account for 65% of all the end point connections. Although, lesser in numbers the value add on enterprise IoT will be significant and categories that will continue to grow within enterprise IoT are connected car, fleet telematics and asset tracking.

India IoT growth story is also very promising. FICCI estimates suggest that in Year 2021 the total number of M2M connections stand close to 500 million with connected car and fleet telematics registering strong growth. The cost of data in India is amongst lowest in the world. 1GB data in India cost approximately \$0.26 compared to global average of \$8.53. India has the

right demographic mix to try new technologies and the IoT market and specifically Automotive IoT market will continue strong growth.

Use of connected technologies in automotive industry has significant economic benefits. It can be used for effective track and trace. The live tracking of fleet trucks and consignment improves logistics outcome and at the same time this simple but extremely powerful feature can be used to extend safety, to reduce accidents, and eventually to save lives.

Connected as a case for vehicular safety

In India, 150,000 lives are lost in road accidents and it is a huge socio-economic loss. There are multiple vehicular technologies that have potential to contribute towards reducing these numbers drastically. Connected Telematics also is a powerful technology which if leveraged adequately can contribute towards saving lives. From Jan 2019, Government of India through AIS140 automotive standard has made it mandatory for all public use vehicles to enable real time tracking via telematics device and mandated an installation of panic button in the public use vehicles. In case of emergency, the occupant can press the emergency button and the information is relayed to the state emergency response control room. The law enforcing agencies will respond and because there is live tracking, they would be able to locate the vehicle in real time

and ensure citizen safety.

The technology can be extended permanently to all vehicles through an embedded telematics unit. The functionality called e-call will enable the vehicle to detect accident on its own and make an emergency call. There are sophisticated sensors available to detect collision or fall and these sensors can relay information to telematics unit to make such a call. The first responders then can reach out to the site of accident quickly and can contribute to saving lives and to improving the outcomes post accidents.

Connected as a case for economic efficiency

Indian commerce is growing at a rapid scale and it also demands more predictable outcomes from logistics. Connected technology has been leveraged from as early as year 2008 to enable real time tracking of long-haul trucks and enforce SLA's for high value consignments. It is now possible to do data driven dynamic route planning, real time consignment monitoring and active journey risk management. These measures enabled



via telematics ensure that the vehicle, the consignment and the driver travel between location A to location B in most efficient and safe manner. The immediate technical advancement in this area is creating driver driving score by monitoring multiple parameters as he/she drives along the route and use this powerful data to organize driver safety trainings. These trainings contribute a long way in reducing journey risk. Specialized cargo movement (like vaccines, perishables etc) is also enabled by using telematics device to transfer the critical quality parameters in real time to control room and same can be monitored against target values to regulate quality of shipment being transferred. There are multiple business models emerging (like marketplace) to do real time matching of fleet with consignments thereby providing efficient utilization of asset.

Key enablers for Connected technology

In the automotive world, the key technology elements of telematics subsystems are – Navigation, Telematics Control Unit, Vehicle to X Units, Intelligent Antenna Module and Wireless Connectivity Module. Since the telematics sub-system also enables remote connectivity & collection of data a strong cloud enabled IT backbone and telecom operations is mandatory for seamless integration and operations of technology stack.

We are witnessing strong advances in technology in each of the key elements of telematics sub-systems and following are the key drivers –

- Service oriented Architecture embedded architecture is giving way to service oriented architecture. It has a base layer of embedded at edge followed by an edge client that connects embedded to IT architecture where data streaming, abstraction and storage is taken care. Big players like Microsoft, Amazon, Google are investing heavily in PaaS components, in time series database and in technology for storing data for analytics.
- New automotive Operating systems – the operating system of the connected vehicle is the new

battle ground. Big tech giants are in race with Android Auto, Apple Car Play and Baidu Car Life leading the race. The power of these OS will unlock the personalization in car like never before. Native app ecosystem, seamless integration with smart phones and deep software updates / data logging is now becoming possible with unique API's in OS.

- 3. **Powerful vehicle domain controllers** – with an ability to handle / process huge amount of data required to deliver use cases. Combined with HSM (hardware security modules) these vehicle computers are key enablers within the vehicle E&E architecture.
- 4. Telecom M2M and wireless advancements – several protocols of connectivity – 3G/4G/5G, NBIoT, Zigbee, BLE, Wifi, DSRC combined with equal advances on hardware are enabling seamless present and future V2X communication standards. These standards are also enabling multiple use cases within an outside the vehicle and making the vehicle truly wireless.

Creating a business case for Connected technologies beyond the obvious socioeconomic benefits

Long term benefits of the telematics are obvious, what is needed in India is building a ROI business case to get this started across automotive vehicle segments at an accelerated scale.

Investment in connected technologies is a CEO agenda for an automotive OEM as the investment is a basis for future data driven business models. The question is never "if" but "when" and "how". All leading automotive OEM CEO's understand the power of creating a digital twin of their customer journey. Connected technologies plays an important role there. Additionally, since these devices are connected there is a huge liability associated with data storage, data ownership, data interoperability and data security. The CTO / CIO of the automotive OEM has a huge role to play while building the business case. Some of the key pointers while looking at short term ROI from an OEM perspective -

- Data for Product Development the embedded and software content is increasing in the vehicle. The development lifecycles are reducing to less than a year now from earlier 18-24 months. The connectivity in the vehicle gives the PD department of the OEM quality access to the vehicle dynamic data and trouble codes. It helps to shorten the endurance cycles, do real time corrections and to store more field endurance data of the part performance.
- 2. Data for customer service diagnostics trouble codes if collected and analysed across vehicle models can give important insights to OEM for doing spare part planning, preventive maintenance checks, training of workshop staffs and thereby improving overall customer NPS. The possibility to do remote diagnostic and over the air flashing can also be leveraged to better manage claims and to manage possible recalls in future.
- 3. **Data for supply chain** the real time tracking of manufactured vehicles can give a real time picture of inventory across supply chain. This helps in better sales forecasting and planning.
- 4. Unique features for the product differentiations – there are OEM's who are packaging three year connected car subscription at the point of sales. The technology is used to provide several cool features via consumer app, via car infotainment system and via integration between several automotive sub-systems (like remote door opening, remote ac on/ off etc). With powerful telematics features like FOTA and OTA the features in the car could be upgraded remotely just like a mobile phone.

In addition to the automotive OEM, the data can also unlock potential for other stakeholders –

 Efficient citizen services – for instance toll booths at NHAI could be automated completely with route tracking of the vehicle and auto debit of the toll to the citizen account. The route information can also be used in an anonymized way to discover traffic patterns and for better highway maintenance and efficiency planning.

- 2. Customized insurance plans – citizen can be asked to participate in a UBI (Usage based Insurance) plan by leading motor insurance companies. The data about driving behaviour can be positively translated into discounts on insurance. In long run such positive economic enforcement will improve driving skills of Indians on road.
- Location based services

 an owner of the car is also a potential customer for the corporate world. Real time location-based offers would enable better conversion on highway and also within city limits.

It is quite possible for an OEM to create a strong business case for the additional investment of few hundred dollars in the telematics sub-system and market it efficiently to the end buyer. If done with urgency the installation rate of telematics system in India can move towards 100% in next 5-7 years.

As Nandan Nilekani said that Indians will become data rich before they become economically rich, there is also a possibility to create a data exchange for the connected vehicle user. The user can share the data at will to access better services and in few cases monetization.

Accelerating CASE – connected as a key enabler

Telematics and connected technologies are key enablers for CASE. Connected technologies (C of CASE) is a horizontal technology enabler to accelerate adoption of automated, shared and electrified. Let us briefly see how!



- Connected and Autonomous vehicles – SAE defines Level 1 to Level 5 autonomy levels. As the autonomy moves upwards from Level 2, real time decision making will shift increasingly to machine from man. An enormous amount of work is going in creating a high-definition maps and in addition a connected vehicle will ensure via V2X communication more real time information for the vehicle computer to take cooperative decisions in accordance with environmental data.
- 2. Connected and Shared mobility it is impossible to imagine shared mobility without connected technologies. Whether it is ride hailing, self-drive or peer to peer all business models need connected technologies to function. Imagine hailing an Uber or an OLA and the capability of the technology to ensure real time track and trace of the vehicle while it arrives at your location. Imagine in the background the algorithms of these tech companies to connect supply and demand in real time. All this was not possible without use of connected technologies. In addition all recent self-drive business models are

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dependent on remote tracing of vehicle, remote booking of the vehicle, remote unlock of the vehicle and also remote immobilization in case the vehicle goes out from defined geo-fence.

3. Connected and Electric vehicles - electric vehicle ownership is not possible without a seamless access to the charging infrastructure. Real time information on left out range in vehicle combined with real time visibility of nearest charging station is required to put range anxiety at rest. This is enabled via connected technologies. In addition to it connected technology is used to collect real time endurance data of the battery in cloud (via BMS). This data could be used to enable proactive maintenance of the battery and also to understand the performance of battery and other powertrain components of the e-vehicles. For e-Vehicles the access to connected technologies is mandatory.

All these market trends will ensure a rapid adoption of connected technologies. It is estimated that by year 2030 connected technologies will start to support ADAS adoption in India.

As a summary investment in connected technologies is beneficial for all involved stakeholders due to significant economic and social benefits. It has to be accelerated in India through strong policy making, strong investment in "make in India" technologies, strong investment on skilling and last but not the least education of its benefits to the end user. The future of the Indian automotive industry is also fast moving towards connected and electrified and it is heartening to see that all stakeholders are gearing towards making the most of it.





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e live in a world where everything is getting connected! We are in pursuit of personalizing everything; the equipment we use at the workplace, appliances we use at home, the books we read, the hobbies we pursue, the food we eat, the shopping we do and of course the car we drive.

When GM launched the OnStar services in 1996 it was first of its kind solution in the market. Probably the terminology, 'connected car', was not yet born in those days. In fact, even in 2008 when I had an opportunity to work on the then next gen OnStar project, the 'connected car' terminology was not common. However, today we all accept that GM OnStar was the first connected car in the market. It enabled customers to make voice calls to call centers, provided navigation support to the customers, allowed customers to subscribe to their favorite albums and play music on demand and many more features like remote diagnostics, roadside assist etc.

Today, undoubtedly 'CASE' (connected, autonomous, shared, and electric) is the strategy and focus of every automotive OEM as well as supplier. It is important to note that all these four aspects are also interconnected. Connectivity is the enabler for autonomous technology, shared services, and electric vehicles.

Why connected vehicles? Usage, Benefits & Challenges

The advancement in internet technology, availability of highspeed internet connection, and the ability to exchange huge amount data through mobile internet fueled rapid advancement in connected car technology. It enabled the development of new innovative applications solving many problems, improving efficiency and providing comfort & convenience to individual vehicle owners as well as fleet operators.

While for an outsider, all vehicles will appear to be same, the requirements, applications and challenges for personal mobility, shared mobility, commercial fleet, public transport as well as offhighway vehicles are all different and unique. Safety of the driver & passenger is the common aspect across all these mobility segments.

Approximately 1.35 million people die each year because of road traffic crashes. Road accident is one of the leading causes

of death as well as injuries with permanent disabilities. It is the leading cause of death for children and young adults aged 5-29 years, leaving behind significant economic impact to their families. Availability of emergency medical assistance in the golden hour will save more lives. Connected features like e-call is aimed at providing immediate assistance to the people involved in accidents. In connected smart city infrastructure, emergency response combined with intelligent traffic management systems can save more lives by speeding up the reach of assistance within the golden hour.

On the personal mobility front, OEMs are focused on providing safety, comfort, and convenience to the end users through connected car features. The comfort and convenience features include monitoring & diagnostics of vehicle status, navigation we use on a day-today basis, personalized notifications & infotainment contents among others.

For shared mobility, its backbone itself is the connectivity. Global players like Lyft, Uber, Grab and Indian players like Ola, Zoom, Yulu, Quickride have demonstrated various possibilities of shared mobility. This has paved way for new business models including 'mobility as a service' as well as a paradigm shift in vehicle ownership models.

Commercial fleet is a very wide area with several use cases and applications. Challenges faced by the fleet operators include ensuring maximum utilization of the vehicles, safety of the driver & vehicle, cost reduction, avoiding fuel theft, avoiding idle time etc. Telematics & fleet management solutions are helping fleet operators to address some of the challenges. Connectivity enabled business model innovation by startups like RIVIGO are bringing new dimension to the commercial fleet operation.

Longer commute times, multi modes & multi operators makes the public transport unattractive & expensive. Connectivity can improve this by helping the users to plan their trips better, reduce the waiting time, enabling single fare payment system etc.

Connectivity closing the gap between OEMs & end users

Connectivity has reduced the gap between the OEMs & their end customers. In the past, there was limited connect between OEMs & the end users of the vehicle. The OEM's service



network was the main link; information like the customer feedback, monitoring of vehicle, understanding the vehicle usage etc. had to be gathered when the vehicle was brought for service. Even here, the system was not fool proof as it was completely dependent on the capability of service personnel to gather the information and the willingness to share by the end customer. Also, the systems lacked seamless integration due to which the flow of information from service center to R&D centers was flawed.

Today, connectivity has improved the flow of information between service centers and OEMs. It has also enabled predictive diagnostics & symptom-based diagnostics for better maintainability & service of the vehicles. The predictive diagnostics solutions continuously monitor the vehicle and gather the information at regular frequency. This data is analyzed and used to predict the failures, recommend the service to the driver, and even schedule the workshop visits. This will help avoid unwanted surprises on road. Symptom-based diagnostics help the technicians in the service center to identify the most probable cause or the root cause based on symptoms observed by the driver as well as the fault codes. Self-learning algorithms can help to continuously update the 'most probable cause' based on the analysis of the symptoms reported and the real failure observed in the vehicle.

Use of digital twin technology can enable further enhancements in this field. The recorded data from a vehicle can be used to create its digital twin which can help to investigate the overall health of the vehicle, accurately predict the parts to be replaced or serviced. It can also help in planning the supply chain better by making the parts available at the right time for service or replacement. Vehicle tracking & driver behavior monitoring is also a boon to fleet owners. This will help them reduce idle time, maximize the usage of the vehicles, monitor & train the drivers in case of rash driving, cultivate better driving habits as well as perform timely service. Better driving habits can also be incentivized through usage-based insurance wherein a good driver will pay much less premium.

Connectivity has also enabled OEMs to track the vehicle information, usage pattern, driving behavior and vehicle performance in real-time. Thanks to connectivity, there are solutions out in the market which gather the necessary information from the vehicle on road, upload the gathered data to the cloud which the engineers can access in real-time, perform analysis and also do necessary modifications and update it into the vehicle fleet (in case of software update). Not to forget, without such gathering of data, post-processing, analysis, and subsequent design & software modifications, the dream of autonomous vehicle will not come true.

Over The Air Update

OEMs are equipping their vehicles with Software/Firmware Over The Air (OTA) update capability. OTA update of the electronic control units (ECU) will allow OEMs to always keep the vehicles up to date by flashing the latest software functions in the vehicle. OTA process is similar to the software update we would do on our smartphone. The vehicle EE (electrical/electronic) network will have either a dedicated gateway controller or the infotainment unit would act as a gateway. The gateway connects to the OEMs cloud through a secure link and the software is downloaded into the vehicle. The software/firmware update into the target ECU (one or multiple ECUs can be updated) then takes place when the vehicle is in a safe state.

Technology development & deployment

To harness the benefits of connected car technology, a very robust infrastructure consisting of sensors, antennas, cloud infrastructure, communication technology and embedded software is necessary. Vehicle to vehicle (V2V) and vehicle to infrastructure (V2I) features requires high speed communication technology, high bandwidth in-vehicle networks, sensors like radar, lidar, camera, thermal sensors etc. The design and placement of all these sensors & antennas needs to be highly accurate. The development, testing, field implementation and maintenance of connected vehicle technology is a complex & expensive. Simulation can be a big enabler for aspects like antenna & sensor design, sensor placement studies, and the validation of performance under different conditions and scenarios.

Cybersecurity

One very important aspect to be taken care of in a connected vehicle is cyberattacks. The highly publicized incident in 2015 where two cybersecurity experts hacked a vehicle on road taking control of the vehicle revealed the amount of risk involved with cyberattacks. Research in this field has shown cyberattack risks increasing with increase in vehicle infotainment system, on-board telematics

and have issued advisory to vehicle manufacturers. This intrusion into the vehicle is of serious concern since the intruder can take control of core functions like acceleration, braking and steering. The consequences of such intrusion can also be fatal. There is also the risk of compromising consumer privacy. Additionally, this

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CONNECTIVITY WILL ENABLE SAFER DRIVING. **BETTER UTILIZATION OF VEHICLES. INCENTIVIZE BETTER DRIVING HABITS. IMPROVE THE** MAINTAINABILITY **OF VEHICLES.** PERSONALIZE OUR **EXPERIENCES**. **PAVE WAY FOR NEW BUSINESS MODELS AND BRING A** PARADIGM SHIFT IN THE WAY WE LOOK **AT VEHICLES AND** MOBILITY

will cause serious brand damage to the OEMs. Hence it is very important to address cybersecurity as connected car features continue to increase.

Cyberattack can happen at an individual ECU level, at the invehicle network level, at the external link through the controllers such as infotainment, telematics units which V2V & V2X link or from the OEMs cloud and enterprise network itself. Solutions such as intrusion detection and prevention systems will help to continuously monitor and prevent cyberattacks. However, it is important to address this aspect holistically from the design stage, ensuring security implementation at all levels.

To address the specific needs of automotive industry in terms of cybersecurity, a new standard SAE21434 is being implemented. This standard aims to address cybersecurity in the engineering of electrical and electronic (E/E) systems within road vehicles. This standard should help OEMs to keep up with changing technologies and cyberattack methods. While it's well accepted that the system is secure as long as it is not hacked, the standard would provide a systematic approach to cybersecurity engineering.

Conclusion

In a nutshell, connectivity will enable safer driving, better utilization of vehicles, incentivize better driving habits, improve the maintainability of vehicles, personalize our experiences, pave way for new business models and bring a paradigm shift in the way we look at vehicles and mobility. At the same time, having a safe and secure E/E architecture as a backbone is crucial for the future of mobility.

References:

- https://www.who.int/news-room/fact-sheets/detail/roadtraffic-injuries
- https://www.bosch-mobility-solutions.com/en/productsand-services/mobility-services/predictive-diagnostics/
- https://www.mckinsey.com/industries/automotiveand-assembly/our-insights/rethinking-car-software-andelectronics-architecture
- https://www.wired.com/2015/07/hackers-remotely-killjeep-highway/
- https://www.pwc.com/us/en/industrial-products/ publications/assets/pwc-auto-cyber-readiness.pdf
- https://blog.marketresearch.com/the-growingimportance-of-automotive-cyber-security
- https://www.iso.org/news/ref2584.html



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ENGINEERING AN ETHICIST IN AUTONOMOUS (VEHICLE) BEINGS

🚈 VIJAI GOPALAKRISHNAN

TCS

very decade brings about new technology that impacts human life so profoundly that the new generation would not readily comprehend a lifestyle prior to that technology. The thought about a world without mobile phones prior to the '90s brings a great deal of wonderment, even to the adults of today, who lived in that era. Sometimes technology creates a new need that we did not know we needed – mobile phones are such.

Fast forward 30 years, and we are in the era where most science fiction of the 70s and 80s is already real, and several of these are at the cusp of mass adoption in the coming decade. Autonomous Beings (Robots, Drones, and Cars) have already arrived and are at the tipping point for mass implementation. If we are lucky enough, most humans alive today will see a day to reflect with immense wonderment that humans used to actually drive cars! The one difference in the birth story of mobile phones and Autonomous Vehicles(AVs), is that AVs have reached a point of overdue necessity that mobile phones did not start off with. This differentiator is the safety of human lives. The auto industry is also in a technological vantage point to enable a solution through AVs for this long due Safety requirement.

AVs are expected to hit the roads in the current decade and become mainstream in the coming decades. The implementation level (SAE Levels) will be staggered and interspersed with timing, depending on the geography, market, infrastructure, and consumer readiness. The accelerated continuous improvement in EV technology, batteries. Semiconductors, Sensors, Connectivity. Mapping, Telematics, Infrastructure management has brought us to a vantage point that implementing AVs at scale is no more a 10-years Vision. We have real Vehicle Development Plans in OEMs that are being executed to fruition, with teasers hitting the public domain every Quarter. We are now not in a stage of debating the relevance or need for AVs. It is a given for most OEMs, with the single benefit of saving lives worth every penny invested in the research and development of AVs. 15% of every vehicle sold by 2030 will be Fully Autonomous.

A low down on AVs will give us an idea that AV implementation involves decision-making on the fly, at the core of its operation. Whenever there is decision-making, it means there are guidelines. There are aspects related to technical, legal, and the not-so-apparent ethical background whenever there are guidelines for decision making.

A skeletal functioning of AVs can be considered so: Sense -> Plan -> Act

Sense: Receive sensor inputs from LiDARs, RADARs, Cameras

Plan: Process the data, decide next action

Act: Execute the planned output in terms of Braking, Acceleration, or Steering, along with ensuring passenger and pedestrian safety

Below is an example of an autonomous/ intelligent battle field scenario!

It is the job of technical, ethical, and legal frameworks to dictate the Plan phase, leading to an "acceptable" Act phase.

A quick under-the-hood check would let us know there is a massive amount of data being churned for the AVs to function(to make decisions and act). The data involves maps, live sensor inputs, vehicle-specific position information, and so on. In essence, the Vehicle's every trip information is not anymore private to the vehicle owner. The decisions made essentially control the Vehicle's behavior on road. As soon as one realizes this, it



PDATT Framework - Designing Robots for the Battlefield: State of the Art - Bruce A. Swett, Erin N. Hahn, and Ashley J. Llorens (Robotics, AI, and Humanity Joachim-von-Braun--Margaret-S. Archer- Gregory-M.-Reichberg-- Marcelo-Sánchez Sorondo---- (Editors))

becomes evident that an AV needs to be subject to the legal and ethical rigor of any other Artificially Intelligent system and possibly even more due to the safety considerations with zero room for errors.

Any framework evolves with time and enablers maturing-up (technical, social, or others); and needs to be ahead of the times in terms of application. A robust framework has foresight. The downside about frameworks is, they need to convert to a legal binding for them to be effective in their implementation. Engineers and Scientists are typically passionate about technology-related best practices, specifications and great at pouring through research papers published in the past and improve current states of technology. Businesses focus on bringing out a great product and ensuring bottom lines are met. Consumers focus on value for money.

Meeting the ethical needs within technology implementations is then seen as a passive goal. With the increasing implementation of Task-Based AI products (e.g. AVs), the need to bring about stronger ethical definitions for products is imminent. The more "human" the machine is, the more tighter the need for integrating ethical frameworks into the products. Trust, understanding machine intent and their capability is a much needed product feature for a product which relies on AI. Would we want to see virtues in AVs? Would we want to see prosocial behaviours in AVs? Would we want the AVs to handle new situations on the fly? Would we want to extend cultural nuances into AV behaviour (honking or not?!)

Philosophy of Ethics, Technology and Science

The oft-used example to draw attention in this context is by considering the following example scenarios:

- If an AV crashes into a private property

 who would you blame? (nobody was
 driving it!)
- If an AV is in a forced situation of having to crash into a child or a senior citizen, who must it save(and why?) – what might a human have done?

Ethical Foundations deep dive into ethical theories and analyze their basic premise. Moral objectivism and subjectivism become the points of consideration. Moral judgment on what is good, bad, right or wrong follow

THERE IS NO REASON AND NO WAY THAT A HUMAN MIND CAN KEEP UP WITH AN ARTIFICIAL INTELLIGENCE MACHINE BY 2035.

-GRAY SCOTT

from detailed evaluation and arguments. We need to analyze what is the current state of affairs from which an aspirational state can be derived.

Ethical studies deal with human values such as sharing, caring, cooperation and commitment. They also deal with human virtues such as honesty, courage, patience, humility, obedience. Ethics is less to do with contemplation and directly linked with outcomes of action.

Laws, rules, regulations, directives, guidelines, dos and don'ts: all of these are built upon the discipline of Ethics. Ethics are here to tell what acts are good and what acts are not good. The desirable state is to have a universal appeal to the definition of good vs bad. Ethical values are complex. Incorporating them into technology is necessary for the betterment of human experience with these technologies. The need for incorporating sound and robust Ethical Frameworks into technology is seen as the need of the hour, as they will have a multiplier effect when deployed into mass-produced AVs.

It is possibly, for the first time in human existence, we are delegating the serving of ethical values through a non-human agent at such a vast scale of consumption. The scale relates to the impact on human lives at scales not operated anytime in history. The Utopian Goal is to reach a state where what is deemed good to one set of humans also means good to "all humans". The Ethical foundations of technology need to be sound and tested for all scenarios and all cases of consumption. The only manner to control this is through the deployment of a cohesive and parallel framework for Ethics that would guide the working rules for the implementation of technology. In the world of AI, AVs are a direct example where

the 5Vs - volume, velocity, variety, veracity, and value have gotten ahead of the Ethics framework, unlike in the past technology revolutions where the 5Vs were well within the prevalent Ethical frameworks of the times. The "handing over" and the scale is unprecedented - thus, the urgency.

Ethics in AI is a widely discussed and evolving area as of this writing. Further, AI being applied to mass-impact areas such as Medicine and AVs call for a heightened sense of urgency. Until then, we will continue to depend on current legal frameworks and not go into the nuances that have surfaced in recent times for AI applications at scale. The need of the hour is to have a well accepted, and comprehensive framework for Ethical AI.

A good starting point will be to work with Fundamental Ethics, not having to reinvent them. We need to see what new transactional manifestations with the real world, for Autonomous Vehicles, call for Ethical codification. This task is not easy. This is almost like hopping onto a moving train; being able to keep up with the pace of innovation and implementation.

The desired state is for Autonomous Vehicles to act as Ethical Beings in all they Sense, Process and finally Act. This, just like how humans are expected to function. The decision-making outcomes are invariably a result of Machine Learning / Deep Learning algorithms that perform Sensor Fusion to provide a decision for the Vehicle to Behave and Act. What did we prioritize to reward inside our Neural Networks – just monetary profits or ethical profits too?

What is the crux of the problem?

It is about being able to fit an Ethical Framework up-front followed closely by a legal and regulatory framework leading to a technical specification and almost having to hard code it into the product, so there is less ambiguity in implementation. In the past, our legal and ethical frameworks have mostly worked as Operating Systems - giving much playspace for interpretation. Delivering justice in non-compliance situations was mostly a post-facto exercise based on the merit of the facts presented in the case when there is a failure to meet. We are essentially trying to reduce opportunities for failure and thereby for post-facto addressing in

the case of AI implementations. We may, well, be dealing with human lives.

A possible Solution Journey?

What may be the right way for OEMs and the ecosystem members to adopt into their product development process?

- Educate engineers and technologists on Ethics (think Six-sigma, Design Thinking, or Agile education drives of the last two decades, inside most large companies in every domain – that even brought about new levels of thought leadership and cultural alignments)
- Allow Product Teams to spend enough time understanding Ethical Frameworks and their general implementation nuances – without rushing to the product context
- Bring Philosophy Majors to the mainstream of technology development – not see them as "good to have" members on isolated teams – these members are the link between technological pursuits and human good – get them to provide buy-in for every significant step – especially in an AI world
- We have failed to recognize what is considered as a "significant step" in some of the past implementations – a great reminder that technology does not have a mind of its own, quite literally
- Bring the Ethicists on par with legal teams, which are reasonably well integrated into most product teams already
- Cross-pollinate best practices in this context from beyond the automotive domain (internet, websites, social networks?)

As long as we strive to only just meet legal or technical specifications, we will continue to run the risk of ethical mishaps in the world of AI. We need to think ground up about product definition and their implementation methods using Ethical considerations as checkpoints at various milestones throughout the product development cycle.

Most definitions of AI can be organized into four views:

- 1. Systems that think like humans
- 2. Systems that act like humans
- 3. Systems that think rationally
- 4. Systems that act rationally

Here lies the daunting task of emulating humans through machines. AV development frameworks need to be spun out of current Vehicle Development THE REAL QUESTION IS, WHEN WILL WE DRAFT AN ARTIFICIAL INTELLIGENCE BILL OF RIGHTS? WHAT WILL THAT CONSIST OF? AND WHO WILL GET TO DECIDE THAT?

-GRAY SCOTT

Processes. These are largely driven by legal and technical specifications that evolved over much of the 20th century. OEMs worked to meet them as minimally necessary conditions to be able to sell the vehicles to make minimal profits. Legal requirements being met, vaguely implied Ethical requirements being met. With the advent of AI into AVs, it becomes imperative to go one step further to look at the Ethical implications of the products that may or may not have binding in today's legal and regulatory frameworks. We need to get Ethical Frameworks to lead from the front - this is the biggest foresight we could be building our products with.

The ELSI (Ethical, Legal, Social Issues) needs to be seen with fresh eyes for the AVs and any product that heavily depends on data and AI in general. ELSI needs to be understood in demography-based contexts, and OEMs need to consider this for every region of sale, aka Operating Design Domain(ODD) in the AV world.

Removal of unconscious bias from the programmers, ensuring parity in test cases, the security of personal information (connected and shared vehicle deployments), are some of the very basic considerations one can think of. We need Ethics frameworks to address Data, Algorithms, Practices and Implementation related aspects.

I want to leave the reader with a simple shift in perspective, one that is hiding in plain sight. Autonomous Vehicles are not about Vehicles, they are about (automating) the human driver. Anything an AV does is subject to the same level of scrutiny along with legal and ethical examination that a Human Driver would be subject to. Who do we blame when we blame the AV for crashes, data breaches, or other unethical and unwelcome behaviors? That is the most simplified way to understand the urgent need for the right frameworks to come into mainstream product development priorities. We need Governments, Regulators, OEMs, Philosophers, Legal Teams, Parts Vendors, and even Consumers to come together and evolve a playbook. Without this, we will not have Autonomous Ethical (Vehicle) Beings! As far as AVs are concerned, the stakes are more directly perceivable for human lives, social harmony, and future cities.

"Artificial intelligence is at the heart of the epochal change we are experiencing. Robotics can make a better world possible if it is joined to the common good. Indeed, if technological progress increases inequalities, it is not true progress. Future advances should be oriented towards respecting the dignity of the person and of Creation. Let us pray that the progress of robotics and artificial intelligence may always serve humankind . . . we could say, may it "be human".

Pope Francis, November Prayer Intention, 5 November 2020 Are we going back to ancient times, where Ethics drove scientific explorations? This time around, it will be far more enriching and rewarding!

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THE RISE OF THE ELECTRIC VEHICLE DURING THE COVID-19 PANDEMIC

MYLES MCNULTY

IOT CONNECTED VEHICLES

he Covid-19 Pandemic has caused and continues to cause massive financial challenges globally within the automobile manufacturing sector. This in turn, has caused a sharp decline in demand of all types of vehicles. What has become apparent, however, in the last 12 months or so is the rise of the battery powered electric vehicle (EV) together with plugin hybrid EV. The uptick and demand for EV appears to be increasing and this has been caused in part by the changing developments of the traditional motor manufacturers and how they are being sold as the new alternative to fossil fueled vehicles.

No doubt about it the Global Pandemic has been tough on many industries not least the motor manufacturers. On the upside, the pandemic has been, in many ways, the catalyst for change. People travel less to their place of business, if at all. The majority of face-to-face meetings are now conducted online. This has resulted in the realisation that business can be carried out effectively without an immediate faceto-face meet that was so often the norm pre-2020. It is now widespread practice for people to be working from home, creating a reduced demand for the use of both public and private transport and within the private sector, the decrease in the reliance of the fossil fuelled powered vehicle.

The global economy has taken a nosedive and recovery will take many, many years and will result in a hike in global taxation. Recovery has begun in most industries some slower than others. Not surprisingly, recovery has been strong in the EV sector and not in the traditional fossil fuelled vehicles. Even with the low oil prices (today the price of a barrel of crude oil is approximately \$30 from a high of about 8 months ago of \$60.00), this has not evidenced an increase in the uptake of the purchasing of new petrol or diesel powered vehicles.

What we are seeing now is the increase in the purchase of EVs on both lease and hire. The gentle sway towards EV was evident pre-pandemic, some countries more than others, but the hiatus in global car sales has kickstarted the industry and has prompted Governments to begin thinking more seriously about the cross-over. This increased demand in the global use of the EV is, in part, stimulated by government-led programs and purchase price subsidies, In many European countries, China and the US, the tax benefits for the business user have also been a stimulus for the move towards EVs. All this together with, for example, Europeans strict targets for CO2 emissions have increased the need for a sensible alternative to the petrolpowered vehicles. Finally, perhaps, the general desire for the private user to be that bit "greener".

The pandemic has brought about this change and a change in people's perspective in their day-to-day operations. This personal perspective may have been the tipping point. People's view on the planet. We all saw, and many experienced, the benefits of the reduction of carbon emissions that were experienced during 2020. This appears to have translated into people's thought processes, and the feeling towards the EV traditionally was that it was perceived to be too expensive, but most of all, the fear of being left stranded without power.

Globally in the last 8 months or so there has been a large increase in the number of EVs being offered for short term hire with no upfront cost. The traditional way of purchasing a vehicle through a dealership has changed significantly as a result of the global pandemic. Dealerships have begun to sell their vehicles online and more emphasis is being made of the Broker who in turn has switched their attention to online sales without any interaction with the customer. In Europe in particular, there has been a proliferation of online vehicle hire companies. These offer an array of EVs from the major manufacturers on a flat monthly fee, no upfront cost, insurance and a good monthly mileage allowance included with the vehicle which is delivered to your door. This new type of ownership is only set to expand. The traditional 1, 2 or 3 year business or personal leases, with large deposits paid up front will soon be outdated.

The cause of the uptake in EVs in Europe has, most likely, been fuelled by the traditional vehicle manufacturers, and the looming emission regulations which are very much on the horizon. This in turn has caused a jump in choice of EVs for the customer. There has been a positive commitment to the buying public, of the new generation battery powered EVs and plug-in hybrid EV models. It has been estimated that the electric vehicle market in Europe is set to expand further. From a market share in 2019 of approximately 1%, it is forecast to be over 4% by the end of this year. In the latter part of 2020, there were over 50 new EV models launched. 2021 will be no different.

It is expected that the vehicle market will continue to recover quickly, but with the EV market share increasing to almost 15% of all new vehicles registered in Europe, it will be EV or hybrid dominant by 2024. A significant uptick from three years ago, when it was barely 1%. There are, of course, global differences within the EV share. China and the US have always led the market in EVs. In the US, for example the EV market share has in fact decreased since 2019. This decrease has been caused by many of the manufacturers cancelling the development of their EV vehicles until the start of 2022. It is expected there will be an increase in market share of the EV and in China the growth has been steady. There are many EV models manufactured that do not leave mainland China.

The common denominator within all markets, is how the EV is being marketed. Already mentioned is the typical lease of a vehicle changing significantly from the traditional business lease, tying you in for a fixed term with a hefty deposit, to a simple rental that can be offset against your tax liabilities.

Telematics has always had a role to play in the leasing of vehicles from simply keeping tabs on the monthly mileage and alerting by exception, to the more robust actions where the vehicle is safely disabled in the event of a fundamental breach of the lease. Telematics also has a significant role to play in the EV rental sector. The simple unit in conjunction with smart phone applications, IOT/ Cloud referencing, allows the end user to access the car they need for a set period, be it hours, weeks or months. Not only is a telematics unit required to enter and exit the vehicle, but the supplier retains information on the vehicle's whereabouts, the state of the battery, and a host of other vehicle related data. The ease at which a user platform and application can be developed has also triggered a rise in the competition of EV car hire for these short periods, with an end user easily switching to another

vehicle if so desired.

Currently the rise of the EV will be fettered the countries hv development and roll out of the charging network. This has been major stumbling block for any country wanting to develop the EV. On the one hand. the Governments pushing are and subsidising the sales of electric vehicles, but on the other, it is still very reliant upon the duties that are raised from the sale of fossil fuel. A balance will need to be met and this will be particularly tough given the pandemic the globe is slowly recovering from. There needs to be further major investment in Europe, US, China and others, if we are to be making serious changes to the way business and the public view the EV vehicle. For the general public have confidence to

in the EV market this must happen fast. Until then, the market share is unlikely to ever exceed 20%.

There have been great strides made by the traditional carmakers, and with this, the public feel more at ease with the notion of using an EV. On the market, Tesla for example, has been viewed as a pioneer, however, by many it is still viewed as a software company assembling



The largescale manufacturers. who have been building vehicles with the requisite **build quality** for decades have that distinct advantage. and now that they are finally investing heavily in EV technology, companies such as Tesla are losing ground

vehicles. This is not to say that they have not gained a march on the competition, particularly in the US and Europe where they have invested heavily in their own charging points. Now that the major manufacturers are gearing up towards large scale investment of the EV, Tesla will find it more and more difficult to compete. The large-scale manufacturers, who have been building vehicles with the requisite build quality for decades have that distinct advantage, and now that they are finally investing heavily in EV technology, companies such as Tesla are losing ground. There may be a sticking point for a few more years yet, and the amount of investment governments grant, to establish the EV charging networks. This is something Tesla don't have to do. With the purse strings drawn tight around the globe caused by the pandemic, investment in the charging networks may be slowed.

As an aside most, if not all, of the traditional car manufacturers are stalling to embrace the full EV, rather preferring to develop Hybrids alongside the full EV. The in-country legislation which sets out the timelines when all vehicles need to be an EV by a date include

Hybrids as an EV. Having a vehicle that will run for 15 miles on electric before reverting to fossil fuel is nonsensical and only delays the inevitable. Governments who have legislated in this way have clearly missed the point.

Let us hope that we do not all rush back into fossil fuel but utilize the last 18 months as a huge steppingstone to great and greener business operations.

AUTHOR



MYLES MCNULTY IOT CONNECTED VEHICLES

Myles McNulty is Owner and VP of IOT Connected Vehicles, a Consultancy he started in 2019 advising organisations on the role of Telemetry and associated applications. Being an independent consultant, he has been

working in the field of Telematics, IOT, SaaS and Connected Vehicles for over 20 years. He has spoken widely on the benefits of telematics and the connected vehicle at conferences in EMEA, JS and China. He lives close to Milton Keynes UK a city that has seen testing and trials of many autonomous cars during the last 30 years.



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A GLIMPSE OF UNENDING HORIZON OF CONNECTED VEHICLE

🚈 THILAK RAMANNA

THE QT COMPANY

Background

Ever wondered how many motor vehicles exists on this planet? According to industry trade journal WardsAuto, the number of vehicles in operation worldwide surpassed 1 billion units in 2010. This figure reflects the approximate number of light cars, medium and heavy-duty trucks and buses registered worldwide but does not include off road, heavy duty vehicles.

Vehicles in operation in 2010 equated roughly to a ratio of 1:6.75 vehicles to people among a world population of 6.9 billion but the distribution was not equal, even among the biggest markets.

In the U.S., the ratio was 1:1.3 among a population of almost 310 million – the highest vehicle-to-person ratio in the world. Italy was second with 1:1.45. France, Japan, and the U.K. followed, all of which fell in the 1:1.7 range.

In China, the ratio was 1:17.2 among the country's more than 1.3 billion people. India, the world's second mostpopulous nation with 1.17 billion people, saw a ratio of 1:56.3.

The world vehicle population in 2010 passed the 1 billion units mark 24 years after reaching 500 million in 1986. Prior to that, the vehicle population doubled roughly every 10 years from 1950 to 1970, when it first reached the 250 millionunits threshold. This number is now estimated to have surpassed 1.4 billion and it continues to grow at an astonishing rate. If the growth rate continues, we can expect to see around 2.8 billion vehicles on the planet by 2035.

With such rise in demand for transportation, the world requires a more intelligent form of urban transportation than what we have seen in the past. While on one side, governments continue to build infrastructure for supporting mass transportation systems, people continue to invest in private transportation modes on the other side.

The growth in number of vehicles also presents its own set of challenges. Let's look at the some of the key challenges.

The first and foremost is safety of the driver, passengers, and pedestrians. According to statistics from WHO, approximately, 1.35 million die each year as a result of road traffic crashes. Between 20 and 50 million more suffer non-fatal injuries, with many incurring disability due to their injury. The second challenge is vehicle efficiency. Today's automobiles are largely based on non-renewable fuels and it is important to ensure that these vehicles are highly efficient. Even with electric vehicles, efficiency will be key. In 2019, Americans used about 142 billion gallons (537 billion litres) of motor gasoline and light duty vehicles account for about 92% of all gasoline consumption in the united states. The third challenge is maintenance of the vehicles and total cost of ownership. In the US, while the average cost of owning a car ranges from \$6354 annually for a small sedan to \$10,054 annually for a pickup truck, the expected cost of routine maintenance may surprise you. According to a study by AAA, a new car's routine maintenance and repairs could cost an average of \$1,186 each year.

Connected vehicles offers means to address these various challenges.

Benefits of connected Vehicles

A connected vehicle can range from something as simple as GPS enabled location tracking inside the car to a fully autonomous vehicle.

Driver and Passenger safety is one of the primary benefits of a connected

vehicle. The vehicle can warn the driver of hazardous conditions both inside and outside the car and also formulate an automated response to such conditions. For example, it can monitor external weather conditions or hazardous road conditions and alert the drivers in time. It can avert collisions by monitoring the speed and proximity of other vehicles around it. It can monitor the alertness of the drivers and warn them of any fatigue. It can create a comfortable driving condition for the drivers inside the car based on their individual preferences.

In terms of efficiency, connected vehicles can enable drivers to reach their destinations in a cost-efficient manner. Wherever smart infrastructure exists, it can communicate with the outside world such as traffic lights and automatically regulate the speed of the vehicle. It can also automatically stop and start the car based on when the light turns red or green. It can enable the vehicle to communicate with smart parking system and enable the driver to quickly identify an available parking slot. Such features not only save time but also leads to greater fuel efficiency.

A connected vehicle also enables monitoring of the vehicle condition on a regular basis by the manufacturer and can alert the driver of any major repair or maintenance work that needs to be carried out. With advanced diagnostics, the system in the car can supply data to both the manufacturer and the owner and help predict any potential issues before it actually takes place. With efficient fleet management solutions, it is easy to track vehicle records and decide which vehicle has travelled the most and accordingly offer service with the help of connectivity solutions.

Technology building block for connected vehicles

Connected vehicles refer (https://faculty. tru.ca/nlu/cvsac.pdf) to the wireless connectivity enabled vehicles that can communicate with their internal and external environments, i.e., supporting the interactions of vehicle-to sensor onboard (V2S), vehicle-to-vehicle (V2V), vehicle-to-road infrastructure (V2R), and vehicle-to-Internet (V2I). These interactions, establishing a multiple levels of data pipeline to in-vehicle information systems, enhance the situational awareness of vehicles and provide motorist/passengers with an informationrich travel environment. Further, connected vehicles are considered as the building blocks of the emerging Internet of Vehicles (IoV), a dynamic mobile communication system that features gathering, sharing, processing, computing, and secure release of information and enables the evolution to next generation intelligent transportation systems (ITSs). The development and deployment of fully connected vehicles requires a combination of various offthe-shelf and emerging technologies, and great uncertainty remains as to the feasibility of each technology.

With increasing intelligence, modern vehicles are equipped with more and more sensors, such as sensors for detecting road conditions and driver's fatigue, sensors for monitoring tire pressure and water temperature in the cooling system, and advanced sensors for autonomous control. The number of sensors is forecasted to reach as many as 200 per vehicle by 2020. Such a big quantity of sensing elements are required to report event-driven or time-driven messages to the electrical control units (ECU) and receive feedback if necessary. Wired solutions such as controller area network (CAN) protocol, FlexRay, and TTEthernet, require cable connections between ECU and sensors. In addition to wired solutions, intra-vehicle wireless sensor networks are feasible too which offers room for optimization especially around weight of the vehicle.

It is widely believed that the advances of inter-vehicle communications will reshape the future of road transportation systems, where inter-connected vehicles are no longer information isolated islands. By means of inter-vehicle communications or V2V communications, information generated by the vehicle borne computer, control system, on-board sensors, or passengers can be effectively disseminated among vehicles in proximity, or to vehicles multiple hops away in a vehicular ad hoc network. Without the assistance of any built infrastructure, a variety of active road safety applications (e.g., collision detection, lane changing warning, and cooperative merging) and infotainment applications (e.g., interactive gaming, and file and other valuable information sharing) are enabled by inter-vehicle wireless links.

Internet connectivity is becoming a must-have feature of modern vehicles. Wireless access technologies play a vital role in delivering the Internet services to vehicle users. Cellular and WiFi are two promising candidates. The cellular networks, such as 3G and 4G-LTE, can provide reliable and ubiquitous access services. The feasibility of using lowcost roadside WiFi access point (AP) for outdoor Internet access at vehicular mobility has also been demonstrated too. Once 5G becomes ubiquitous, a lot more use cases can be enabled.

Market opportunity for connected vehicles

According to market reports, the global connected car market size alone in the pre-COVID-19 situation was projected to reach USD 180.9 billion by 2025, from USD 63.2 billion in 2020. A

decline in production since 2018 and the COVID-19 pandemic have had a severe impact on the entire automotive industry. This has resulted in disruptions in the supply of automotive components due to lockdowns imposed by governments. This scenario is expected to affect the connected car market, as the growth of this market is directly related to the production of vehicles. The global connected car market size post-COVID-19 was expected to be USD 53.9 billion in 2020 and is projected to reach USD 166.0 billion by 2025, at a CAGR of 25.2% from 2020 to 2025. However, a steady recovery post-2020 in vehicle production will support the growth of this market in the coming years. An increase in efforts by governments for developing intelligent transportation system, increasing demand for smartphone features in the car, and automated driving technologies along with passenger safety features will boost the connected car market.

In summary, in addition to the tremendous safety potential of connected vehicles, they also promise to increase transportation options, reduce travel time, and reduce cost of vehicle ownership. With the advanced communications data available, traffic managers will be able to control the flow of traffic more easily and prevent or lessen developing congestion. This could have a significant impact on the environment by helping to cut fuel consumption and reduce emissions. Overall, connected vehicles holds a lot of promise for the future in terms of safety, convenience, and cost optimization.

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Thilak Ramanna is currently the Country Head at The Qt Company for South Asia, Australia and New Zealand regions responsible for

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STORY OF CONNECTED VEHICLES -INDIAN MARKET

🚈 YASHPAL SINGH

MG MOTOR INDIA PVT. LTD.

Connected Vehicles Role:

Connected Vehicles in India are gradually acquiring an essential commodity status, in the near future customers will even not bother about asking as it will be default requirement in passenger and commercial vehicles. Connected vehicles are emerging in different business segments from long time now, talking about commercial or passenger vehicles, talking about conventional fuel vehicles or electric vehicles, connected solution plays a vital role for enhancing Customer, Manufacturers and the whole eco system experience as well.

Past, Present and Future challenges around Connected Vehicles:

Connected Vehicles have evolved over years, let's see the past, present & future journey of connected vehicles.

In past connected vehicles usage

was just revolving around the remote monitoring & usage analysis of moving assets, challenges were enormous around reliability of Telematics device, Data communication, Mobile network and centralized local servers. Over a period, these challenges raised questions on reliability and use of Connected Vehicles as whole.

Some challenges around connected vehicles in logistics industries were like driver used to disconnect the power to the Telematics devices, interfering communication of the Telematics devices by tampering the communication signals, some of the typical real-life issues experienced around the connected vehicle were around the GPS signal obstruction by drivers who had a perception that connected vehicles are for monitoring them and not the vehicle. SMS based Telematics devices performance used to depend on the number of SMS



received at SMSC of a Mobile Network Operator, which used to worsen during festive season when the SMS used to get bombarded during midnight. But as the whole ecosystem has evolved and technology grew the SMS based services got developed in to GPRS based services and GPRS in to LTE, streaming of data became reliable and faster on 3G network (GPRS) to LTE, the communications protocols have evolved.

These challenges were also around the passenger car segment which had its own technological constraints and concerns of sharing the usage data to a Telematics service provider. Off the shelves device market was growing due to which non standard Telematics hardware was spreading all over the industry. Telematics devices and service providers creeped into the market sighting profits in the market. Business models were getting designed into subscription-based services, recurring cost was focused more towards the Service cost and operational cost. Even the SaaS model was being experimented in this field, where the Fleet Management solution software was being installed on the client machine which was charged based on the number of users. All in all, different business models were being explored.

Past features of Connected Vehicles & Evolution:

These vehicles were connected to its owners or Fleet Owners through Web Based solutions and SMS Alerts, many Alerts such as over speed, Power supply disconnected or resumed were formulated for real time experience for the customers. Over a period specifically in logistics industry consignment tracking solutions were designed and used for calculating ETA (Expected Time of Arrival) and give a fulfilling experience with the geofence Alerts. Many logistics businesses flourished which used this connected vehicle operations in a persistent way. There were many challenges however which were to be solved yet, including the cost of Telematics devices which is main ECU in this connected vehicle solution.

SMS based devices or CDMA based devices got developed in to GPRS based devices, which used to communicate to the centrally based servers over UDP or TCP/ IP. Challenges were enormous around design of devices, the memory handling on the Communication devices like Telematics Devices. The message queuing issues at servers. Parsing logics and design of DB played a crucial part in connected vehicle experience for the customers. Connected Vehicles were bound to off car functions and features and were more over surrounded by safety features as well, some organizations used the Fleet Management solution around safety features such as Driver behavior, Route Deviation and monitoring continuous driving hours for drivers. Many accidents were averted by using these features and making road safer for drive, Connected Logistics solutions were embraced by many transporters and organizations. Organizations started realizing the importance of connected vehicles and revenue benefits around this solution.

Feature Inheritance:

Solutions around School Busses and BPO services also got evolved which were helpful to develop safety for Children and Women workforce, by keeping track of the Vehicle and providing a SOS service in case of an emergency. These ideas were inherited into Connected Taxis as well, where the Estimated time of Arrival and Safety of women travelling alone was of utmost importance.

Until times the Connected Vehicle features were focused on the off-car functionality and real time information for Vehicle owners, be it commercial or passenger segment vehicles.

In-Vehicle & Off-Vehicle feature development:

The In-car connectivity and customer entertainment has been a big leap in the

connected vehicle domain, the internal communication network of the vehicles played a strong role in the technology enhancements, which also helped to develop many functions around user experience.

Some of the benefits which are extended by connected vehicles to OEMs and consumers are as follows:

- 1) Connected Vehicles are a converted into wizard, which can be controlled by the user and remain 24x7 connected with the owner and servers, the user is always connected to their vehicles through Mobile App and can control and monitor the vital parameters of vehicles on the go.
- User can study the driving behavior and can improve on it, resulting in fuel saving and develop safe driving habits.
- 3) A user has an advantage of having in car entertainment on the go.
- 4) A user can have best navigation services which always proves helpful to drive on unfamiliar roads.
- 5) OEMs can have reduction in AfterSales or Customer services.
- 6) OEMs can design better products by studying the usage of connected vehicle functionality.
- 7) Over The Air firmware updates help the users to get latest features developed at comfort of sitting at home.

These are some of the basic advantages for consumer and OEMs around connected vehicles.

Connected Vehicle Present & Ecosystem enablers:

Apart from this, other enablers who play important role in the connected vehicles ecosystem are the Mobile Network operators, Cloud services provider and Hardware developers. Today most important developments around IoT are proving a boon for connected vehicles ecosystem. The modules such as Wi-Fi and Bluetooth are enhancing In-car connectivity experience for the users.

Mobile Network Operators (MNO) have realized the importance of connected vehicles, they are focusing on this business as a new horizon for them, with special focus on the services and security in communication, MNO has come up with some advanced solution for attracting and getting a stake in the Connected Vehicles domain.

Cloud Services are developed, and many ready components are developed which can be directly used with the secured connected vehicle architecture. Cloud service providers have studied the challenges and have developed some specific modules which solves the challenges around the Data Parsing and processing challenges in real time, this enhances the customer experience many folds.

Communication protocols such as MQTT can be used which are lightweight with publish / subscribe messaging transport that is ideal to connect with remote devices with small code foot print using minimal network bandwidth.

Connected Vehicle Security Consideration:

Focus on the connected vehicles from all the enablers is helping it to be embraced by the users. All these developments also have improved security in connected vehicle model. Security for the connected vehicles starts from the network topology design, this is of utmost importance where the connected vehicle modules are virtually separated from the other ECUs of vehicle, which will help to avoid penetration of attacker to the internal modules of car in any case. The second layer of security is around the In-vehicle module interfaces with the external world such as HMI, Wi-Fi and Bluetooth connectivity. The third layer of security is around the communication protocol between the communication devices and server which is in an encrypted format. The fourth layer of security is around the cloud servers. Thus, the complete connected vehicle model has be developed with security as the utmost area of focus to keep the customers data safe.

The future of mobility is Shared, Electric and connected as they say, so connected vehicles are here to stay and will always be prevalent in all the segments, be it commercial, passenger, conventional fuel or electric vehicles, it must be connected. The connected vehicles will gradually talk to whole ecosystem and will attain V2X status in coming years, where the vehicle will be connected to other vehicles, Traffic systems, humans and Infrastructure components etc.

Success Factors of Connected Vehicles:

Apart from all the technological advancements, below are some of the important factors for success of implementing Connected Vehicles solution:

1) Reliability of Hardware (ECU's):

Reliability of the hardware is utmost important as the Vehicles will be moving and are not location fixed assets, so obviously difficult to service and are not available as per the schedule. Service must be made available as per the schedule of the owner or customer. So, if the Hardware is not reliable the service cost will impact the OEM's and bring adverse experience to customers.

In this OTA also helps, where in newer services can be provided to customers with some basic service support to the customer.

2) Design of Data Packets, Categorization & Database design:

The data packets which will be sent by the Communication device must be designed wisely to capture most relevant data in one go and the interval of data packet transmission which will impact the data usage, which directly depends on the data tariffs charged by MNO. Most efficient design will have shorter and meaning full data to be transmitted which also contributes to load on the server and application. The parsing and processing of data should be faster and real time which is significant for customer experience.

3) Project Driving and Implementation:

Connected vehicle projects need a specific experienced work force to drive and deliver the project, it's not a mainstream product or project which can be managed with some hardware or software project managers. These projects need whole lot of experience and an ecosystem around Telecom, Software, Hardware, GPS, Applications and Cloud server experience. Sometimes the connected vehicle projects fail due to lack of experience around it and if considered as a project with a mainstream project or product.

4) User Interface for Web Application and Mobile Application:

Like other applications, the UI/UX plays an important role in making connected vehicle implementation successful. Its all about how easy a feature can be understood and accessed by user, for example a feature which is most used must be on the landing page and should not require more clicks to reach the feature in the application. The data placed on the landing page must be most relevant and real time, which contributes for the success criteria of Connected Vehicle solution.

5) Operations & AfterSales Service:

In Logistics business the connected vehicles play a prominent factor in profit enhancements, but only when the Connected Vehicles functions

AUTHOR



YASHPAL SINGH AGM – IT (CONNECTED CAR) MG MOTOR INDIA PVT. LTD.

Yashpal has over 19 years of experience in totality including 15 years in connected vehicles & solutions, his experience spreads over conventional fuel & Electric vehicles including fleets for last mile connectivity, he has global experience in Connected Vehicle domain, his experience spreads over various organizations like MG Motor India, Reliance Industries Ltd., Mahindra Reva Electric and features are used wisely. Day to day operations and services matter for keeping the essence of connected vehicles live. The vehicles are to be monitored daily and the usage reports are to be used wisely at all the levels of authority. Here the workforce with right experience helps, which otherwise can lead to failure of the solution.

Business models around operations and services have got created in the market who supply the third party connected solutions and provide an operations and service solution for the connected vehicles. This help to save a lot around the efforts and generate profits for the Fleet owners.

Disrupting phase in Connected Vehicles:

The current market of connected vehicles is undergoing a huge disruption with emerging mobility traits like the focus on the last mile connectivity for passengers, where the e-auto, e-rick and other small vehicle manufacturers are making their way in the mobility domain. In the taxi market two wheelers are making their way with connected scooters and e-cycles as well. Every where people are talking about the charging stations and battery swapping stations for commercial vehicles. But above all these vehicles will remain connected.

Connected vehicles market will still grow and every vehicle on the road will be connected in coming years, AI, ML and data analytics will help to connect these vehicles with more modules in the ecosystem thus making travel safer, easier and enjoyable.

"As published, Analysts forecast that by 2023, worldwide sales of connected vehicles will exceed more than 70 million units, meaning that nearly 70% of worldwide new light-duty vehicles and trucks will be shipped with embedded connectivity, bringing new services and business models to bear in automotive markets".

References:

https://technative.io/digital-inclusionwhat-does-it-bring-to-the-future-ofconnected-vehicles/

Vehicles, Tata Technologies, Nio and Sun Mobility.

MANAGING YOUR FLEET JUST GOT EASIER MONITOR DATA THAT MATTERS!



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DRIVER'S AI ASSISTANT FOR CONNECTED VEHICLE

ABHISHEK KUMAR ARYA TECH MAHINDRA

Driver's AI Assistant for Connected Vehicle

A lot of work has been done in the field of Autonomous vehicle. Combination of various technical strategies are put in place to enable the same. One of the commonly used strategy is having an in-vehicle processing capability using a powerful computer surrounded by various sensors installed in the vehicle to sense the environment of the vehicle.

In order to have a better knowledge of these surroundings and improved navigational capability the vehicle is also connected with a satellite and can communicate and exchange information with other vehicles. All this information is processed in real time by the onboard processor to provide autonomous capability to the vehicle.

Though the research will continue to make autonomous vehicles more intelligent having enough capability to drive in any type of surrounding, for all practical purposes we cannot ignore the importance of drivers driving various categories of vehicles. In fact they are the ones who have done the job for us till now and will keep on doing the same for years to come.

Therefore, it is equivalently important to improve technology to assist drivers for better driving experience and to improve overall safety. As per various studies, we can list down few of the many reasons for an accident:

- Drunk driving
- Mobile phone
- Speeding
- Weather conditions
- Driver fatigue

These can be addressed up to a great extent through an intelligent connected vehicle with a combination of information received through satellites, vehicle's current and surrounding geographical locations, virtual assistant to communicate with the driver, and audio notifications and in-cabin monitoring of the driver.

The enablement of various features to assist drivers and improve driver's experience is explained below:

Virtual Assistant: In most of the commercial vehicles, normally, the drivers travel alone without company. During long journeys it becomes a monotonous and a boring job for them. This tempts the driver to use their mobile phones to check incoming messages and notifications or for communicating with someone. Hence, providing a virtual invehicle assistant to drivers to interact will give them the sense of companionship during their journey.

This virtual assistant can also be connected to the vehicle diagnostics to provide vehicle health to the driver as an when required. The important checks such as vehicle engine status, air pressure, filter oil, door locks, and seat belt can be communicated to the driver. All the communication to/ from the driver will be controlled and routed through it. Having AI enabled capabilities, this assistance will improve over a period of time and will develop itself into a unique personality aligned to driver's interests.

Having a voice enabled driver virtual companion may reduce driver's distractions due to use of mobile phones, thus reducing the possibility of accidents.

This virtual assistant can also help driver to remain connected to the base location, therefore any eventuality can be communicated back to them immediately to channelize assistance, if required.

Connected Vehicle: A connected vehicle will let the vehicle's driver to be aware of the geographic conditions of the





terrain where he is currently driving. Since the centralised systems have plethora of data regarding in-route weather conditions, traffic congestions, accidents; the information can help the drivers to make informed decisions, whether to take a break or do a route diversion to avoid unfavourable weather conditions depending on the type of cargo and the criticality of reaching at the destination.

The information of the vehicle being driven at any road based on its current geo-location and the applicable speeding restrictions on that road can help to apply restrictions on the driver to not breach the maximum speed at the road. This will enable variable maximum speed allowed for a vehicle depending on which road the vehicle is being driven.

The vehicle will only have a limited amount of information and computing capability, however the centralised systems will have enormous data and the processing capabilities. This will help in providing the connected vehicles with computed information thus extending and assisting their capabilities enormously.

It can also facilitate intra-vehicle communication with nearby vehicles which can assist each other, if required.

In-vehicle monitoring: Another feature to be considered in connected vehicle is in-vehicle monitoring by installing camera to monitor the driver. In order to protect privacy, the telecast of the video should be restricted; instead the processing of the captured images/ video

stream should be done locally and only the computed result should be sent to the central system.

The deep enforced learning video analytical algorithms applied on the in-vehicle video feed can be used to understand the driver's physical state related to fatigue and also to analyse whether the driver is drunk or not.

The driver's visual physical behavior related to:

- Lack of co-ordination
- Loss of balance
- Drowsiness

could be analysed to ascertain whether the driver is drunk or not. A confidence score of 90% or above relating to the said physical conditions can be used by the virtual driver assistant to restrict the driver from driving. It can achieve this by locking the driver to mobilise the vehicle and/ or inform the centralised system about the physical state of the driver. The system will perform fitness level verification of the fitment of the driver for driving the vehicle. The example tables (i) and (ii) show the fitness verification of a driver based on his/her physical condition.

Any continuous efforts to attempt to drive the vehicle can also be reported to concerned authorities by the on-board computer.

Managing driver's fatigue is also very important for ensuring safety and security of the driver and others. It is one of the main reasons for accident as well. Transport authorities of various countries across the globe take driver fatigue very seriously and any failure to comply results in heavy fines to driver and the organisation operating vehicles.

The fatigue of the driver can be identified by following physical symptoms:

- Drowsiness
- Unable to keep eyes open
- Yawning
- Shaking head

These physical symptoms can also be identified by analysing the video feed of the in-vehicle camera by vehicle computer to notify the driver to take appropriate breaks. With the available geo-location information, it is able to suggest the driver of the near-by locations suitable for taking rest.

In countries like Australia, the drivers must observe the NHVR (National Heavy Vehicle Regulation) compliance fatigue rules. Every Australian state has its own set of rules, and it is mandatory for drivers to comply the same and provide the evidence if asked by RTO (Road transport authority) failing which heavy penalties are applicable.

For example, as per BFM (Basic Fatigue Management) rule applicable in

Physical Condition related to	Status	Fit for driving	Overall status
Lack of co-ordination		Yes	
Loss of balance		No	Not Fit to drive
Drowsiness		Yes	
	Table (i)		

Physical Condition related to	Status	Fit for driving	Overall status
Lack of co-ordination		Yes	
Loss of balance		Yes	Fit to drive
Drowsiness		Yes	

Table (ii)

Time	Work	Rest
In any period of	A driver must not work for more than a maximum of	And must have the rest of that period off work with at least a minimum rest break of
6 Hrs 15 min	6 hours work time	15 continuous minutes rest time
9 hours	8 Hrs 30 min work time	30 minutes rest time in blocks of 15 continuous minutes
12 hours	11 hours work time	60 minutes rest time in blocks of 15 continuous minutes
24 hours	14 hours work time	7 continuous hours stationary rest time
7 days	36 hours long/night work time	No limit has been set
14 days	144 hours work time	24 continuous hours stationary rest time taken after no more than 84 hours work time and 24 continuous hours stationary rest time and 2 x night rest breaks and 2 x night rest breaks taken on consecutive days.

Table (iii)

[source:https://www.nhvr.gov.au/safety-accreditation-compliance/fatigue-management/work-and-rest-requirements/basic-fatigue-

management-bfm)

NSW, Australia, conditions as per table (iii) must be satisfied.

Despite the fatigue variation from driver to driver, these guiding principles are in place to address driver fatigue to the best possibility. This means that the invehicle assistant should be able to analyse fatigue symptoms, help in aligning fatigue management as per individual driver's needs and advice driver accordingly so that the driver can take proper rest and is also in compliance to the state specified fatigue rules and guidelines.

Challenges and Considerations

Having discussed the features required in a vehicle for driver's assistance to improve driver's experience, safety and security of the driver, various challenges can arise which need to be addressed as well. These include and are not limited to:

Connectivity: The features such as sharing real time geographic location, get accurate weather information, information of near-by places and vehicles require a continuous connection of the vehicle to central server with a proper connectivity. This means a continuous connectivity with appropriate bandwidth is required for optimal operation of connected vehicle. The upcoming advancement in telecommunication such as 5G will play a significant role in providing smooth connectivity to the vehicle to perform all the operations smoothly while moving.

Operating Cost: Up to now the major operating cost of the vehicle is related to periodic servicing of vehicles, however, for connected vehicle offering the other costs related to connectivity, subscriptions to services such as weather information, navigation assistance, terrain maps, communicating to nearby vehicles, emergency assistance etc. will also form the part of operating cost expenses.

Surrounding Noise: The voice enabled interaction capability need to be improvised further so that the drivers can interact with the virtual assistant in a noisy environment. The surrounding noise need to be filtered out so that it is able to accept driver's commands without any extra efforts. The idea is to provide driver an experience of companionship within the vehicle driven by him/her.

AI Improvement: The AI assistant capability also needs to be improved so that it can sense the driver's mood and can strike communication. Instead of only working on the driver's commands and fulfilling the request, it should have conversational capabilities and also learn and adjust as per interaction with the driver.

Driver Monitoring: The vehicle needs to be fitted with in-vehicle camera so that it can monitor driver's physical state and can notify in case of any change in physical behaviour of the driver. The vehicle will also have the capability to identify and segregate the condition of the driver from fatigue, influence of alcohol, illness and thus should be able to respond appropriately or request assistance.

This may be achieved in practice by deep

reinforcement learning. It is a fairly new technology which combines the famous Deep learning, which is a supervised learning technique engaging several layers of neurons, and the Reinforcement learning. Now, as we know deep learning methods can efficiently solve complex high-dimensional data such as images (engaging computer vision), with less manual feature engineering, it probably makes a perfect fit for the problem set.

On the other hand, reinforcement learning, follows the natural human behaviour of trial and error, learning from its previous experience. So, in this case, it guarantees an optimum algorithm over time, i.e., the algorithm will learn from its own history, taking actions to change the state based on a policy and provide better results, decreasing the probability of an accident with every iteration.

Tech Giants like Tesla, Google, and Uber etc., are also employing the same tech (Deep reinforcement learning) for their respective projects of Autonomous cars.

To summarise, with the advancement in connected vehicle space, and in-vehicle AI enabled assistance, the vehicle can have a personality and be able to assist the driver in performing duties more efficiently, thus significantly improving driver's experience and safety.

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VALIDATION OF CONNECTED VEHICLE SOLUTIONS

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uto industry is going through massive disruption because of the exponential developments in Connected, Autonomous, Shared, and Electrified (CASE) technologies. Customer expectations are changing and new players are entering the market offering value propositions beyond what the traditional vehicle offers. The markets are clearly seeing this trend as driving future growth in the industry. For instance, Tesla's market cap is now more than the 9 largest automakers combined; and just the speculations about Apple Car is influencing the market cap of traditional players like a Hyundai or Kia by 15% to 20%.

While each element of CASE is a big technology shift in itself, the "Connected" aspect is going to be pivotal in amplifying the value of the other elements – Autonomous, Shared and Electrified. This is not just in terms of technology, and user experience but also in terms of the business models in both the passenger and commercial vehicle markets. A Mckinsey perspective shows that the connectivity powered recurring businesses could be worth \$1.5 trillion, a 30% additional revenue potential, over the traditional car sales and aftermarket revenue streams.

The data from the passenger and commercial vehicles would be used in very interesting ways to provide differentiated value to different customer personas.

Software intelligence powered by AI, rule engines, and 3rd parity integrations spanning across the vehicle and the cloud would continue to evolve as the key differentiator between different vehicle models and services, making connected vehicles one of the cutting edge IoT systems that leverage every possible development in technology including 5G, Blockchain, Top end AI, etc.

While these are exciting developments, vehicles are now much more complex and are part of an interconnected system that is changing all the time.

All aspects of web/mobile software development like faster iterations, regular software updates over the air, security, backward compatibility, end of life decisions etc., now have to be handled in the context of connected vehicles. But this time around the participating actors in the systems aren't just users but also the physical things – the car as a whole, the battery, the tire, the environmental data from sensors. In addition to the above, the various vehicle models with varied capabilities and services attached to them to be supported over many years of the vehicle lifetime. This presents a new risk - will the vehicle and these new services function and perform reliably every time? Remember a Ctrl+Alt+Del is not an option when you are on the road.

While mastering a successful product launch with respect to time, cost and quality is a key capability of every organization, product launch delays and recalls have rapidly increased in the recent years in the auto industry. Failure in any of these parameters could lead to financial, branding, reputational losses and also have the potential to impact the market competitiveness of a company.

The key focus of this article is the validation of software components related to the connected offerings. Assumption here is that the architecture of the connected offerings would be overlaid on top of the systems in the vehicle domain that would evolve independently, and those including the hardware support required for the connectivity related offerings would continue to get commoditized as they mature.

Key Challenges in Validating Connected Offerings:

Architecture, development, quality assurance, and maintenance of these connected vehicle features are different and are extremely complicated compared to traditional software considering that



The current set of tools and techniques are inadequate, costly, or timeconsuming and there

> is excessive reliance on field tests

- 1. These systems interact with the physical world and could have numerous combinations of data scenarios
- 2. Algorithms would need to operate on data streams instead of a point in time data
- 3. Sensor fusion to account for uncertainties in measurements and also to be able to make proper decisions in certain scenarios
- 4. Varied network conditions that a vehicle experiences
- 5. Sensor measurement faults driven by the environment, as simple as that of the unavailability of continuous GPS fix
- 6. Performance requirements of different parts of the system at the scale of millions of vehicles
- Multiple teams with varied competencies are involved, and they don't necessarily understand each other's constraints well given the backgrounds
- 8. Agile software development methodologies coming into play considering the competitive nature of the software
- 9. Parallel development of vehicle and cloud software

Testing becomes all the more important to handle the inherent risks that come with this complexity. But that's easier said than done when it comes to Connected features or critical enabler features like FOTA that impact even the features that aren't directly connected. The current set of tools and techniques available to testers are either inadequate, costly, or time-consuming and there is a huge reliance on the field tests to thoroughly validate the connected software.

Given the situation, the following are some of the general realities that we see day in day out when talking to our customers:

- 1. Miles and miles of repeated field tests as the software continues to evolve with more and more functionalities.
- 2. Last-minute surprises in the field test much later in the development cycle delaying the launch.
- 3. Test execution isn't controlled

Device Count	Calculation	Savings/Losses
1	0.1 Cent/Hour/Device * 24 hours * 30 days * 12 months	USD 8.64
10K	8.64 * 10,000	USD 86,400
100K	8.64 * 100,000	USD 864 K
1 Million	8.64 * 1,000,000	USD 8.6 Million

Figure 1 Impact of changes in unit economics of device level OPEX

and repeatable, making the results from different rounds of testing to be unpredictable rather being incremental.

- 4. Cost overruns on the software programs because of the inability to rightly model the costs involved in getting the validations done
- 5. Performance challenges as the scale go up, in spite of using popular cloud platforms and elastic architectures
- 6. Uncontrolled OPEX costs associated with the connected assets in terms of the compute, network, and storage resources required to deliver the functionalities.

Case 1:

Consider a 'tractor as a service' solution that's envisioned to be the core of the business model transformation for an OEM -i.e. from selling just the vehicles to services charged on usage. The decisions that this system would take based on the telemetry data from the vehicles would become the core of this business model, and hence these business critical functionalities in the software need to be validated thoroughly.

Validation of this service isn't easy from a technical perspective. The algorithms use multiple parameters like the vehicle movement identified by GPS information, geo-fences, the speed & RPM of the vehicle, fuel consumption, shape and size of the field, size of the tractor and implement attached to it and so on. The algorithms need to be tested against all the possible permutations and combinations of these parameters

On top of this are the complexities of measurement errors, network unavailability, GPS unavailability, etc., which are handled by basing the decisions on streams of data that came in the last few minutes instead of the point in time data. It's also important to make sure that things like fuel pilferage don't happen by looking at the telematics data to avoid operational losses. In addition to these, there are also the aspects like FOTA that need to be validated to make sure that the rollout is smooth and is backward compatible with the different versions of software that's out there on the field already. How would one validate this system and sign off with confidence every time there is a code change for defect fixes or enhancements?

Case 2:

Now consider the scale and performance issues. Connected vehicle platforms are expected to handle millions of vehicles and high data rates without compromising on the SLAs for alerts or response times, as more and more vehicles get sold. Architects approach this problem with horizontally scalable event-driven micro-services pipelines - managed services or otherwise. But the catch is that these systems and services come with their own set of configurations that need to be tuned in an orchestrated manner to get the required performance, often times the tunings fix one problem and open up other problems.

Most of these tend to be cloud-based deployments so that they can scale elastically whenever required based on a certain set of rules. This means the developers could eventually tune the system for the best performance while inadvertently throwing more than planned resources and get the job done. This impacts the unit economics of the connection which just not the hardware BOM anymore and also includes the OPEX costs associated with the cloud, connectivity, data storage, etc., (Ref: Figure 1)



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Figure 2 Software Components under Test

At scale, even small cost variations caused by these deviations could be staggering. These are just two examples to illustrate the magnitude of challenges involved in bringing connected vehicles to market. The complexity only goes up as we push more and more towards a seamless V2X coupled with autonomy. The first step in solving any problem is recognizing there is one.

What are the options?

Components to be validated are on the cloud as well as on the vehicle, and those have to be validated in isolation as well as an integrated system under various network conditions. The application workflows generally include the TCU/CCU, Head unit on the vehicle, Mobile and Web applications. (Ref: Figure 2)

Validating these systems using protocol simulators, test bench or even real vehicle test are inadequate, costly, time consuming and aren't precisely repeatable in a controlled fashion. Doing these validations for every release with so much of constraints is a testing and project management nightmare.

The only option that comes close from a technical perspective is developing a custom test bench

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– SIL (Software-in-the-Loop)/ HIL (Hardware-in-the-Loop) based approaches – to simulate the vehicle and have rest of the system on the edge and cloud tested either manually or through automation. An ideal test bed should facilitate the scenario simulations, virtualization of hardware, scalability and performance tests for hundreds of thousands of vehicles for different scenarios both through manual and automation testing.

Given the complexity, these options aren't feasible and viable to build and maintain as the core product evolves sprint after sprint. And even if one attempts to build such a system it is very hard to deliver on all the expectations of the test bed including the network conditions, large scale scenario testing, etc., including the requirement for an on-demand elastic infrastructure that needs approvals every time when the configuration changes. Last but not least, it is just not prudent to invest the resources in a non-core activity considering the scarcity of software engineering talent in the industry. The business might as well invest those talented resources on the core product offering.

But the good news is that the problem

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has launched a first-of-its-kind IoT Test Automation platform. Doppelio is being used by businesses across use cases like connected vehicles, connected supply chain, and connected buildings to ship products on time and with reduced risk of failure. of validating connected offerings isn't unique to auto industry and is applicable to all industries that are trying to leverage IoT for reinventing their offerings and business models. This is exactly the problem that IoT centric validation platforms like Doppelio are solving for the enterprises building connected vehicles and connected offerings mitigate the risk of failure, accelerate their time to market and also reduce the cost of quality.

References:

- Connected Vehicles Doppelio https://doppelio.com/connectedvehicles/
- 2. If it is Connected, It can Break -Connected System Testing - Doppelio https://doppelio.com/iot-testing/ifit-is-connected-it-can-break/
- 3. Unlock the Power of Connected Vehicle Data with the AWS Connected Mobility Solution - YouTube
- 4. Microsoft Connected Vehicle Platform: trends and investment areas | Azure Blog and Updates | Microsoft Azure
- 5. Automotive revolution perspective towards 2030 | McKinsey
- 6. Mastering automotive softwarelaunch excellence | McKinsey
- 7. The 4 Ways Of CASE In The Automotive Industry (digitalistmag. com)
- 8. Understanding Connected Vehicle Architecture for Automotive OTA -Sibros
- 9. Building Connected Vehicle Platforms

 A Practitioner's Perspective | Vehicle
 Telematics, ADAS, Connected and
 Autonomous Vehicle (telematicswire.
 net)

A RACECAR DRIVER AND AUTO TECH ENTREPRENEUR'S PERSPECTIVE ON THE FUTURE OF AUTOMOBILE INDUSTRY

🚈 AKSHAY GUPTA

QUIXOTE AUTOMOTIVE TECHNOLOGIES PVT. LTD.

often get asked about the purpose of Motor Racing. Why keep going round in circles? Why drive so fast and risk lives? Why burn so much fuel/ money?

As much as the petrolhead in me loves the aspects of motorsport that gives me so much adrenaline & joy, the engineer & entrepreneur in me cannot stop loving the sport enough.

We know that motor racing first began as soon as the second car was built! Gradually, it began to become much more than a mere competition of the drivers, as the complexities of an automobile kept increasing. Now, it has evolved into a sport where some of the finest engineers come together to compete against one-another. Motor Racing's contribution to the world of Automotive Engineering has always been applauded. For the uninitiated, technology transfer was one of the major reasons that Automotive Manufacturers went racing. In the early days, Disc Brakes, Independent Suspension, Monocoque Chassis, Honda's VTEC variable valve timing, lighter material, etc. were invented for Racecars and gradually transferred to your daily drive. In the modern world, the significance of motorsport as a mechanism to build highly competent technology is sometimes dismissed, but the reality is quite the opposite. To give an example, 50% of the budget of one of the top Formula One team comes from the Manufacturer's R&D budget allocation, rest from their Marketing Pool. The answer is simple, as we move towards higher complexities in every-day cars, the relevance of motorsport as a tool keeps increasing.

But what does the future really hold?

We all know where we are headed. Our cars will be Connected, Autonomous, Shared & Electric.

My first experience with Telematics or Connected Cars was studying millisecond accurate race-data post every session inside the car. This not only assisted us to improve our lap times by a crucial tenth of a second to go from 8th on the grid to 2nd or 3rd, but also helped us when there was an accident. The telematics data was closely monitored for driver inputs to determine the fault or understand if there was a mechanical failure. We see Telematics gradually becoming mainstream technology in the modern-day vehicles. The work we do at Quixote is a testament to the technology transfer in terms of vehicular telematics from racecars to road cars!

It took decades for Telematics to become common-place in everyday cars, but what we are witnessing now is a rapid increase in time to market. We have already seen that a 2014 Hybrid Formula-One Power Unit (Not engine) has assisted car manufacturers to significantly improve their hybrid/battery systems within a couple of years of deployment in F1.

As we move higher up the ranks of motorsport, the complexities of the technology and the relevance to the future keeps increasing significantly.

But the modern-day problems are quite different and so is the modern-day motorsport!

More often than not, I find myself in several arguments trying to defend the Autonomous, Connected, Electric & Shared future. I get really bizarre looks from friends in the Racing Industry, Automotive Journalism or Racecar Engineering. As if I have betrayed the tribe.

It isn't the Capitalist in me but the curious human that admires it.

- The engineering geek in me is lured by the technological challenge it poses in front of us. It isn't a solved problem and a massive technological challenge. One that pushes Science & Technology very far.
- 2. The Entrepreneur in me loves it for the sake of efficiency (both monetary &

human capital) and the innumerable business opportunities that it opens up.

3. The Racecar Driver in me is happy about what it means to the world of motor racing!

So, what's the world of motorsport bringing on the table for the Autonomous, Connected, Shared & Electric Future.

Robo Race (Autonomous)

In Formula One, the driver accounts for 30% of the equation, in most cases the car that the Engineering Team builds accounts for 70% of the equation. What happens when you remove the driver and make engineers a 100%?

The answer is Robo Race! A competition for completely autonomous, electrically powered vehicles! The competition has six competing team of engineers with standardised chassis and powertrain such that the only competition is to develop better real-time computing algorithms and artificial intelligence technologies. They have successfully concluded an Alpha Season and are trying out a Beta Season.

It is yet to formally begin and the cars are much much slower than what could be. But imagine the possibilities.

The human body is limited by the amount of force it can withstand. Material science is far ahead of the forces that human body can withstand. So, when we do figure out autonomous cars, it will be quite a spectacle to see them battle it out at unimaginable speeds. Maybe on ground, maybe not. The current limitations are the innumerable variables and environmental factors that limit the AI.

Toyota WRC (Connected & Autonomous)

In 2016, Toyota partnered with Microsoft to build on top of the data from their World Rally Championship cars. Unlike road racing, rally racing doesn't happen on well-paved tarmac but on random roads and surface spread around countryside.

Toyota has been utilising the WRC cars to develop a data analysis platform to gather, visualise and analyse various data related to driving which is utilised in race activities. Simultaneously building information-sharing system to allow team members to collaborate share materials which enhancing the communications of the data through providing cloud services. All of this has translated into a new entity called Toyota Connected, a new user experience and product-development company aimed at expanding, collecting and analysing large amounts of vehicle data to help further improve quality, safety and the driving and ownership experience for Toyota customers.

While the data of these World Rally cars are utilised to train autonomous vehicles to drive on various surfaces and understand the limitations. The first type of application is Chauffeur Mode, where the car is fully autonomous In order to accomplish this safely, it is estimated that some 14.2 billion kilometres of testing, including simulation, are required. Microsoft is an important partner in the test-mile accumulation, since a lot of the work can be done through multi-agent simulation.

Formula E (Electric)

Battery tech & Motor tech. These two domains pretty much cover most of the R&D / cost of an electric vehicle. The aim of Formula E from the get-go was to form a separate motor racing category aimed at developing cutting-edge electric cars. The championship has attracted a lot of interest. Audi, BMW, Porsche, Nissan, Jaguar, Mercedes, Nio & even Mahindra are a part of the championship. In 2022, the cars are expected to generate 350 kW of max power, while 600 kW of recovery power can be generated under braking. There's a very interesting documentary on Amazon Prime Video Titled "Racing into the future: Formula E as a TechLab for the BMW Group", on BMW I Motorsport's Formula E projectfrom the test and development phase to the first win in the first race with the BMW iFE.18.

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An international racecar driver turned entrepreneur, Akshay Gupta is the Co-Founder & CEO of Quixote Automotive Technologies - an automotive tech start-up working in Connected cars, InsureTech, ADAS, and autonomous vehicular technology driving his team towards the notion that 'safety shouldn't be a luxury'.

Following his passion for the Automotive Sector, Akshay has also been an Automotive Journalist, a Racecar engineer; and has deep interests in Philosophy, Psychology, Science, Technology, and Art.

THE NEED FOR V2X IN INDIA

R oad accidents are a leading cause of death across the world, with over 1.35 Million fatalities and 50 Million injuries every year. India, with its population of 1.3 Billion people, contributes significantly to those statistics as well.

In 2019, the total number of registered vehicles in India was well over 300 Million, and in the same year, the total number of reported road accidents stood at 437,396, resulting in the death of 154,732 people. These figures do not include road accidents not reported to the authorities, which may well be in the millions.

To understand the gravitas of the number of fatalities claimed by road accidents in India, it would perhaps help to compare them with the greatest health disaster of our times, the COVID-19 pandemic.

The pandemic caused global lockdowns and a public health scare of unprecedented levels across the world, and since March last year, the deadly virus has claimed 156,000 lives in India. A similar number of Indians were killed in road accidents in 2019 alone.

There are several reasons for the high number of traffic accidents and fatalities in India and these include factors such as over speeding, lane violation, jumping of traffic signals, poor road engineering and design etc. The fatality number is further escalated when emergency care is unable to reach these accident victims on time. The key cause for such delay in emergency services reaching the victims on time is often caused by traffic congestion, wherein vehicles such as ambulance and fire engines are stuck in traffic or unable to clear signal intersections on priority. Numerous lives which could have otherwise been saved are often lost due to such delays.

Research done by Management of Acute Coronary Event (MACE) Registry of the Indian Council of Medical Research (ICMR) states that over 50% of heart attack cases reach the hospital late, often owing to the traffic situation on Indian roads and it is quite similar when it comes to other emergency cases as well.

The key to reducing the overwhelming number of fatalities and accidents and also overcoming the problem of fatalities being caused due to congested or poorly managed roads comes down primarily to enhancing the way commuters, vehicles and roadside infrastructure communicate with everything around them. Information on traffic jams, vehicles at intersections, warning information on accidents or other emergency information, collision alerts with vehicles or pedestrians, stop signs, speed limits signs, etc should be informed to the driver at timely appropriate intervals which could greatly help in creating safer driving.

To address the above needs, a wireless communication standard for automobiles known as "Vehicle-to-Everything" or V2X is now emerging. V2X is used for improving the safety and security of commuters and pedestrians on roads, emergency vehicle priority systems and also enables future advancements in automobile tech such as autonomous driving.

Countries such as Japan, the United States, China, and others in Europe, have already introduced wireless communication in automobiles. Meanwhile many major players in the automotive industry are also manufacturing vehicles equipped and ready with V2X.

The primary technologies used for V2X communications in automobiles are:

- 1. DSRC V2X (Dedicated Short-Range Communications Vehicle-to-Everything)
- 2. C-V2X (Cellular Vehicle-to-Everything)



DSRC V2X primarily functions in the 5.8-5.9 GHz Super High Frequency (SHF) band and the 500-800 GHz Ultra High Frequency (UHF) band, while C-V2X operates in different cellular bands (4G/5G) available in various countries.

DSRC V2X provides real-time, direct communication without the need for it to first be relayed to a base station thereby providing very fast communication between devices. This results in shortlatency, increased reliability and better coverage, making DSRC V2X the preferred solution for safety applications.

C-V2X on the other hand utilises cellular bands, wherein the communication goes through a base station and requires a certain time lag to communicate. Though C-V2X has higher data carrying capacity, communication done via C-V2X is not in real time, they are therefore better suited for use in a wide variety of non-safety applications.

To address the issues stemming due to traffic congestion, mixed landscape of our cities and heterogenous traffic environment in India, a combination of DSRC V2X and C-V2X based technologies seems to be the ideal solution.

Since DSRC V2X communications can happen on both Super SHF as well as UHF, it is also important to assess both alternatives on their merits.

While speaking to an automotive consultant to get this views on DSRC V2X frequency bands, he said, "SHF's have higher information carrying capacity, but SHFs travel in straight lines, and as a result have weaker wraparound tendencies than their UHF counterparts. Because UHFs are capable of better wraparound, the communication can get through buildings and other urban infrastructures better and still reach their intended recipients with lower attenuation and loss of signal strength". In Japan, UHF bands (500 - 800 MHz) have been put into practical use for DSRC V2X, with over 200,000 cars already fitted accordingly. Combined with other safety regulations, the utilisation of V2X communications has resulted in a safer driving environment. Only 2839 fatalities from road accidents were registered in 2020 in Japan, a low number relative to the 120 Million population.

Using DSRC V2X for automobile communications is currently under consideration in India. The Department of Telecommunications is considering the use of 5.875 GHz to 5.925 GHz band Dedicated Short Range Communications (DSRC) for Intelligent Transport Networks including V2X in India. However, currently the use cases of any V2X applications functioning on this band in India are almost non-existent.

When it comes to C-V2X, as previously mentioned, the usage is geared more towards non-safety applications that do not require real-time communication. The communication done through C-V2X is ideal for high bandwidth consumption services such as infotainment, navigation and other non-critical communication between V2X devices done through a network. Due to its transmission through a cellular network, C-V2X is less secure than DSRC as only few mechanisms and procedures have be specified to secure the system, continuous relay is not assured, and the latency isn't guaranteed either. While explaining to us the applications of C-V2X, the consultant said, "C-V2X is also known as V2N (Vehicle to Network). C-V2X communication normally requires around 1 second or more to communicate depending on the network infrastructure capacity and network congestion, as the transmission taking place travels from the origin device terminal to the cellular backend network and thereon to the destination cellular network

before reaching the end device. It is not a direct point to point communication as used in DSRC."

Example of DSRC-V2X (Source: Zero-Sum ITS Solutions India Pvt Ltd) Example of C-V2X (Source: Wikimedia-Land Rover MENA)

The adoption of V2X has been slow, but in recent years, 2018 to 2021, a few trials on V2X have taken place in India. Zero Sum ITS Solutions, a Japanese Intelligent Transportation Systems provider has been conducting multiple demonstrative experiments using V2X communications (in Vehicle to infrastructure scenario) based on a UHF based DSRC band, to improve travel times for emergency vehicles in the city of Ahmedabad.

Speaking about the project, a senior official with the Ahmedabad Municipal Corporation said, "This is the first time in India that ambulances, VMS boards and traffic lights have been linked together in a completely automated and wireless system. We are exploring the option of using V2X not only for emergency vehicles, but also for improving the travel and arrival times of other essential services in the city including Bus Rapid Transit System in the city".

As the acceptance of V2X grows across the world, it is important for India also to adopt a hybrid strategy that combines the use of both DSRC V2X and C-V2X. With the growth of smart cities and smart connected cars in India, V2X is expected to soon see faster adoption across several sectors in India including automotive and traffic infrastructure. It is therefore vital for involved agencies such as automotive manufacturers, civic agencies, highway authorities, traffic police, telecom operators and traffic infrastructure agencies to come together to device a V2X strategy that is best suited for India.

- Telematics Wire

HOW TO BE A GREAT DEALERSHIP IN THE NEAREST FUTURE

A NADEZHDA PANCHENKO BRIGHT BOX

et's imagine a really bad dealership. How would you recognize it? Well, first of all, this dealership annoys customers. It annoys customers by letting them wait in queues for hours before receiving any attention, by aggressively advertising their services online and offline because they don't want anyone to forget their existence, and then by providing no valuable customer service for those who open their hearts and wallets. Such a dealership's process for buying a car is exhausting and involves up to five different employees, three different software packages, and a dozen phone calls. Finally, the price is never transparent and always inexplicably high.

That doesn't sound appealing, does it? But let's imagine that's how life is anyway and, even worse, that every nearby dealer is the same. In fact, various studies have shown that this is exactly how life is. According to research by Cox Automotive, only 36% of customers are very satisfied with their dealership, and around 90% of dealers agree that they need to improve their services in order to survive. Thus, at some point, they start trying to think of new ways to sell and service cars and to melt hearts. There is no need to ask why they need to do this, so let's face a more important question: how do they do this?

It's 2021, so the first thing that springs to mind is digitalization. Most businesses are already going through a digital transformation, and digitalization is the immediate, essential future of the automotive industry as well. Nothing should stop us from going online and accessing services remotely, whether talking about requesting a test drive, finding maintenance, or buying a new car. "Well, ok," one might say, "digital, internet, online. I get it. But how, exactly?" Industrial practice has clearly shown that it's not as important what kind of tools you use or how you use them as much as what, exactly, you do with them.

The question of how to be a good dealership in the near future is the main subject I will address. The main idea is that we need to go online to provide customers with simple, yet effective, selfservice tools and an improved customer experience. So, let's come up with a checklist of things that great dealerships could offer.

Customer view

Before we start, it is important to take a look at the modern customer – the person who wants to buy a car, needs maintenance, or simply wishes to take the car of his dreams for a test drive. Who is this person, and what does he (or she or they) want?

The answer is simple and corresponds to current realities, including the worldwide pandemic, economic performance, and global digitalization. You probably find yourself wanting the same things, as we all take the role of customer several times a day, and that's why it is simple and understandable. With that in mind, let us answer the question:

The customer wants services to be

• Fast. Customers want it as fast as possible. For example, the customer doesn't want to wait in a queue for







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ILLUSTRATIONS BY MARCELL KATO

the car to become available for a test drive. Instead, we can let him choose online a convenient time to visit the dealership.

- Simple to use. Customers don't want to spend their time on extra research, so why not provide them with an interactive knowledge-base or readyto-use comparative reports?
- Transparent. Customers want to know what is happening and why. For instance, the customer could make use of an automatically generated report on the test drive he just enjoyed, explaining every aspect of the car's advantages and features.
- With minimum human contact. Customers don't want to have multiple, unnecessary calls about scheduling an appointment for a test drive or maintenance. Even if needed, such conversations should be short and effective. Let them test drive, choose, and buy their cars on their own, while encouraging them to see you as an expert assistant.

Isn't all that obvious? Yes, it is; this is basically what customers have wanted for years, and it is what they still want, although the desired amount of human contact may have reduced due to the new pandemic reality. Considering this portrait of a customer, let's now move on to trying to satisfy those needs when it comes to services related to cars.

Selling a car

"Service and acquisition take the most energy from consumers," claims another Cox Automotive study, and they couldn't be more right. Buying a car always involves the exhausting experience of research, followed by waiting for the car to be delivered, which can take several months. Customers are forced to complete many levels in this game. Why not make it simpler?

We buy things every day, and we all already know how things are done in sales. You advertise, you exchange goods for money, and you advertise again. The same works well for selling both coffee and cars, but let's take a look at the exchange itself, keeping in mind our own needs as customers. I, personally, would prefer to get my espresso at the very time and place at which I feel the need for caffeine, with minimum steps and minimum contact with other people. Zero effort would be best – and please make me smile, too.

Buying a car is more complicated, but only a little, and the case of Tesla is a prime example. Simply put, you can get your new Tesla parked outside your window several days after you decide to buy, without leaving home, and this takes a countably low number of clicks on your smartphone. Isn't that brilliant? It's fast, it's simple, and you don't even need to put on a pair of shoes.

But we can go even further. We can tell the customer what is happening with the car from the moment it leaves the factory to the moment it appears at his front door. The cost of tracking the car's location is only a dime, yet it makes the customer smile and makes the process more transparent.

In fact, any steps taken toward simplicity and transparency of the purchase process will allow the valuable time of the dealership's employees to be saved and trustful relationships to be built with customers. For the record, here's another insightful finding from Cox Automotive: "62% of consumers want a relationship with their dealer that extends beyond a simple transaction."

Test drives

The test drive is the key touchpoint in the process of buying a car. Nothing is more decisive than the connection between the potential owner and the car that emerges during the test drive. The figures are compelling: Autotrader's Car Buyer of the Future study shows that 88% of customers would not buy a car without test driving it first, yet 81% of customers would prefer a different test drive experience to the traditional one in which sales talk is prevalent. The findings clearly demonstrate that, in order to boost sales, test drives need to be tuned up with a view to the customer's needs.

First of all, let's consider the time spent on test drives, keeping in mind the basic customer needs that we mentioned. Customers tend to want to spend more time with the car on their own, and dealers would benefit from spending less time on sales pitching, preparing the cars for test drives, and accompanying drivers. There are many ways to tackle this time-balancing problem, such as building a system of fully automated test drives.

Imagine a fleet of test drive cars that continuously report all the essential information about their state, location, and critical indicators directly to the dealer's internal systems. This model would cover some of the basic requirements of the process; customers can easily perform the test drive themselves with peace of mind, which translates into mental ownership. Salespeople, in turn, can spend less time preparing the cars by simply using remote monitoring tools. Moreover, since every acceleration and turn on a route is easy to track online, the need to keep an eye on the process in person will be eliminated. The customer could thus enjoy an individual test drive experience with zero contact from the dealership and with a feeling of already owning the car.

This solution would require investments in research, technical solutions, stable infrastructure, and so on. Nevertheless, some ready-to-go solutions already exist, and we at Bright Box would strongly recommend implementing them with appropriate customizations, rather than reinventing the wheel from scratch.

Another thing to consider is giving customers the tools to manage their time with regard to visiting dealerships. In fact, not only test drives could be automated with the help of online schedules and CRMs, but literally anything for which the dealership can plan and manage available time slots for personal service. Plan your schedule, make it simple to create a request for a specific time, and remove the wasteful expenditure of your employees' valuable time on scheduling. Customers, along with the available online tools, could not be more ready for such changes.

AUTHOR



NADEZHDA PANCHENKO LEAD PRODUCT ANALYST BRIGHT BOX

Nadezhda Panchenko is a successful business and product analyst with over 7 years of demonstrated expertise. She started her career as a Business Analyst at BearingPoint, an independent consulting firm with ts and global reach. Before Bright Box, she worked as Senior Business Analyst at der in cybersecurity – Kaspersky.

And more

How can you reduce the time spent on sales? What technical tools can be used to make cars communicate with your systems? How can you make processes paperless? How can you use analytical tools for effective stock management, promotions, and sales? What are the best practices in the connected car industry? If any of these questions catch your attention, address them to those who can give you the tools to make your business a part of the connected car world.

If you have a friend who is asking where to find the tools and professionals to help her become a great dealership, tell her to start at Bright Box. We know everything about the industry in general and about individual makes and models in particular. We know the technologies, and we have the skills. We have experience in building various systems, portals, and mobile applications to help our clients, no matter whether they are OEMs or dealerships wanting to improve their processes, enhance customer service, and boost sales.

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EMBRACING THE FUTURE OF CONNECTED VEHICLES IN INDIA

A MOHIT MEHROTRA

OMNICOMM INDIA

elematics and IoT solutions have entered industries as diverse as logistics, construction, ports, oil & gas and mining to enhance navigation, remote tracking, safety, productivity, asset utilization, fuel consumption and operational efficiency.

The demand for connected vehicles is increasing and it is critically important for those involved in the ecosystem to keep pace and embrace the future. Covid-19 restrictions have also increased growth in the connected vehicle industry. Even after the pandemic ends, demand will rise for features such as secure driving, remote control and auto fault diagnosis with benefits other than the ability to facilitate social distancing.

Fleet management companies are predicted to propel the e-mobility space in the near future. According to Deloitte, by 2025, the connected car market in India is projected to grow at a CAGR of 22.2% to reach an estimated USD 32.2 billion from USD 9.8 billion in 2019.

Adapting to growth involves catering to the specific needs of various industries and developing more innovative solutions for automation, better network services and more evolved hardware models.

Evolution of connected vehicles in India

Many companies are considering the major costs involved in maintaining a fleet of vehicles, which can constitute 30-50% of total operational spend. Fleet-related expenses were traditionally recorded using ledgers and log books, which is outdated and challenging to maintain.

As digitalization grows in India, companies are looking for efficient systems to access fleet-related data and take important operational decisions. Enhanced connectivity, communication, monitoring and safety of drivers and goods alike are now possible with the new generation of smart IoT and telematics platforms for connected vehicles.

Connected vehicles in India: a case study

With more than 20 years of experience in telematics and IoT solutions, we have significant expertise in developing fuelcontrol and vehicle monitoring technologies for applications such as heavy trucks, construction equipment, generator sets, fuel storage tanks, pumps, off-highway vehicles and commercial vehicles. A recent use case demonstrates a typical connected



vehicle project in an Indian business.

- A client has a stone quarry using several excavators and tippers. A complete-fleet management solution was deployed to keep real-time records of asset utilization by tracking the total hours of engine operation.
- Overloading the excavator for extended periods of time can • truncate its life. The solution records and analyzes engine usage to optimize operations.
- Correlating load data with fuel consumption on a time series • allows the plant and machinery head to accurately index the cost of excavation and predict future costs. This also minimizes wastage of fuel while idling and points to battery health, since a bad battery gives operators a reason to keep the machine idling. The custom reports help the client address these issues in real-time.
- The client deploys excavators inside a 250 ft mining pit. At this distance, it is not possible to hear the hum of engines and clanking of steel buckets from the control tower. At night, machine operators often put the machine in idle mode, turn on the AC and doze off. The next morning they claim overtime and extra fuel. Our solution maps hours of utilization at full load and idling against fuel consumed, resulting in fuel savings of over 25%, rationalization of overtime wages and 30% reduced engine wear.
- Safety is another concern. The system also tracks machinery health and sends instant alerts to the control tower if unexpected events occur.

The future of connected vehicles in India

As a leading IoT and telematics manufacturer, our role in the future of connected vehicles in India is to meet the demands of customers in all industries with customized solutions and aggregated data analytics through a combination of robust hardware and smart, secure software solutions.

However, advanced vehicles bring a host of concerns about data generation and exchange. This new technology needs to address privacy, data protection, encryption and normalization. The true value of a holistically efficient system is in its ability to provide business data while following the norms of security and data safety.

Connected vehicles are certainly the next big economic evolution for Digital India. With the growing need to maximize resources and efficiently control business assets, telematics experts are developing cutting-edge IoT solutions that ensure data provision and customization, security and smart insights.



MOHIT MEHROTRA MANAGING DIRECTOR OMNICOMM INDIA

USAGE AND FAMILIARITY WITH IN-VEHICLE INFOTAINMENT

A RICHA TYAGI TELEMATICS WIRE

n early 2010s automakers had started equipping high end variants of luxury vehicles with infotainment panels. Over the last few years we have seen more and more variant option coming with infotainment panel. In 2015, Android Auto was the Mahindra XUV500. Apple CarPlay came after some time. Maruti Suzuki's Baleno featured Android Auto as well as Apple CarPlay. Even today, market is being driving more from the push, rather than need based pull. Though some of the features are already benefiting a big segment of users- like navigation, traffic condition and updates etc., but the connected smart phones are fulfilling the purpose.

Features like navigation, humanmachine interface, advanced music system, internet connectivity will





continue to change the way consumer perceive about the innovative features related to infotainment in cars. Demand for IVI is accelerating and the industry has to have strategic tie-ups with companies who would help them to have the competitive advantage. In-Vehicle Infotainment industry is still in its development stage in India. The growing urban population is seen as a factor which could increase the market for IVI. Many international players have invested in developing innovative infotainment features for Indian cars.



Fig 2: Graphical representation of response on usage of different brands



Fig.3 Are you aware that nowadays newer vehicle have infotainment system in place of music system?



Fig 4 What features of infotainment system you are aware off?



Fig 5: What features you generally use in an infotainment system?

Study Area & Group

We Telematics Wire carried out a study to gauge the awareness amongst the people about infotainment and its benefits. It examines awareness of consumers on the basis of age group across less than 25 years, 25 - 45 years, 45 - 65 years and 65 years above, based on occupation students, service/business and homemakers and geographical region. The geographic area of response is a region in northern India, covering Western Uttar Pradesh, Delhi NCR and Haryana. Data was collected with the help of a questionnaire circulated amongst the respondents using Google Sheet.

The age group between 25-45, most vibrant group of society, indeed has responded most for survey, which shows high interest in technological development in automotive sector (fig 1).

Car Brands in the race

There is some popular vehicle make in the geographical area we covered. There is also a trend towards feature rich and newer types of vehicles. In the below graph, it seems large section from this region travel in Maruti, Hyundai, Tata Motors, and Mahindra cars.

In this region, more than 80% of the people are aware that music system is being replaced by in – vehicle infotainment system (Fig 3). But still many people used music system term in place of "infotainment", when they go to buy a new car.

Infotainment Feature Awareness

The general information shared with the respondent included brief introduction to the "info" and "tainment". That, the "info" in infotainment, refers to all carrelated information, like battery voltage, tyre pressure and oil pressure, and is supposed to help the driver understand their car's current status, including speed and remaining fuel and vehicle navigation. Here except for vehicle navigation most of the feature people are not aware of and is not being available in majority of vehicles. The "tainment" in infotainment, refers to entertainment, includes all functions which entertain the driver while driving. This involves

audio, from a radio (AM/FM) or a CD and videos or games from a DVD or even streamed online, are being used. But mostly it is either FM or USB pen drive and in some cases apps.

In the fig 4 it can be seen that the awareness about the features of in-vehicle infotainment is high. News and updates are found to be most commonly used by the people among the features followed by music and navigation (fig 5).

Infotainment in Shared Mobility

Shared mobility players like Ola and Uber also have introduced – infotainment panel for a segment of users/passengers. The console for the passengers include entertainment options such as movies,



Fig. 6: What other features would you like to have in an in-vehicle infotainment system?



Fig 7: Are you aware of Ola Play or Uber infotainment?



Fig 8: What do you like to watch on Ola Play or Uber infotainment?

trailers, and TV shows, information and features that are linked to your destination, a web browser and connectivity with certain apps such as Apple Music, Sony LIV streaming app, Audio Compass and Spotify.

As per the study, in the northern region most of the people are aware about infotainment system in cabs (fig 7). Music and navigation are the commonly used features by the passengers (fig 8).

Conclusion

The infotainment panel is more or less seen as music system but in place of music console it is touch screen driven. That there are many other features which could help them manage their vehicle is either not been understood or is being downplayed by the car makers. If we look at the OBD II, which was mandated from 1st April 2013, but even today, except for the exceptional situation, the car maintenance is based on the kilometers driven rather than how the vehicle is or its health. The 'info' part of the infotainment could disrupt the business model of the car sales. The dealers/sellers which make more or comparable money on car service than the actual sale of car, seems sceptical about making the end users fully aware of the "info" part, as it may dent after sales paid service revenue. There is a need to create awareness through campaign about the benefits these new components will bring to the society at large.

SOME OF THE INFOTAINMENT PANELS

Sony Corporation



Pioneer Corporation



Continental AG



Visteon Corporation



Kenwood Corporation



Boss Audio Systems



Bosch



Blaupunkt



Harman International Industries Inc.



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Qualcomm introduces Gen4 Snapdragon Automotive Cockpit Platform

Qualcomm Technologies, Inc. introduced its digital cockpit solutions with the 4th Generation Qual-comm® Snapdragon™ Automotive Cockpit Platforms. The latest version of the platform bundles ad-vanced computing, machine learning, computer vision, and a suite of sensors into a chip no bigger than a silver dollar.

Utilizing 5nm processing technology, the new digital cockpit platforms provide automakers with the one of the highest performance system-on-chip. The platform supports a variety of technologies, including the typical alphabet soup of acronyms: The Blackberry QNX real-time OS, Linux, and C V2X technology the latest iteration of a long support



C-V2X technology, the latest iteration of a long-running dream in the connected car world.

Qualcomm said the platform will begin production in 2022. The broad automotive ecosystem can evaluate, demonstrate and develop solutions with the 4th Generation Qualcomm® Snapdragon™ Automotive Development Platform (ADP), which is expected to be available in the second quarter of 2021 (Q2'21).

Teletrac Navman announces Al Dual Dashboard Camera

Teletrac Navman announced the release of its AI Dual Dashboard Camera, an AI-enabled smart dashcam with forward-and driver-facing cameras that integrate fully with the company's TN360 platform. The AI Dual Dashboard Camera enhances the capabilities of the company's existing software solutions and provide critical insights into driver behavior and incident recordings.

The AI Dual Dashboard Camera is an a vision-based fleet safety platform developed and manufactured by Netradyne that combines both AI and Edge Computing to capture and analyze data in real-time, create alerts to help drivers avoid risky situations and provide causality of events. Drivers receive automatic positive driving notifications, visibility into risky driving behavior and performance coaching.

The AI Dual camera is also equipped with high definition 1080P video with both forward and driver-facing visibility, a 9-axis Gyro and Magento accelerometer, real-time audible driver alerts and 4G LTE connectivity. The AI Dual camera joins the previously released AI quad camera, which features four lenses to capture outward, inward and peripheral views.

Iteris launches ClearMobility Cloud

Iteris, Inc. launched an open-architecture cloud framework for smart mobility infrastructure manage-ment, the ClearMobility™ Cloud. The ClearMobility Cloud's mobility data management engine, applica-tion programming interface (API) framework and microservices ecosystem provide standardized data ingestion, cleansing and analytics, as well as authentication and security for each component of Iter-is' ClearMobility Platform. The ClearMobility Platform includes software applications, smart sensors, and managed services that complement the company's specialized consulting and advisory services.

ClearMobility Cloud includes a unified portal that enables users to access multiple Iteris software appli-cations for easy navigation between modules within Iteris' ClearGuide™ transportation performance measures solution. The release also facilitates integration between ClearGuide and the IRIS open-source Advanced Traffic Management System (ATMS). The ClearMobility Cloud's standardized data architecture enables ClearGuide to provide real-time travel time data to IRIS for the automatic update of variable message signs (VMS) through work zones, as well as overlay VMSs on ClearGuide's real-time maps.

MiX Telematics launches MyMiX Tracking app

MiX Telematics has launched app-based tracking for vehicles and drivers. MyMiX Tracking leverages mobile phone technology to enable real-time tracking of drivers while also recording, measuring and enabling real-time self-correction of risky driving behavior events including speeding, harsh braking, harsh acceleration and mobile phone use while driving. The app-based solution is an extension of MyMiX, a comprehensive driver engagement app that also equips drivers with valuable information and alerts to improve their driving style, including immediate, in-cab audible feedback. The solution is useful for customers running sub-contractor vehicles, leased vehicles, company cars, short-term rentals, or grey fleets, and is a cost-effective and impactful alternative to installing a hard-wired on-board computer or tracking device inside a vehicle.



The Fusion Project works to accelerate data management for connected and autonomous vehicles



Airbiquity®, Cloudera, NXP® Semiconductors, Teraki[™], and Wind River® announced The Fusion Project, an automotive industry collaboration to define a streamlined data lifecycle platform to advance intelligent connected vehicles. The Fusion Project addresses the challenges by pre-integrating technologies from five industry providers into a solution that automakers can easily evaluate and introduce into vehicle design and production cycles for next-generation connected and autonomous vehicles.

The first application for The Fusion Project is specifying a solution for intelligent vehicle

lane change detection utilizing synergistic technologies from each company:

- Airbiquity Over-the-Air (OTA) Software Management
- Cloudera Data Lifecycle Solutions from the Edge to AI
- NXP Vehicle Processing Platforms
- Teraki Edge Data Artificial Intelligence (AI)
- Wind River Intelligent Systems Platform Software

The solution creates a capable and efficient data lifecycle platform from data ingestion through OTA machine learning model updates without a loss of data fidelity while maximizing system decision accu-racy.

Quectel announces 2nd gen of 5G NR modules compliant with 3GPP R16 standard



Quectel Wireless Solutions announced the release of secondgeneration 5G new radio (NR) modules that comply with the 3GPP Release 16 standards. The release includes the sub-6GHz modules Rx520F and the Rx520N

series as well as the RM530x series of mmWave modules.

5G NR modules are based on the latest Qualcomm® Snapdragon[™] X65 and X62 5G Modem-RF Systems and are designed to satisfy the needs of industries that require enhanced mobile broadband and reliable communication capabilities. The modules will also speed up the commercialization of 5G technologies and bring the benefits of mobile broadband to typical scenarios including Fixed Wireless Access, Industrial IoT, Mobile Compute, telemedicine, private networks, and more.

Quectel's 5G NR sub-6GHz modules include the RG520F (LGA form factor), the RM520F (M.2) based on Snapdragon X65, and the RG520N (LGA), the RM520N (M.2) based on Snapdragon X62. The module supplier will also offer second-generation modules that support sub-6GHz and mmWave dual connectivity. It support all three combinations of sub-6GHz time division duplex (TDD) and frequency division duplex (FDD) carrier aggregation (CA).

Anritsu launches new 5G RF Regulatory Test System ME7803NR

Anritsu Corporation has launched a new RF Regulatory Test System ME7803NR solution for regulatory compliance testing of 5G communications systems. RF Regulatory Test System ME7803NR uses the Radio Communication Station MT8000A Test as а simulated 5G NR base station in combination with a spectrum analyzer and signal generator to implement ARIB/ETSI/FCCcompliant FR1 RF tests. In addition, the measurement efficiency and quality of 5G terminals are assured by the easy-to-operate GUL and built-in calibration function for improved reliability. The RF Regulatory Test System ME7803NR sup-ports FR1 RF regulatory compliance tests of 5G NR terminals

Skoda launches 'Traffication' infotainment app



ŠKODA infotainment apps have now been joined by a new Traffication Infotainment App. This applica-tion enhances ŠKODA drivers' safety by alerting them to traffic hazards such as stranded vehicles. Moreover, the app prevents drivers from entering a motorway slip road against the direction of traffic and becoming wrongway drivers.

First launched in the ŠKODA SUPERB, the Traffication Infotainment App can also be easily downloaded and installed in the SCALA, KAMIQ, KAROQ and KODIAQ models, provided the vehicles are equipped with their respective top infotainment systems based on the thirdgeneration Modular Infotainment Matrix. The app will be made available for further ŠKODA models during the course of the year, and ŠKODA will also gradually expand the range of functions supported by this new safety feature.

Vodafone tests centimeter-level vehicle tracking

Vodafone has used new precision positioning technology to remotely track a vehicle to within 10 centi-meters of its location. Vodafone is working in with Sapcorda, using Vodafone's global internet of things [IoT] platform.

Vodafone is redefining its network and technology on a Telco as a Service (TaaS) model. It makes key network capabilities available through common APIs in a cloud platform to deliver new software, video and data applications at scale, additionally to gigabit-capable connectivity.

Vodafone IoT-enabled vehicles, machinery and devices, when linked with Sapcorda's comprehensive network of GNSS receivers and augmentation technology, improves location accuracy by correcting for things like the curvature of the earth, atmospheric delays, and clock differences of global positioning satellites. Combined with video and onboard diagnostics, the technology will also allow vehicle opera-tors to hold out accurate location-sensitive remote inspections and even pause machines like grass cutters on public footpaths when they encounter people.

LeddarTech launches PixSet, full-waveform flash LiDAR dataset

LeddarTech® announces its publicly available sensor dataset for advanced driver assistance and auton-omous driving research and development called the Leddar™ PixSet. This dataset includes full-waveform data from LeddarTech's Leddar™ PixEll, a 3D solid-state flash LiDAR sensor. The Leddar PixSet provides information from a wide variety of situations, creating real-world data for advanced driver assistance and autonomous driving. The Leddar PixSet was developed with the collaboration of Silicon Valley-based Deepen AI, which provided comprehensive object annotations. These new datasets provide an opportunity for 3D computer vision to go beyond LiDAR point clouds with a full-waveform LiDAR dataset.

ZF coASSIST Level2+ automated driving system on Dongfeng Motor vehicle

ZF has launched its coASSIST Level2+ semi-automated driving system on the 2020 Dongfeng Aeolus Yixuan which was launched late in 2020.

The coASSIST system offers drivers significant comfort and safety benefits, while meeting projected Euro NCAP 2025 test protocols and delivering popular Level2+ functions. ZF is a full system integrator of coASSIST which was developed in conjunction with partner Mobileye and includes Mobileye's EyeQ[™] camera technology. It also utilizes Hella short-range radars.



0.05° Attitude 0.02° heading

1 cm POSITION

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- » Fusion with Pulse or CAN OBDII Odometer
- » Fast Initialization









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ON Semiconductor launches automotive qualified SiPM array product for LiDAR applications



ON Semiconductor announced the RDM-Series silicon photomultiplier (SiPM) array, ArrayRDM-0112A20-QFN that extends the LiDAR sensor capabilities to its broad portfolio of intelligent sensing solutions.

The ArrayRDM-0112A20-QFN is a monolithic 1×12 array of SiPM pixels based RDM process, which enables high sensitivity to near-infrared (NIR) light to achieve industry-leading 18.5% photon detection efficiency (PDE)(1) at 905 nanometers (nm). The high internal gain of the SiPM allows sensitivity down to the single-photon level, a feature that in combination with the high PDE, enables the detection of the faintest return signals. This results in the ability to range to greater distances even with low reflective targets.

Benefiting from the high PDE of ArrayRDM-0112A20-QFN, LiDAR systems supporting functions like fully autonomous driving use cases, such as robotic transportation, to safely navigate the environment in real time, have been proven to range over 300 meters in distance. The ArrayRDM-0112A20-QFN is AEC-Q102 qualified and developed in accordance with IATF 16949.

Alarm.com 'Connected Car' offers monitoring solution

Alarm.com Connected Car, developed in collaboration with CalAmp, offers all the benefits of a vehicle monitoring solution plus the unique benefit of deep integration with the Alarm.com smart home security system. Vehicle insights, notifications and home automation features are all



accessible through one interface – the Alarm.com mobile app.

Connected Car uses a dedicated cellular connection and has a battery backup, so it communicates with the home system and end-user, even when the vehicle's engine is off. With CalAmp's telematics technology integrated with the solution, users can create rules so they receive Alarm.com notifications about specific vehicle details or activity, such as: Diagnostics and potential repairs (check engine light on, low battery or low fuel), Driving Behavior (sudden acceleration, hard braking, excessive speeding), Unexpected Movement (vehicle moves while the engine is off, indicating it may have been towed, crashed into, or stolen).

Sibros teams with STMicroelectronics to deliver OTA for connected vehicles

Sibros Technologies announced а collaboration with STMicroelectronics. within the ST Partner Program. Through the cooperation, Sibros has paired its Deep OTA Updater and Logger embedded applications with the ST Smart Gateway Platform (SGP), featuring STA1385 Automotive SPC58NH Microprocessor, Automotive Microcontroller and a Secure element.

The combined solution takes full advantage of ST's reference smart gateway platform featuring STA1385 microprocessor as OTA orchestrator receiving and authenticating firmware updates and forwarding to the SPC58NH microcontroller for dispatching to the target ECU.



TikTok owner ByteDance said to invest in selfdriving startup, QCraft

TikTok owner ByteDance may invest in self-driving technology company QCraft, according to media outlets.

QCraft, founded in 2019, managed to acquire the California public road test permit and has been conducting tests on California's public roads since July 2019. As of March 2020, QCraft has offices in Silicon Valley, Beijing, Shenzhen, Suzhou, as well as other

tech hubs in China. QCraft is working with several global partners to deploy the QCraft driver in a variety of business applications.

Magna unveils new PHEV and BEV drive systems



Magna unveiled its all-new connected plug-in hybrid electric vehicle (PHEV) drivetrain and next-gen battery electric (BEV) drive systems.

The Magna EtelligentEco, an intelligent, connected

PHEV system that reduces greenhouse gas emissions by up to 38%, offers a cloud connectivity feature allowing it to perform several new. It accounts for local electricity sources when charging is required and recommends a greener power option to the driver. Additionally, the driver can employ smart cruise control and eco routing which includes topology and traffic status to help determine the most efficient path to a destination. The combination of these features enables significant CO2 reductions.

The hybrid transmission features a 120-kW e-motor at its functional core. The system performs in dynamic driving situations, as well as launch and reverse driving, all in electric mode. The Magna EtelligentEco offers a driving range of 62 miles. The Magna EtelligentReach is an all-electric AWD solution with next-gen technology options including intelligent operating software and controls.

Spireon launches GoldStar Wireless GPS tracking solution for Buy Here Pay Here dealerships and auto lenders



announced Spireon the launch of wireless version of GoldStar®. vehicle tracking and collateral management solution for Buy Here Pay Here (BHPH) dealers and auto lenders. GoldStar Wireless hardware can be self-installed and activated within minutes to facilitate crucial data collection. monitor predictions. default

locate on demand, and, when necessary, streamline quick asset recoveries. GoldStar Wireless operates with an advanced, extended life battery of up to three years and allows dealership and lender customers to activate one of three tracking modes over the lifetime of the device to meet their needs: Quick Track, Daily Track and Recovery Track.

The introduction of GoldStar Wireless expands the Spireon auto solution suite, which includes GoldStar Connect, a full-featured mobile-application that helps BHPH dealers and lenders build customer loyalty and mitigate risk, while providing customers with the benefits of connected car technology.

CalAmp launches fleet management solution



CalAmp announced a flexible and data-enriched intuitive user interface for its CalAmp iOn™ fully integrated solution for fleet and asset management.

Key enhancements include: It maintains service schedules by receiving alerts from Bluetoothenabled iOn Tags™ when high-value assets are missing; monitor driver performance with iOn Vision™ and a Driver Behavior Scorecard; and react swiftly to vehicle collisions. It keeps operations running smoothly through easier navigation, map layering and a cleaner interface displaying a holistic view of all vehicles, drivers and assets.

With the CalAmp iOn suite of web and mobile SaaS telematics services and an easy-to-use software interface. a fleet utility manager knows exactly where their critical assets are to fix a broken water main or forecast when a field technician will arrive at a specific downed power pole before they move on to the next one. Because the CalAmp iOn platform blends fleet tracking with Esri® ArcGIS® insight, fleet operators, ranging from public works and safety to construction and commercial enterprises, will have access to accurate and essential data that can measurably improve their operations, profitability, and even help save lives.

Global Merger & Alliances

- BlackBerry expands partnership with Baidu to power autonomous driving technology
- Veoneer signs agreement with Qualcomm for its Arriver
- Goodyear and Conmet to offer fleets the commercial tire industry's first combined tire and wheel hub analytics solution
- LG joining Qualcomm to develop 5G automotive platforms
- Bosch and Mitchell introduce new target system for static ADAS calibration
- Anritsu in collaboration with Qualcomm achieves GCF approval for Voice Over New Radio (VoNR) Test Cases
- Faurecia and Immersion partner for haptic automotive technologies
- Goodyear ventures invests
 in autonomous trucking
 company TuSimple
- Danlaw teams up with NextDroid to support ADAS & AV Development validation, providing measurable safety
- Toyota, Denso team with Aurora on self-driving cars for Uber
- Bosch-Microsoft jointly developing vehicle software platform
- ASRG partners with Upstream to enhance automotive cyber threat intelligence
- Bright Box joins My Policy group, a provider of services for telematics motor insurance
- Foxconn to manufacture electric vehicles for Fisker

Electric vehicles usage should be made mandatory for all govt officials says Gadkari

Transport Minister Nitin Gadkari on Friday said that electric vehicles should be mandatory for all officials in government ministries and departments. He, further, persuaded Power Minister R K Singh to make it mandatory to use electric vehicles for officials in his department saying he will do so for his departments.

He said that the use of 10,000 electric vehicles in Delhi can alone save Rs 30 crore per month. On this occasion, Singh also announced that a fuel cell bus service will be launched from Delhi to Agra and Delhi to Jaipur soon.

Delhi Government launches 'Switch Delhi' campaign to promote electric vehicles

Delhi Chief Minister Arvind Kejriwal has launched the 'Switch Delhi' campaign on February 4 to promote electric vehicles. Kejriwal appealed to people of Delhi to adopt electric vehicles, and also announced that the state government will hire only electric vehicles for various purposes in the next six weeks. With its new electric vehicle policy, the Delhi Government aims at achieving an ambitious target of having at least 25 percent of vehicles running on electricity by 2024.

Goa announces electric mobility initiatives

Goa's Minister of Power, Environment, and New & Renewable Energy, Shri Nilesh Cabral emphasized the importance of ushering in electric twowheelers in Goa. According to Cabral, the clean mobility program will be applicable for the first 10,000 electric two-wheelers sold in the state, which will reduce 5,000 tonnes of CO2 emissions every year and remove 10% of the polluting vehicles off Goa's roads. The program is implemented by Convergence Energy Services Limited (CESL), a 100% owned subsidiary of Energy Efficiency Services Limited (EESL). The state government is also installing easily accessible public charging stations throughout the state of Goa. Tata Motors partnered with the Department of New and Renewable Energy to deploy its electric vehicles in Goa as a part of its tender with EESL.

Central Govt to help Andhra Pradesh develop electric vehicle infrastructure

As part of the national policy, the Central Govt will support Andhra Pradesh to develop electric vehicle charging infrastructure in the State, said EESL-Gol, executive vice-chairman Saurabh Kumar, while re-questing the State government to support the objective of bringing electric vehicles revolution in the country in the next 10 years.

The EESL has already established 80 charging stations in Andhra Pradesh and supplied 300 e-cars to var-ied government departments. EESL executive vice-chairman urged the department of transport, DIS-COMs and power utilities to launch more e-vehicle charging stations in coordination with APSECM and Renewable Energy Development Corporation of Andhra Pradesh (NREDCAP).





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