85
Accelerationn

62
Banking

72
Overall Score

62
Corneing

98
Speed

The Preferred Partner of Automotive Manufacturers in India for Cyber Security

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Remote Feature Activation

Connected Vehicle

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Vehicle Tracking

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Mobility Services

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CONTENTS

34 Blitz scaling Usage Based Insurance with Smartphone Telematics

Kamal Aggarwal
SenSight Technologies
Private Limited

Driver Behaviour Dashboard

Rewards & Badges Acc to Driver Behaviour

Created Trips with Analytical Data

3 Risk Level

11 Risk Level

BYD Atto 3

BYD to launch e-SUV in India

BYD, a Chinese EV startup, is planning to enter Indian mainstream EV market with an electric SUV. It will assemble vehicles in Sriperumbudur, near Chennai.

During the next two years, it plans to sell 10000 assembled vehicles in India as well as explore setting up of a local manufacturing facility.

The upcoming SUV will be the company's second EV to be sold in India, the first one being its electric MPV E6, introduced in November 2021.

According to Sanjay Gopalakrishnan, Senior Vice President, BYD India, the new SUV will be Atto 3, which is powered by the company's patented blade battery technology and will have a 60.48 kWh battery to provide a range up to 480 km. Gopalakrishnan said BYD's electric vehicles will be positioned as a 'tech premium' brand in the Indian market. The company has been encouraged by the good response to its first product E6 and growing SUV sales in the country to launch a new electric SUV into the Indian market.

The five-seater SUV will come with a full range of active safety technologies as standard, including auto emergency braking (AEB), front - and rear collision warning, rear cross traffic alert with rear cross AEB, lane departure and lane keeping assist, adaptive cruise control, and door open warning.

Technology-wise, the Atto 3s interior will feature a 12.8-inch tablet-style infotainment system that can electronically switch between vertical and horizontal orientations, a small 5-inch driver's digital instrument cluster attached to the steering wheel column, and configurable ambient lighting.

The upcoming model, the Atto 3, a global product, has already been rolled out in Singapore and unveiled in Japan. Delivery in India is expected to start from January 2023. It is expected to compete with the Tata Nexon EV Max, MG ZS EV and Hyundai Kona Electric.

The company, founded in 1995, has brand recognition outside China, despite selling 641,000 pure electric and hybrid vehicles in the first half of 2022 – nearly 80,000 more than its rival Tesla, said Aljazeera report.

BYD is confident on sales growth as it expects volume growth from both the personal and fleet segments. While the company has already tied up with companies like ChargeZone, Voltic and Indipro for charging infrastructure, it is also in talks for some home-charging solutions as well.

BYD now has dealerships in 12 cities and will expand to 16-17 cities with 23-24 showrooms by the end of 2022. But, it is also attracting buyers from Tier-2 and Tier-3 cities.

BYD displaced Tesla as the No. 1 EV maker by volumes as it sold 6.41 lakh units during the first six months of this calendar year — an increase of more than 300 percent as compared to a year-ago period — when compared with Tesla's EV volumes of 5.64 lakh units.

In 2007, BYD entered the Indian market for the production of electronic parts, batteries, and mobile phones in Oragadam. In 2016, it was supplying batteries and bus chassis to Olectra from its Sriperumbudur assembly plant.

Self-driving vehicles on UK roads by 2025

Autonomous mobility seems to be poised for a leap in UK if we go by UK government's paper on Connected and Automated Mobility 2025, which was released on 19th August. The paper claims a roll out of self-driving vehicles on the roads in two phases. According to plans autonomous vehicles including cars, coaches and lorries that can drive themselves on motorways could be available to purchase within the next year. For these vehicles, users would need a valid driving licence, so they can drive on other roads. The real challenge would however be in the launch of other fully self-driving vehicles, for example used for public transport or delivery vehicles, expected on the roads by 2025. These vehicles would not need anyone on-board with a driving licence as they would be able to drive themselves through the journey.

A new legislation which is being discussed, states that manufacturers are responsible for the vehicle's actions when self-driving, meaning a "human driver would not be liable for incidents related to driving while the vehicle is in control of driving[1]". The new laws for the safe rollout of self-driving vehicles by 2025 will be brought through parliamentary approval.

This statement could set an example globally, where liability in case of autonomous vehicle accidents are in a gray area.

In 2020, during a trial of an Uber self-driving car, a back-up driver was charged with negligent homicide that took the life of a pedestrian[2]. Uber faced no charges!

Similarly, earlier a fatal accident in 2019 involving a Tesla vehicle running on Autopilot, the driver was charged with two felony counts of vehicular homicide with gross negligence[3]. Tesla has no charges!

The government has allocated £100 for this project. Out of this, £34 million for research to support safety developments. This would help evolve the legislation. This could include research the performance of self-driving cars in poor weather conditions and how they interact with pedestrians, other vehicles, and cyclists. The government has also confirmed £20 million, as part of the overall £100 million, to help kick-start commercial self-driving services and enable businesses to grow and create jobs in the UK, following an existing £40 million investment.

Successful projects could help see, for example, groceries delivered to customers by self-driving vehicles, or shuttle pods assisting passengers when moving through airports. £6 million will also be used for further market research and to support commercialisation of the technology.

Self-driving vehicles could revolutionise public transport and passenger travel, especially for those who don't drive, better connect rural communities and reduce road collisions caused by human error. Further in the future, they could, for example, provide tailored on-demand links from rural towns and villages to existing public transport options nearby. They could also provide more direct and timely services that enable people to better access vital services such as schools and medical appointments.

As the country prepares to write new laws in regard to self-driving vehicles, the government has opened a consultation period on a "safety ambition" for self-driving vehicles to be as safe as a competent and careful human driver. This ambition would inform standards that vehicles need to meet to be allowed to 'self-drive' on the roads, and organisations, such as manufacturers, could face sanctions if standards are not met.

Reference

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BlueCruise as it will appear on Ford F-150

Ford's self-driving software BlueCruise

Ford is rolling out its self-driving software BlueCruise in its vehicles in US. According to the company, the Mustang Mach-E, F-150, and other vehicles will be equipped with Blue Cruise. So far, Ford vehicle customers have driven 10.6 million miles of hands-free highway driving since the technology launched in July 2021.

Currently, adoption is increasing as Ford's Power-Up software updates allow BlueCruise to its customers. Those who bought their vehicles before BlueCruise was officially launched, can use Power-up software update to activate the system.

Ford says some 15,000 2021 F-150 and Mustang Mach-E owners have installed BlueCruise. Another 35,000 customers are in process. Adding these numbers to those who already had the tech when they took ownership, there will be nearly 70,000 Ford customers using the BlueCruise hands-free highway driving system.

Where to use BlueCruise
Ford BlueCruise allows for true hands-free driving on prequalified sections of divided highways called Hands-Free Blue Zones that make up over 130,000 miles of North American roads.

Ford BlueCruise uses blue lighting on the digital instrument cluster to indicate when the vehicle is in a hands-free zone.

How BlueCruise Works
Ford BlueCruise builds upon available Intelligent Adaptive Cruise Control with Stop-and-Go and Lane Centering and Speed Sign Recognition. It allows the driver to operate vehicle in hands-free mode while being monitored by a driver-facing camera to make sure driver is keeping eyes on the road.

BlueCruise Availability
The technology is being manufactured into new vehicles and rolling out for existing vehicle owners via Ford Power-Up software updates.
- 2021 Mustang Mach-E
- 2021 F-150
- 2022 Mustang Mach-E
- 2022 Expedition
- 2022 F-150

BlueCruise uses blue lighting to indicate when the vehicle is in a hands-free zone

Baidu launches pilot robotaxi project in China

Baidu, Inc has secured the permits in China to offer driverless robotaxi services to the public on open roads. Apollo Go, Baidu's autonomous ride-hailing service, is now authorized to collect fares for robotaxi rides - completely without human drivers in the car - in Chongqing and Wuhan. This marks a turning point for mobility in China, leading to driverless ride-hailing services.

Baidu will begin to provide fully driverless robotaxi services in the designated areas in Wuhan from 9 am to 5 pm, and Chongqing from 9:30 am to 4:30 pm, with five Apollo 5th gen robotaxis. The areas of service cover 13 square kilometers in the Wuhan Economic & Technological Development Zone, and 30 square kilometers in Chongqing's Yongchuan District.

Baidu's robotaxis have undergone multiple steps of testing and licensing, starting from testing with a safety operator in the driving seat, to testing with a safety operator in the passenger seat, before finally receiving authorization to operate with no human driver or operator in the vehicle.

Baidu's robotaxis come with multi-layer mechanisms to ensure safety, including the autonomous driving system, monitoring redundancy, remote driving capability and a robust safety operation system, all of which are backed by world data including a total test mileage of over 32 million kilometres has driven by Baidu's autonomous vehicleAVs to date.

By the end of March 2022, Baidu had cumulative of 4000 autonomous driving patent applications in China. It has over 1500 global patents in autonomous driving.

Apollo Go

Apollo Go is currently available in 10 cities: Beijing, Shanghai, Shenzhen, Guangzhou, Chongqing, Changsha, Cangzhou, Wuhan, Wuzhen and Yangquan. Apollo Go has started commercialized operation in multiple cities. Users can hail a robotaxi with one tap in Baidu Maps, Apollo Go's standalone ride–hailing mobile app, or the Apollo Go mini program on the Baidu app.

Apollo Go has provided over 1 million robotaxi rides — mostly for free. Paid robotaxi rides are available in four cities: Beijing, Chongqing, Yangquan and Wuhan (added in early July).

Baidu plans to expand Apollo Go operations to 65 cities in China by 2025 and 100 cities by 2030.

Baidu has a large AV test site in Beijing called Apollo Park. The test area supports AV development, as well as 5G and C–V2X technology testing. Infrastructure to enhance AV use is a big part of Baidu's plan to expand Apollo Go. Baidu will use 5G C–V2X as it deploys robotaxis. Apollo Park has over 200 AVs and can support all aspects of development and testing.

Lyft and Motional to launch electric robotaxi in 2023

Lyft, Inc. and Motional announced the launch of Motional's electric IONIQ 5-based robotaxi, an autonomous vehicle designed for driverless ride-hail operation, on the Lyft network in Las Vegas.

Motional and Lyft plans to launch driverless service in Las Vegas in 2023, before expanding to other major U.S. cities.

The Path to Driverless Rides

Motional and Lyft have been conducting autonomous rides in Las Vegas since 2018, and now Lyft riders will be among the first to experience Motional's new autonomous electric vehicle, which has a custom-designed user experience for a fully autonomous journey.

Riders will be able to control their ride without assistance from a driver. The enhanced experience includes unlocking the doors through the Lyft app and starting the ride or contacting customer support from the new in-car Lyft AV app, an intuitive in-ride display tailored to autonomous ridesharing. Motional and Lyft are making the new user features available to the public now in preparation for when the service plans to be fully driverless next year.

Motional and Lyft's Partnership

In 2018, Motional and Lyft entered into a partnership with the launch of their public service in Las Vegas. The service has been used by over 100,000 Lyft riders, with over 95% leaving five-star reviews and many going on to become repeat riders.

Motional Ioniq 5 Robotaxi

IONIQ 5 will be assembled by Hyundai, integrated with Motional's autonomous vehicle technology, including a suite of more than 30 sensors including lidar, radar and cameras that can be seen throughout the interior and exterior. That sensing system provides 360 degrees of vision, and the ability to see up to 300 meters away, according to Motional.

Motional

Motional is a driverless technology company making autonomous vehicles. The company formed in 2020 as a joint venture between Hyundai Motor Group and Aptiv.

The Motional team has driven some of the driverless industry's largest leaps forward, including the first fully-autonomous cross-country drive in the U.S, the launch of the world's first robotaxi pilot, and operation of the world's most-established public autonomous fleet which has conducted over 100,000 public rides. Motional is developing and commercializing SAE Level 4 autonomous vehicles for ride-hail and delivery applications.

Inline Driving Scorecard

Intangles has launched a new Inline Driving Scorecard feature that enables fleet operators to monitor and analyze erroneous driving practices like idling, harsh acceleration, free running, hard breaking and overspeeding.

In its bid to promote fuel efficiency and appropriate driving behavior, Intangle's latest feature enables operators to promote and incentivize good driving behaviour using the Scorecards. The feature is a one-stop-destination to gather precise and apt insights into the efficiency of drivers. The platform displays scores based on various aspects of driving behaviour and is, therefore, a reliable tool that provides actionable insights. It provides accurate feedback on gear utilization trends, idling instances and other erroneous driving practices, thereby improving fuel efficiency and overall health of the vehicle. Fleet operators have witnessed an impressive 12-15% improvement in mileage and fuel economy on utilizing the feature.

This feature comes in addition to Intangles' plethora of existing vehicle monitoring features. They use historic and real-time data to deliver alerts of possible failures, which leads to a significant reduction in the on-road break-down of vehicles, thereby increasing operational hours and lowering maintenance/repair costs. Averting an imminent break-down saves unplanned costs towards towing, making alternate arrangements for goods or passengers and post-failure repairs and replacements which may prove costly. With Intangles, fleet owners have all the necessary information related to fault codes that may arise in their vehicles, whether minor, major or critical ones, at their fingertips along with repair strategies depending on the severity. The Vehicle Monitoring feature also helps fleet operators conduct preventive and proactive maintenance to reduce vehicle downtime.

This solution also helps in addressing the issue of fuel pilferage. Fuel theft has been a major cause of concern among fleet operators and vehicle owners for a long time. There have been quite a few fuel-tracking devices in the past, however, none were accurate and efficient enough to provide comprehensive insights on the quantity of fuel theft, with the exact location and time to support the claim, in turn, helping compute the accurate cost per km of fuel consumed.

Around 90% of all road accidents occur due to driving errors. In addition to the loss of lives and goods, accidents also significantly, directly or indirectly, impact costs such as repair costs, increase in insurance premiums, and costs incurred due to vehicle downtime.

Intangles' driving behaviour monitoring feature allows operators to check the increasing number and keep track of the driving behaviour along with personalized training to each driver on a regular basis. This comprehensive solution can successfully track more than 20 exceptions in driver behaviour like overspeeding, idling, hard braking, free running, etc which helps generate actionable insights.

DriverDNA scoring to boost usage-based insurance pricing

ABAX enters motor insurance

ABAX, a leading automotive telematics company in Europe, with Greater Than as AI-analysis platform partner, has entered into insurance sector.

Greater Than is the developer of DriverDNA for real-time insurance and predictive risk insights. DriverDNA through a deeper level of data analysis predicts crash type as well as crash likelihood per driver. This new capability will help insurance, mobility, and fleet with risk forecasting, delivering both safety and financial benefits.

Pattern AI is another product of Greater Than helps predict crash risk and CO2 impact, using real-time location data analysis. Some of the key benefits are individual, fair insurance pricing, prompt identification of risk and timely actions for risk mitigation. After more than eight years of research, now, Greater Than is taking its risk prediction to another level by predicting cost and identifying crash type, as well as likelihood.

Enabled by the AI technology, ABAX is tapping into the commercial insurance market, launching a dynamically priced auto insurance offering in Norway for its B2B fleet customers. With the dynamically priced offering, ABAX customers can benefit from increased transparency, and lower insurance cost through the Tryg insurance solution, provider of general insurance services in the Nordic countries.

Greater Than will also launch a service where customers can build their own risk models, just by feeding the AI with their specific claims data. This will bring the information even closer to the core of unique business opportunities for each segment of the market.

Greater Than's Pattern AI technology recognizes patterns in driver behavior to create a unique DriverDNA for each trip and compares this against a database of over 7 billion real-life trips to determine a unique crash probability for each trip.

The company's next-level micro-pattern profiling, which identifies crash type, will be included as standard in Greater Than's Risk Portfolio Tracker solution. Data is collected via GPS, requiring only a smartphone app, SDK or API.
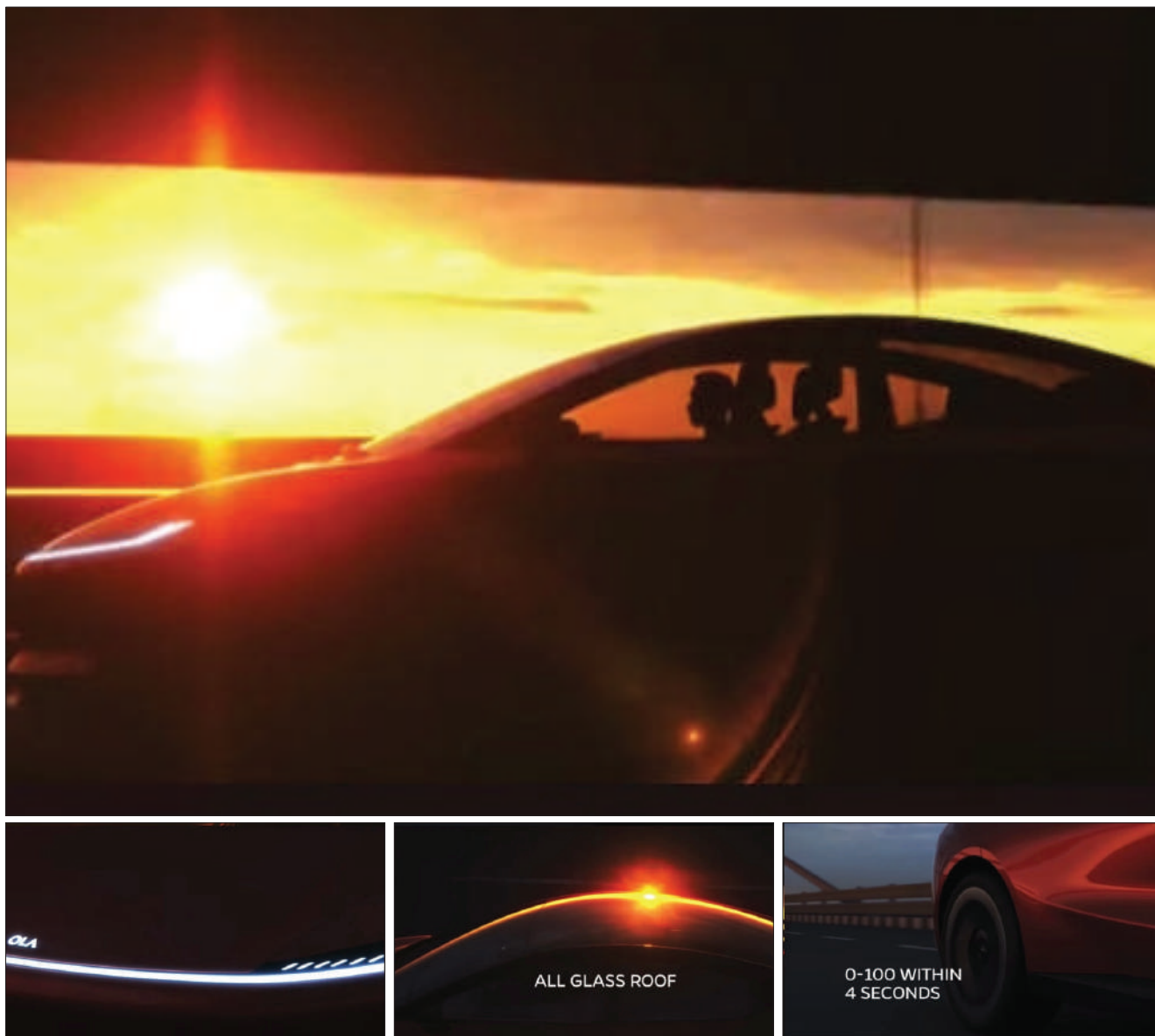
Ola Electric Car to be launched in India

Ola electric car, to debut in 2024

After building an electric two-wheeler ecosystem, Ola unveiled its electric car at the Mission Electric 2022 event, which will make its debut in 2024. Bhavish Aggarwal, CEO of Ola Electric, shared a few details about the company's upcoming electric car, including its design, features, range, and performance.

The upcoming Ola electric car will be capable of a 0-100 kmph sprint in 4 seconds, while it will offer a range of 500 km on a full charge. This will put the Ola electric car almost on par with some of the European electric cars on sale in India.

The official name of Ola Electric car has not been announced yet but the company claims that it will be the quickest EV in India. It will have a drag coefficient of less than 0.21cdr, all glass roof and allow keyless operation.

Ola's upcoming electric car will get a handle-less door design, a large touchscreen infotainment system, a digital instrument cluster, and more. Additionally, the electric car will be powered by Ola's Move OS technology and is likely to get Advanced Driver Assistance Systems along with a host of other safety features.

In a statement to PTI Bhavish Aggarwal said that the company will take a top-down approach. The first Ola car will be a luxury crossover. It will target the premium segment. It could have prices between 40 lakhs and 50 lakhs. In future, consumers can expect more affordable electric cars from Ola.

Bhavish said Ola plans to develop two vehicle platforms and six different cars, all of which will be manufactured from its Giga factory in Tamil Nadu. It has an objective of manufacturing a million units of electric car each year at the FutureFactory near Bengaluru.

According to Bhavish Aggarwal, the penetration of cars among Indians are quite low and there is a potential of big spurt.

HDFC ERGO launches 'All Things EV' platform for present and future EV customers

HDFC ERGO General Insurance Company has launched 'All Things EV (https://www.allthingsev.io/),' a one-stop-solution portal for electrical automobiles (EV).

In line with the Government of India's push for electrical mobility, this initiative caters to the wants of current and potential EV customers.

As part of this initiative, the corporate has unveiled a devoted platform for the prevailing and potential EV ecosystem customers, which hosts end-to-end data on this rising sector; the platform caters to all Indians who've both bought EVs or are planning to purchase EV or to make incomes out of the booming EV area. The platform has a roadmap with options like slot reserving at charging stations, roadside help, RTO companies and creation of an EV group.

The platform helps the prevailing customers with data on close by charging stations, places of charging stations alongside the route for intercity commute and wealthy content material across the upkeep of their EVs, mentioned the corporate in a media launch.

Potential EV consumers can get data on all of the EV choices out there in India, together with the price of possession and subsidies provided by totally different state governments.

Anyone trying to arrange charging stations may also discover out the out there choices of charging items, and the related price and profitability metrics.

CATL announces its second European battery plant in Hungary

Contemporary Amperex Technology Co., Limited (CATL) officially announced it will invest 7.34 billion euros to build a 100 GWh battery plant in Debrecen of east Hungary, which is also its second battery plant in Europe following its German plant. Subject to the shareholder meeting approval, construction of the first production facilities will start within this year.

Covering an area of 221 hectares in the Southern Industrial Park of Debrecen, the project will supply both cells and modules to European automakers.

Debrecen is located at the heart of Europe, and with close proximity to some auto plants of its customers such as Mercedes-Benz, BMW, Stellantis and Volkswagen, CATL's Debrecen plant will enable it to better cope with the battery demands of the European market, improve its global production network development, and help accelerate e-mobility and energy transition in Europe.

As part of its commitment to reducing the carbon footprint in battery manufacturing, CATL will use electricity from renewable energies, and is considering developing solar power with local partners in the country.

Tata Power to set up EV charging points across JP Infra's residential projects to accelerate sustainable mobility in Mumbai

In alignment with the Maharashtra Government's EV Policy, Tata Power and JP Infra Mumbai Private Limited, one of the prominent real estate developers in Mumbai, have joined hands to install 60+ electric vehicle charging points across all JP Infra's projects viz. JP North Garden City (North Euphoria, North Alexa, North Aviva, Codename Dream Home), North Barcelona, and North Imperia, thus providing end-to-end EV charging solutions to residents for making sustainable mobility achievable.

Residents with electric vehicles will have access to a 24×7 charging facility and can connect through the Tata Power EZ mobile application for all services, including remote vehicle charging monitoring and e-payments. The partnership will enable the residents to access a constant and universal EV charging experience.

Rekor Systems enables safer roads and drivers using connected vehicle telematics data available through the Otonomo Platform

Otonomo Technologies Ltd. announced that Rekor Systems, Inc., and Otonomo are expanding their existing relationship with a multi-year contract supporting the mission of improving road and driver safety. Rekor, a global AI technology company that provides data-driven insights to build safer, smarter, and more efficient cities around the world, is deeply integrating the multi-layered connected vehicle data available via the Otonomo Smart Mobility Data Platform into its Roadway Monitoring and Response Platform to enhance the accuracy and granularity of the Rekor incident identification algorithm, making it possible to respond to traffic incidents faster, potentially saving lives. With the Smart Mobility Data Platform, Rekor supports customers across departments of transportation, city traffic management centers, and regional transportation centers in St. Louis, Missouri, Gothenberg, Sweden, and the broader bay area of San Francisco, California.

The Otonomo Smart Mobility Data Platform provides easy access to a range of proprietary and patented mobility data solutions that power customers products and services—from curated, high-quality, multi-layered connected vehicle data, standardized and blurred to remove identifiers; to VIN-specific data compliant with data privacy regulations; and ready-to-use insights generated with proprietary machine learning and AI.

Zibo, China poised to take the lead in intelligent connected vehicles

In order to position itself in the lead of the intelligent connected vehicle (ICV) sector, the government of Zibo, Shandong, China has recently been working with ICV players, such as Baidu Apollo, QCraft, Dongfeng Yuexiang, Golden Dragon and Suntae Auto, the frontrunner in Zibo's ICV industry chain. The aim of the collaboration is to establish an ICV full-scenario ecosystem along the 100km-plus stretch of road in the mountain park located in the eastern Zibo National New & Hi-tech Industrial Development Zone.

By using communication networks and driverless technologies such as 5G, Mobile Edge Computing (MEC), and Vehicle to Everything (V2X), the Zibo ICV Full-Scenario Ecosystem Project has comprehensively tested capabilities like vehicle environment perception, intelligent decision making, collaborative control, and information exchange and sharing between humans, vehicles, roads, and the cloud with ICVs including multi-functional unmanned sightseeing vehicles, mobile shops, patrol vehicles, motor sweepers, mobile toilets and road-side and cloud-based auxiliary equipment. In doing so, the project aims to provide diversified services such as hailing unmanned shuttle buses on smartphones, smart shopping, dining and entertainment. Thus far, the project has put two unmanned motor sweepers, two unmanned mobile shops, and 15 unmanned sightseeing shuttle buses into operation. Furthermore, projects such as QCraft Robobus Production Line, Autonomous Driving R&D Center, Production Base, Sales Center, and Simulation Center have also been launched.

The autonomous bus fleet debuts in Zibo

Jaguar Land Rover prepares for advanced electrified and connected future with new testing facility

Jaguar Land Rover has taken another step towards a new era of electrification and connectivity by opening a facility to test the next generation of vehicles for electrical and radio interference.

The Electromagnetic Compatibility (EMC) laboratory at Gaydon in the UK, will ensure future vehicles meet current and future legislation and quality standards for connectivity and electronics. New Range Rover Sport, which launched in May, was the first vehicle to undergo a bespoke testing programme at the in-house facility.
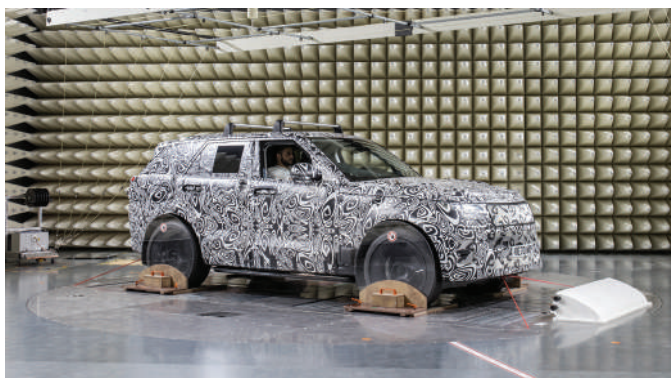
A critical aspect of vehicle performance, EMC is the ability of electrical equipment and systems to function correctly in their electromagnetic environment. It works by limiting the unintentional generation, propagation and reception of electromagnetic energy to reduce the risk of unwanted effects such as electromagnetic interference.

Jaguar Land Rover's new vehicle laboratory features two anechoic chambers: an electrically 'quiet' rolling road that enables engineers to test vehicles at speed, as well as equipment to assess the performance of individual components, such as batteries or electric motors. Bluetooth, GPS, WiFi, 4G, 5G, adaptive cruise control, wireless charging and blind spot monitoring are all examples of vehicle services and features that the facility will test for EMC.

Gatik and Cummins integrate Gatik's autonomous driving technology with Cummins' advanced powertrain in next-generation autonomous fleet

Gatik announced that it will collaborate with Cummins Inc. to facilitate the integration of Gatik's autonomous driving system with Cummins' advanced powertrain solution in Gatik's fleet of medium-duty trucks. Cummins delivers powertrain solutions that provide leading performance and fuel economy through the integration of hardware and software.

Under the collaboration, Cummins will utilize its suite of advanced software features to integrate its powertrain solution to enable Drive-by-wire (DbW) for Gatik's industry-first medium-duty (class 6) Isuzu FTR fleet with the Cummins B6.7 engine. The integration of Gatik's commercial-grade autonomous technology with Cummins' powertrain increases functional safety and enhances reliability of the autonomous system, while improving fuel efficiency and offering superior vehicle performance on Gatik's short-haul, B2B delivery routes. Cummins will work closely with Gatik's engineering team to provide additional technical expertise.

MiX Telematics to acquire Trimble's Field Service Management business

MiX Telematics announced that the company has signed a definitive agreement to acquire Trimble's Field Service Management's (FSM) business. The acquisition is subject to customary closing conditions.

Stefan Joselowitz, Chief Executive Officer and President of MiX Telematics said, "The MiX and Trimble Field Service Management teams are working very closely together to ensure a seamless transition. The combination adds significant scale to our North American telematics subscriber base while diversifying that business into additional industry verticals. North America is a strategic priority for MiX, and we are well positioned to pursue M&A opportunities to bolster our regional organic growth investment."

FSM will add more than 40 000 subscribers to MiX's subscriber base. The acquisition will be immediately accretive to MiX. Trimble's FSM business has been reported as part of the Trimble Transportation segment. The sale will not have a material financial impact on the segment or Trimble's overall financial results.

BorgWarner acquires Rhombus Energy Solutions

BorgWarner Inc. announced that it has acquired Rhombus Energy Solutions. Headquartered in San Diego, California, Rhombus offers V2G and Underwriters Laboratory-certified charging. Rhombus supplies its patented technology to EV OEMs, including Proterra, and charging and grid service providers.

The transaction has an enterprise value of up to $185 million, which is being funded primarily with cash balances. Approximately $130 million was delivered at closing and up to $55 million could be paid in the form of contingent payments over the next 3 years.

HEADLINES

- Senmiao Technology announces signing of new agreement with BYD affiliate for leasing of electric vehicles
- Avanci signs agreements with Hyundai and Kia
- Mercedes-Benz signs MoU with Government of Canada to strengthen cooperation across the electric vehicle value chain
- Volkswagen Group and Canada aim to advance sustainable battery supply chain in North America
- Celgard enters into strategic alliance agreement for high-performance lithium iron phosphate (LFP) battery separator technology with American Battery Factory
- STEER EV enters into agreement with Enterprise Fleet Management to order electric vehicles
- Lakewood, Ohio, expands ParkMobile partnership in an effort to modernize parking in the City
- Enel X Way and HiON announce US strategic partnership to expand availability of electric vehicle charging stations
- Actasys enters into collaboration with Webasto, a tier one automotive supplier
- EVmatch and Wallbox announce partnership to improve consumer accessibility and reach of EV charging solutions

Siemens and MAHLE sign letter of intent for wireless charging of electric vehicles

Siemens and MAHLE intend to collaborate in the field of inductive charging of electric vehicles. Both companies have signed a letter of intent to this effect.

One aspect of the planned cooperation includes coordinated standardization efforts in the relevant pre-standardization and standardization bodies. The goal is to close gaps to ensure full interoperability between vehicles and the charging infrastructure.

In addition, there are plans for a close exchange of ideas to develop a complete inductive charging system for electric vehicles. MAHLE aims to contribute its many years of experience as an automotive supplier and Siemens its expertise in the field of charging infrastructure.

Hyundai Motor Group invests in startup BOS Semiconductors

Hyundai Motor Group announced its investment in BOS Semiconductors, a fabless startup based in Korea that designs system-on-chip (SoC) solutions expecting to collaborate toward semiconductor of future mobility.

Starting with this investment, the Group plans to continuously seek various automotive-related semiconductor technologies and cooperate with diverse chip companies to secure competitive semiconductors for automotive.

For the venture, the Group leveraged the second fund of its ZER01NE open innovation platform, which it created in February 2021 with Hyundai Motor Company, Kia Corporation, and Hyundai Motor Securities along with external investors, including Korea Development Bank and Shinhan Bank.

ZER01NE's second fund has an expanded investment target and scope compared to its first fund, formed in 2018. The Group is using the second fund to proactively invest in promising startups to support its future mobility businesses, such as advanced air mobility, eco-friendly vehicles, connected cars, artificial intelligence, and robotics.

CATL and ZEEKR sign five-year strategic cooperation agreement, first volume of Qilin batteries to power ZEEKR models

CATL and ZEEKR jointly announced ZEEKR as the first car brand to be powered by mass-produced Qilin batteries. ZEEKR 009 will be the world's first car with Qilin inside, and ZEEKR 001 will be the world's first model equipped with Qilin batteries of 1,000 km range. The two companies have reached five-year strategic partnership, and based on deep cooperation, agreed to strengthen interaction of supply and demand so as to promote the technological advancement of the new energy industry.

The Qilin batteries are based on CATL's third-generation CTP technology. With a record-breaking volume utilization efficiency of 72% and an energy density of up to 255 Wh/kg, it achieves the highest system integration level worldwide so far, capable of delivering a range of over 1,000 km. Moreover, by adopting the trail-blazing large-surface cell cooling technology, Qilin supports a hot start in 5 minutes and fast charging in 10 minutes. With the same chemical system and the same pack size, it can deliver 13% more power than the 4680 battery, accomplishing an all-round improvement in range, fast-charging, safety, service life, efficiency and low-temperature performance.

NETA AUTO selects BlackBerry QNX to power the NETA S, next-generation EV sedan for the Chinese market

BlackBerry Limited and HOZON NEW ENERGY AUTOMOBILE CO., LTD. (HOZON) announced that NETA AUTO, China's EV brand owned by HOZON, has selected BlackBerry QNX technology to power its soon-to-be-produced futuristic sports sedan, the NETA S. The deployment will ensure the functional safety, cybersecurity and reliability of the vehicle's critical systems while providing users with an engaging, immersive, and digital-first driving experience.

As part of the agreement, the NETA S will use the BlackBerry QNX® Neutrino® RTOS and QNX® Hypervisor for the vehicle's new intelligent technology cockpit, the 'NETA SPACE'. In addition, NETA AUTO's full-stack NETA PILOT 3.0 intelligent ADAS technology will also feature the QNX® OS for Safety, helping realize intelligent assisted driving in multiple scenarios.

Global overseas ADAS and autonomous driving Tier 1 suppliers market to 2025

The 'Overseas ADAS and Autonomous Driving Tier 1 Suppliers Report, 2022' report has been added to ResearchAndMarkets.com's offering.

The gap between suppliers has widened in terms of revenue growth, and many of them plan to launch L4 products by 2025, countries allow L3/L4 vehicles on the road to a limited extent.

Germany enacted Autonomous Driving Act in July 2021. Through its new legislation, Germany has become the first country in the world to allow L4 autonomous vehicles onto public roads without requiring a human backup safety driver behind the wheel. Application scenarios include: shuttle buses, short-distance public transport in urban areas, logistics between distribution centers, demand-oriented off-peak passenger transport in rural areas, first/last mile passenger or cargo transport, automated parking of dual-mode vehicles.

Japan's government planned to amend traffic laws to allow L4 autonomous vehicles to drive on some roads and ask lawmakers to approve the change as early as March 2022. Under the revised law, a license system will be introduced for operators of transport services using autonomous vehicles with L4 autonomy. Operators will be required to assign a chief monitor who can supervise the operation by riding a car or through remote control and can command multiple vehicles simultaneously. Japan aims to achieve L4 by 2025, which would allow private cars and delivery trucks (platooning) to operate on expressways, as market-oriented application.

In March 2022, the U.S. Department of Transportation's National Highway Traffic Safety Administration (NHTSA) issued the `Occupant Protection Regulations for Automated Vehicles`, stating that fully autonomous cars no longer need to be equipped with traditional manual control devices such as steering wheels, brakes or accelerator pedals. The United States plans to realize the market-oriented application of L3 passenger cars in low-risk driving environments such as urban commuting, and L4 passenger cars on expressways (like going on/off ramps, autonomous lane change) by 2025.

In July 2022, Shenzhen, China issued `Regulations on Administration of Intelligent Connected Vehicles in Shenzhen Special Economic Zone`, allowing L3 autonomous vehicles to be tested and demonstrated on open roads in administrative areas with relatively sound CVIS infrastructure.

Consumers want electric vehicles more than autonomous vehicles, according to Ipsos' latest research

For years, automakers have talked about electric vehicles and autonomous driving as two connected parts of the future of cars. But new research from Ipsos shows that automakers might be better off if they talked about them separately.

Ipsos' latest Mobility Navigator Study shows that while almost half of drivers (49%) say they're interested in an electric vehicle for their next car, only 31% would be interested in a fully autonomous (aka self-driving) car. And people are growing more interested in electric vehicles every year, while interest in self-driving cars remains stubbornly low.

That's not to say people aren't interested in any new driving technology to help them on the road. More than 60% of consumers say they are interested in individual features like accident avoidance, night/all-weather vision, and advanced driver assistance, which are key advancements in driving technology.

Vehicles today offer more potential interactions for the driver, raising concerns over the level of driver distraction. These worries are becoming a common issue. In a U.S. poll of 1,000 adults conducted in 2021, Ipsos found that drivers believe they encounter a distracted driver in one of every two drives they take.

In addition to identifying which features and technology generate the most interest among consumers, the study results also reaffirm that the auto industry is facing a potentially sticky generation gap regarding these transformational technologies. The latest Mobility Navigator data on electric vehicles shows a dramatic difference in attitudes toward electric vehicles by generation. Millennials and Gen Z consumers are much more positive about electric vehicles than their Boomer counterparts. When consumers are asked about autonomous driving technology, the same gap emerges, and may be getting worse.

Another finding with far-reaching ramifications: Consumers ultimately want control of autonomous technology. Even those consumers who are pro-autonomous driving vehicles express that there is a time and place for it: Three out of four consumers who would consider autonomous technology say they would only want to use it in certain circumstances. This will also require more education for consumers, so they better understand and trust the technology. And until full autonomy is embedded and accepted, it will mean that consumers need user-friendly controls and interfaces with which to control the autonomous tech in their vehicle.

Lei Jun unveils Xiaomi Pilot Technology

Xiaomi Group officially revealed the development status of Xiaomi Pilot Technology, in the first R&D and staffing update since announcing its entry into the smart electric vehicle segment in March 2021, 500 days ago. Xiaomi plans to invest RMB 3.3 billion in the first R&D phase of its autonomous driving technology, and has established a sizable R&D team of more than 500 world-class professionals. A series of valuable acquisitions and strategic investments in upstream and downstream enterprises have also allowed Xiaomi to steadily build out its mid-to-long-term industrial capabilities in the field of autonomous driving.

During press conference, Xiaomi also released a live road test video of its autonomous driving technology, demonstrating its advanced algorithms and capability to handle a comprehensive list of scenarios.

Lightning eMotors announces launch of Lightning Insights real-time EV telematics and charger management software

Lightning eMotors announced the launch of Lightning Insights™, a significant extension of its state-of-the-art telematics system built for monitoring and managing Lightning fleet assets in real-time.

Lightning's original telematics solution, created 10 years ago, was already a market-leading platform offering an array of data collection and analysis capability that was unmatched in the industry.

The new system, which monitors up to 156 data points including vehicle location, state of charge, energy usage, efficiency, lifetime metrics with total driving hours, energy usage, vehicle health and many other important vehicle metrics, is integrated into every new Lightning eMotors vehicle. Additionally, Lightning Insights provides complete control over Lightning's fleet charging solutions including charger access, charge time scheduling, load management, payment methods and more.

In addition to a user-friendly portal, Lightning Insights customers can leverage the available API to enable seamless integration of Lightning vehicle data with other third-party telematics or charging management systems. This capability offers versatility for fleet operators that already utilize other providers and don't want an additional portal to log into. Every vehicle equipped with Lightning Insights connects to Lightning's data servers over an encrypted 4G connection, not only allowing Lightning to monitor all aspects of the vehicles' health, but also providing real-time analytics viewable by customers.

QoSec - Building Cybersecurity for Automobiles in M2M communications

✎ **VIJAYA VIVEK KAMATH**
Sensorise

With advancements in the technology and emerging customer expectations, the automotive industry has evolved over the period. Fuel efficiency, driver behaviour, vehicle health and many more parameters for a safer user experience are predominantly the industry' s need for gaining the competitive advantage in the exceptionally changing environment. Upcoming innovations are focussed on autonomous driving, escalated level of comfort, safety yet a faster means of travel.

Role of IoT in automotive industry

IoT (Internet of Things) is one of the core components, bridging the various individual mechanisms knitted together by sensors, devices, control units etc, through the internet for machine communications. IoT is the new gene of the advanced automotive DNA, enabling machine communications for data exchange, without any human intervention, thus empowering the automobile industry for safer, optimized and more efficient operational footprint.

With the widespread growth of Intelligent Sensors, Wireless Connectivity, Cloud Collaboration, Analytics and Big data, the world is opening eyes to a new dawn of IoT and Machine to Machine (M2M) communications. IoT is constantly creating new business models and introducing proficiencies matching the industry needs with huge returns for business growth across a variety of industries, connecting many more machines to the Internet than humans.

While M2M concept and technologies have been in use for quite some time for effective monitoring and control, the changing business scenarios and new use cases are acting as growth stimulants for IoT in various segments. Rising demands for M2M solutions are primarily triggered by the widespread adoption and proliferation of affordable wireless communication, making the overall system much sustainable, profitable and reliable.

IoT enabled Electric Vehicles

Environmental threats posed by air pollution, fuel depletion and an array of related concerns had led to the evolution of electric vehicle segment. Analysis of certain parameters to gauge the performance and impact of the system is extremely critical. These eco-friendly entities are intelligent vehicles provisioned to operate on propriety mechanisms to collect vehicle data for effectively minimizing the cost of design, manufacturing and operations in total. While these tracked performance parameters count in speed, mileage, acceleration, battery management, fault alert, charging status & frequency, fuel monitoring, and more – the data packets with the related information can only be tracked and monitored for preventive and predictive maintenance if available on a platform in real-time. The analysis, trends and insights can be examined for tremendous value and measurable return on investments for businesses by creating new business models,

and introducing efficiencies that enhance the customer experience.

Adoption of IoT enabled automotive system enables real-time monitoring of vehicle and its vital health parameters to offer real-time measures, ensuring optimal performance. It also contributes to the safety measurements by real-time time tracking, geo-fencing, etc. to mitigate passenger and vehicle safety risks. The telematics data covers sensitive data from sensors, control units and other components and this information is transferred to the cloud for data analytics through M2M communications for an enhanced customer experience and business opportunities.

For OEs, the investments associated with the product design is the most critical and reportedly, 60% of this cost is linked to Battery and associated Battery Management System Functions. The efficiency of the battery management system drives the operational expense and is the proprietary asset of the business. The data captured and processed through IoT enabled devices and accounts for various parameters such as current, voltage, temperature during charging and discharging conditions, power, State of Health (SoH), and State of Charge (SoC) etc., is a sensitive information which is transferred to the cloud for analysis through IoT M2M connectivity. IoT also enables a two-way communication for

SIM CARD >108 mm² | M2M UICC MFF 6x5 30 mm² | DFN 4x4.2 16.8 mm² | WLCSP 3.5x2 7 mm² | DFN 2X2 4 mm²
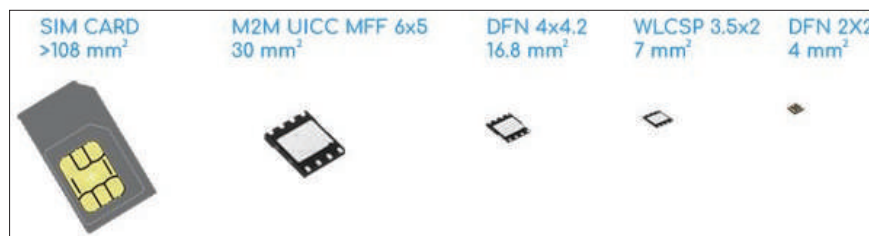
alerts and notifications to the machine from the platform for diagnosis or preventive maintenance. This real-time data is the right match to all the queries related to an ideal machine functioning and predictive analysis to prevent failures/ breakdowns.

Overall, IoT holds a crucial role in the success of electric vehicles.

Industry Challenges

The geographical diversity is the limitation of all the network providers, and it is impossible for any network provider to serve the entire globe with consistent connectivity. Moreover, the loss of network contributes to the downtime, thus deteriorating the data analytics for predictive and preventive analysis. The security is another challenge which is often overlooked due to rapid competition in go to market products. Hacking of any sensitive data may lead to major disruptions. However, the security integrations made in the device or sensor in the fitment stage may lead to expenses soaring the manufacturing cost. Thus, these challenges need to be addressed so that the evolving technology is affordable for all.

QoSim as Quality of Service - Enabling Innovation in IoT M2M Connectivity & Lifecycle Management

QoSim is a unique proposition for Quality of Service (QoS), offering multiple connectivity profiles on a single SIM card with a capability to intelligently switch the networks when the primary network is lost. This uninterrupted connectivity proposition is also empowered with remote subscription update for hassle-free download of any new profile on the same SIM card, over the air, without any physical intervention with the SIM. This service is powered by a cloud-based connectivity lifecycle management platform, SenseLCM for remotely managing the multiple profile on a single platform and remotely diagnosing and troubleshooting the connectivity concerns.

Importance of Security in M2M communications

Data security in IoT segment is much vulnerable to cyber threats and poses significant impact on the overall automobile
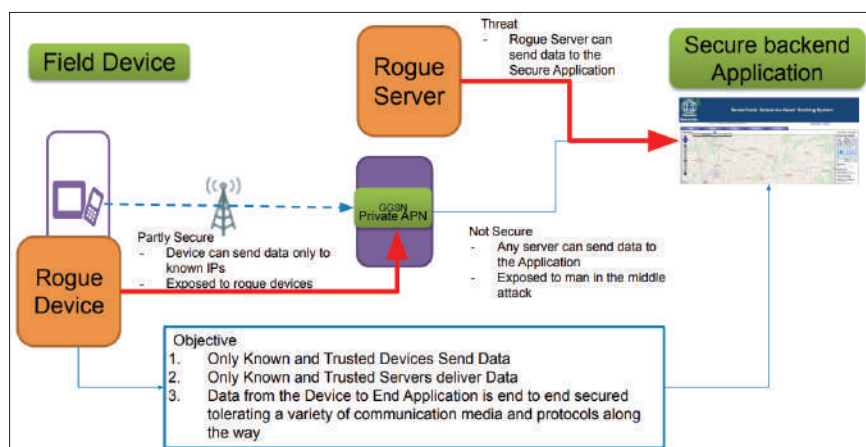

Fig 1: Security Challenged Architecture (Use Case: Telematics and Tracking)

ecosystem. Any device connecting to the Internet with an operating system is prone to cyber-attacks and is a prominent security concern for enterprises.

Apart from the Quality of Service, there is a crucial need of M2M connectivity with security elements to keep the data safe, private and invulnerable to hacking and cyber-attacks. Majority of the Machine to Server Communication uses Public Cloud / Open Internet, hence data encryption is critical for IoT Security.

QoSim is a secure applet with strong digital identity, unique IMSI and mutual authentication elements. End-to-end security-by-design is enabled by the advanced QoSec feature with security based on GSM standard to facilitate secure data communication from SIM to Machine Applications. The feature highlights are as follows:

- Carrier Class Security by Design for constrained IoT Devices as per TRAI recommendations
- Common Service Layer Security Enablement using Standards based Auth Algorithms
- Crypto processes as approved by ETSI/ 3GPP Standards

With the impending 5G trials and a number of use-cases coming up in the Connected Car, Autonomous Devices, Electric Vehicles etc., security is the base requirement considering the number of cyber-attacks. is a complete end to end security solution for multiple industry use-cases. It includes card in various form factors, applet and backend server to encrypt and decrypt the data for use at defined distinct nodes. The most striking feature of QoSec is the key differentiation that distinguishes the encrypt key from that of the decrypt key such that an application on the device can encrypt a message, but nothing on the device can decrypt the same, thus ensuring complete security from malicious applications, without any change to Device PCBs.

With secured IoT and M2M communications, enterprises and businesses can automate many processes and minimize downtime, reduce operating costs, increase efficiency, and enable predictive maintenance for a future ready scenario. Sensorise solutions remove complexity from IoT implementations, allowing for rapid achievement of business outcomes with the proven Sensorise capabilities to rapidly drive real business value for the organisations and their customers. ❑

AUTHOR

VIJAYA VIVEK KAMATH
Business Mentor
Sensorise

Vijaya Vivek Kamath is an IT veteran with extensive experience of over 27 years in Systems Integration, Program Management, Technology Architecture and Mobility Solutions, especially in the Telecom Business Vertical. As one of the core founding members of Sensorise, Vijaya has steered SenseLCM vertical and created strategic business models for the multi-profile eSIM in automobiles and now introducing security for data encryption in M2M communications.

Compiler Tool Qualification for Functional Safety and Cybersecurity

✍ **GERARD VINK**
TASKING

The automotive industry is characterized by three major trends: digitalization, connectivity, and highly automated vehicles. While safety processes are established and mature, each of these three trends requires the need for comprehensive cybersecurity processes. This article focusses on the management of compiler-induced cyber security vulnerabilities.

In 2020 the United Nations Economic Commission for Europe (UNECE) released the regulation on uniform provisions concerning the approval of vehicles with regards to cybersecurity and cybersecurity management system, also known as WP.29.

In the European Union, the UK, and several countries outside Europe such as Korea and Japan this regulation is being incorporated into legislation for vehicle type approval rendering cybersecurity compliance as nonnegotiable for securing market access.

Although WP.29 does not mention the ISO/SAE 21434:2021 Road vehicles — Cybersecurity engineering standard, it is understood that if an OEM and its supply chain can demonstrate compliance with this standard, then that compliance can be used to demonstrate compliance with the WP.29 regulation. Likewise, demonstrating compliance with the ISO cybersecurity standard should protect OEMs and their suppliers from liability.

Compiler Qualification for FuSA

Compiler tool qualification for functional safety is a solved problem. The ISO 26262 standard devotes an entire chapter to criteria to determine the required level of confidence in a software tool and provides methods for qualifying the tool to create evidence that it is suitable to be used for functional safety related software development.

Four methods are provided to qualify a software tool: Increased confidence from use, evaluation of the development process, validation of the software tool, and development in accordance with a safety standard. For higher ASILs, only the latter two methods are suitable. In the industry, the tool validation method is widely applied. Essentially, tool validation means using validation measures to prove that the software tool meets specified requirements for its purpose.

Two different approaches are being used to meet the ISO 26262 tool validation requirements. Some compiler suppliers perform the tool validation in-house and invite a conformity assessment body to certify that the tool and its safety documentation are fit for purpose. In this case, the customer receives a certified compiler toolset and only needs to apply the guidelines from the safety manual to show that his use case is compatible with a qualified use case. Other vendors offer a certifiable (versus certified) compiler toolset plus a tool qualification methodology with supporting tools and documentation. The tool qualification methodology is generally certified and the customer must perform the tool qualification which can be summarized as:

- Specifying the use case in order to define the requirements to be satisfied by the tool
- Selecting the appropriate tests to verify those requirements
- Performing the tests
- Analyzing the test results
- Generating the safety documentation
- Applying the guidance from the safety documents.

The downside of this latter approach is that there are quite a few hidden costs such as: learning the qualification methodology and associated tooling, licensing the necessary tests suites, performing the tool validation process, interacting with the certifier, and finally what to do if tests fail.

Compiler Qualification for Cybersecurity

The ISO cybersecurity engineering standard (ISO 21434 section 5.4.7 Tool Management) specifies that "tools that can influence the cybersecurity of an item or component shall be managed". A compiler can modify (optimize) the behavior of a program in ways that the programmer did not foresee. The software developer's structural intent may not be accurately depicted in the final representation of the source program and therefore the compiler affects the cybersecurity of the software.

Unlike the ISO FuSa standard, the ISO cybersecurity standard does not specify tool qualification requirements. No guidance is given as to what exactly "shall be managed" means. As such, this leaves a lot of room for interpretation:

- The criteria to determine the required level of confidence in a compiler toolset for the development of cybersecurity related software are unknown; and
- No method is specified to demonstrate that the cybersecurity related criteria have been met.

However, the ISO cybersecurity standard contains many references to the ISO functional safety standard. The proven

tool validation method of the ISO 26262 standard is suitable for the qualification of a compiler toolset used in development of a cybersecurity regulation complaint software. In order to apply this method, the tool validation criteria for the development of cybersecurity related software need to be established.

Tool Validation Criteria for Cybersecurity

Analogous to the tool validation criteria for functional safety, the criteria for tool validation for cybersecurity can be specified as:

- The validation measures shall provide evidence that the software tool complies with the specified cybersecurity requirements.
- The cybersecurity risks that can be introduced by the software tool and their corresponding behaviors shall be analyzed together with information on their possible consequences and with measures to avoid or detect them.
- The reaction of the software tool to anomalous operating conditions shall be examined.

To meet criterion 1, the cybersecurity requirements on the compiler toolset must be specified. The Mission Assurance Engineering (MAE) process developed by the National Cyber Security FFRDC (NCF), which is part of MITRE, can be used for this purpose. This process is compatible with the criteria from ISO 21434 chapter 15 Threat Analysis and Risk Assessment methods. If this MAE process is performed by the tool vendor and the results are described in the tools' safety & cybersecurity documentation, then this eliminates the need for the tool user to perform a tool validation.

Criterion 2 must be satisfied by the tool user based on the guidance from the tools' safety & cybersecurity manual. Finally, the tool user must assess the residual risk associated with his specific use case that remains after applying the guidelines.

To satisfy criterion 3, the tool supplier has to analyze the reaction of the software tool to anomalous operating conditions using the aforementioned Mission Assurance Engineering process. The findings are translated into guidelines and are included in the tools' safety & cybersecurity manual. Analogous to satisfy criterion 2, the tool user must implement the provided guidelines and asses the residual risk for his use case.

Identification of cybersecurity requirements

The mission assurance engineering (MAE) process that is used to identify the cybersecurity requirements related to the compilation process is shown in Figure 1, it provides a analytic approach to:

- Identify the cyber assets most critical to mission accomplishment.
- Understand the cyber threats and associated risks to those assets.
- Select mitigation measures to prevent and/or fight through attacks.

TASKING implements this MAE process using a Failure Mode and Effects Analysis (FMEA) and a Threat Assessment and Remediation Analysis (TARA). Note that the purpose of these activities is to ensure the integrity of the tool user's software, rather than the integrity of the compiler toolset. This is in line with the aim of ISO 21434 which is to address the cybersecurity perspective in engineering of electrical and electronic (E/E) systems within road vehicles where systems external to the vehicle are not within the scope of the ISO 21434 standard. The integrity of the compiler toolset and files operated upon is governed by other standards such as ISO/IEC 27001 – Information Security Management. It is important that both the tool supplier and user also comply with an IT security standard.

Failure mode and effects analysis (FMEA)

The Failure Mode and Effects Analysis (FMEA) is used to identify the potential cybersecurity risks that the compiler toolset can introduce into the user's software. The mission objective of the compiler tool can be defined as: the behavior of the software being compiled shall meet the user's intentions under both normal conditions and under cybersecurity attack conditions. Note that the ISO C and C++ language specification provides large freedom to compiler engineers to apply transformations on the software that are correct based on a legalistic interpretation of the ISO C and C++ standards, but that would surprise many talented software programmers. Therefore it is beneficial if the FMEA is executed by a team of engineers that have an in-depth understanding of the compilers' requirements, architecture, design and implementation. For each identified failure mode one or more mitigation measures to reduce the risk must be provided.

Threat Assessment and Remediation Analysis (TARA)

The Threat Assessment and Remediation Analysis (TARA) from MITRE is a methodology used to identify and assess cyber vulnerabilities and select countermeasures that are effective to mitigate those vulnerabilities. This methodology is compatible with the requirements of ISO 21434.

The TARA workflow shown in Figure 2 can be summarized as follows. System technical details are used to construct
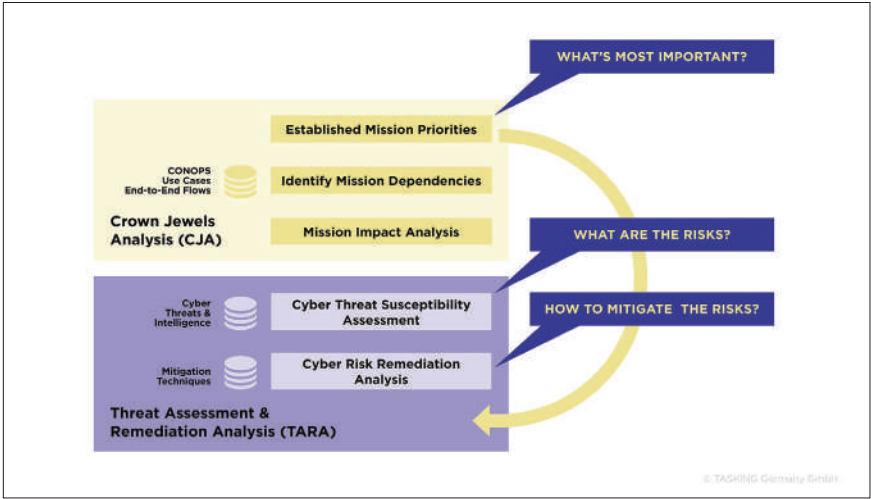

Figure 1: The Mission Assurance Engineering (MAE) Process Framework

a cyber model of the system architecture, which provides a basis for searching the catalog for plausible attack vectors. For our purposes the Common Attack Pattern Enumerations and Classifications (CAPEC™) database is used as catalog. Subsequently the list of attack vectors is filtered and ranked based on assessed risk, producing a vulnerability matrix. The list of vulnerabilities is combined with mitigation mapping data from the catalog to identify an initial list of countermeasures, which is filtered and ranked based on assessed utility and lifecycle cost, producing a mitigation mapping table.

Figure 2: TARA assessment workflow

Subsequently countermeasures are selected based on cost and level of risk tolerance. Finally, a solution effectiveness table is created which lists recommended countermeasures/mitigations and provides details on the effectiveness of each countermeasure over the range of vulnerabilities assessed. In addition to information from the CAPEC catalog, information can be retrieved from other databases, such as the CWE catalog of software and hardware weakness types and the CVE catalog of disclosed cybersecurity vulnerabilities.

Due to the highly dynamic nature of the cybersecurity domain, a regular repetition of the above analyses is necessary.

The Result of the FMEA & TARA

Forementioned analyses show that compiler-induced vulnerabilities can be classified as being related to standard vulnerability classes, side channel attacks, undefined behavior, and persistent state violations. The associated mitigations are either cybersecurity related requirements that must be implemented by the tool vendor or requirements that shall be satisfied by the tool user.

Requirement to be implemented by the tool vendor are for example: protection against stack-smashing attacks via compiler placed stack-canaries, measures to detect buffer-overflow, or provisions to support memory layout randomization.

Requirements to be met by the tool user relate to generic coding guidelines and guidelines specific to the particular compiler toolset being used. MISRA compliance is considered a minimum, adherence to the SEI CERT C/C++ coding guidelines provides more comprehensive prevention against cybersecurity-related risks. The guidelines for a particular compiler toolset depend largely on the optimization philosophy that is applied by the compiler vendor. Some vendors claim that FuSa and cybersecurity requirements inhibit all optimizations applied by the compiler. At the other end of the spectrum, compiler developers apply a very legalistic interpretation of the ISO C standard and consider compiler-induced cybersecurity risks as a side effect of the user's insufficient understanding of the programming language. At TASKING, we believe that optimizations do not have to introduce FuSa and cybersecurity risks if, and only if, the compiler provides sufficient diagnostic information about the applied optimizations to make the user of the tool aware about possible consequences.

Conclusion

We have described a systematic methodology to qualify a compiler toolset as suited for the development of software that must meet ISO 21434 criteria.

The methodology is based on the MITRE Mission Assurance Engineering Process. TASKING applies this methodology to ensure that its compiler toolsets are fit for purpose.

The combination of both an FMEA performed by engineers with expert knowledge of a compiler's design and implementation, and a TARA based on cybersecurity knowledge obtained from public databases, are complementary.

Both analysis result in cybersecurity related requirements that must either be met by the tool supplier by supporting additional facilities in the toolset, or that must be met by the tool user by applying the guidance from the safety and cybersecurity documentation that comes with the tool.

A tool qualification performed by the compiler vendor increases the quality of the analysis related to compiler-induced cybersecurity vulnerabilities. For the tool user, it avoids the need to acquire tool specific competences and knowledge, and results in cost and lead-time reduction. ❏
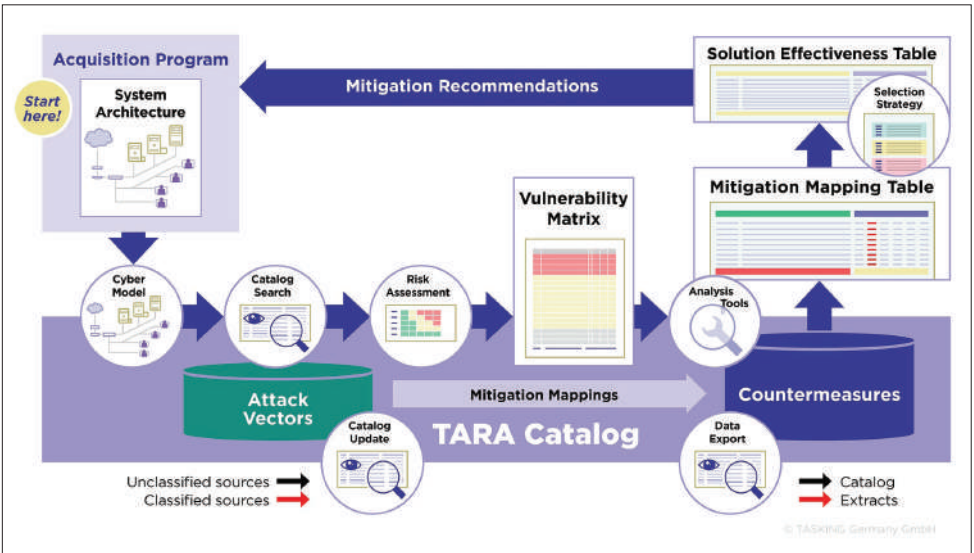
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GERARD VINK
Industry Specialist Product Definition
TASKING
Gerard Vink studied mechanical engineering and computer science and has long-term experience with the development of tools and processes for (embedded) software development. In his spare time, he likes to race motorcycles and was Dutch champion in the RC1000 class in 2019.

Safety Protocols should be followed in EV Batteries

Puneet Jain, founder of Natural Battery Technologies talks about the safety of electric vehicle batteries in India, in an interview with Telematics Wire.

PUNEET JAIN
FOUNDER
NATURAL BATTERY TECHNOLOGIES

Tell us more about Natural Battery Technologies

NBT, at its core, has always been about innovation since its inception and has been evolving; we are developing high-performance batteries with increased safety parameters, customs energy storage systems, solar energy storage systems, BMS, and many others. Today, Natural Battery Technology is the leading manufacturer of lithium-ion-based battery products such as Lithium-Ion Batteries, Lithium-Ion Cells, LiFePO4 Cells, Battery management Systems, Battery Packs for Solar Street Light, Solar Home Lighting Systems, Energy Storage systems (UPS & Inverter) & other portable devices.

What made you venture into the field of battery manufacturing?

When I returned to India from Dubai after a long stint, I noticed the gap in India's EV battery manufacturing market; after extensive research and establishing ties with raw material suppliers, I finally launched NBT on 2019. Saurabh Patawari came in with his manufacturing excellence and experience joined hands to develop the batteries at larger scale.

What unique strength do you count on in the field of battery manufacturing for EVs?

Being engineering graduates, we focus on first principle thinking to bring about the most feasible and useful products in the market for our customers to adopt easily. With our strengths in research and development as well as manufacturing excellence, we can introduce new product iterations in the market at the pace no one can matc.

What makes Natural Battery Technologies different from other battery manufacturing companies?

The major differentiation factor is that NBT's Li-ion batteries surpass the Lead Acid batteries across all parameters, such as high-power density, deep cycling capability, and much longer service life. Additionally, NBT provides a high range of customer-specific customizations and is 50% More Energy Efficient; has 40% Longer Run Times; is 50% Smaller Carbon Footprint; has a 45% Lower Cost than Lead Acid Batteries, and also comes with easy Plug and Play Technology

Further our research into alternative chemistries gives us the edge to develop the right product for the application.

How could policy intervention from MoRTH or govt of India help improve the battery manufacturing ecosystem in India ?

It is significant for encouraging phased manufacturing programs for batteries and EV components. The initiative aims to aid in the setting up of an intricate framework of state-of-the-art battery manufacturing units all across India. To support cell manufacturing, the country needs a sufficient supply of raw materials, mainly lithium, cobalt, nickel, etc., through mining grounds within the country or its peripheral countries.

Recently we have seen multiple fire incidents in electric vehicles, what are your views on it?

Indeed, the unfortunate cases of recent EV vehicle-related accidents have raised concerns over the safety of batteries. However, NBT, since its inception, has dedicatedly worked towards the safety aspects of batteries. Our technologically empowered infrastructure and innovation allow us to monitor the health of a battery by considering various parameters. There is a standard for every battery's health stats, and if any product is found lacking behind those standards, the consumer is alarmed to get the required fixations done to avoid accidents.

Do you recommend any safety protocols to be followed?

The identification of battery failure issues, volatile thermal behavior, and associated risks with an identification device to understand the root cause of failure, real-time verifiable exchange value for battery swapping, net metering of charging stations from Discoms, and financing (by bank and NBFCs) of only those batteries that meet government standardization. ❑

SmartDrive - Delivering Smart Usage-based Insurance (UBI)

✒ **DR. AMIT SHEKHAR**
BytEdge, Inc.

Due to all the good reasons, pay-per-use is all the hype right now. Whether it's cloud tech, software solutions, electricity, mobility and even water. Consumers are adept to pay per use for most physical goods and now services are also being packaged to accommodate that pricing. That being said, it's in no way an easy feat to achieve. Thankfully, we now have disruptive technologies and adaptive consumers making it easier for companies to introduce mind- boggling concepts. One of these crazy ideas was to charge insurance premiums based on your driving behaviour. So next time you overspeed, you may end up with a speeding ticket along with a higher premium for insurance. This will be a real-time analysis of your driving behaviour with an immediate effect on usage-based insurance, Usage-based Insurance (UBI). On the other hand, if you are a good driver, you may get a real-time discount on your car insurance.

The global Usage-Based Insurance Market size stood at USD 19.6 billion in 2021 which is projected to reach USD 66.8 billion by 2026. That means growing at a CAGR of 27.7%.

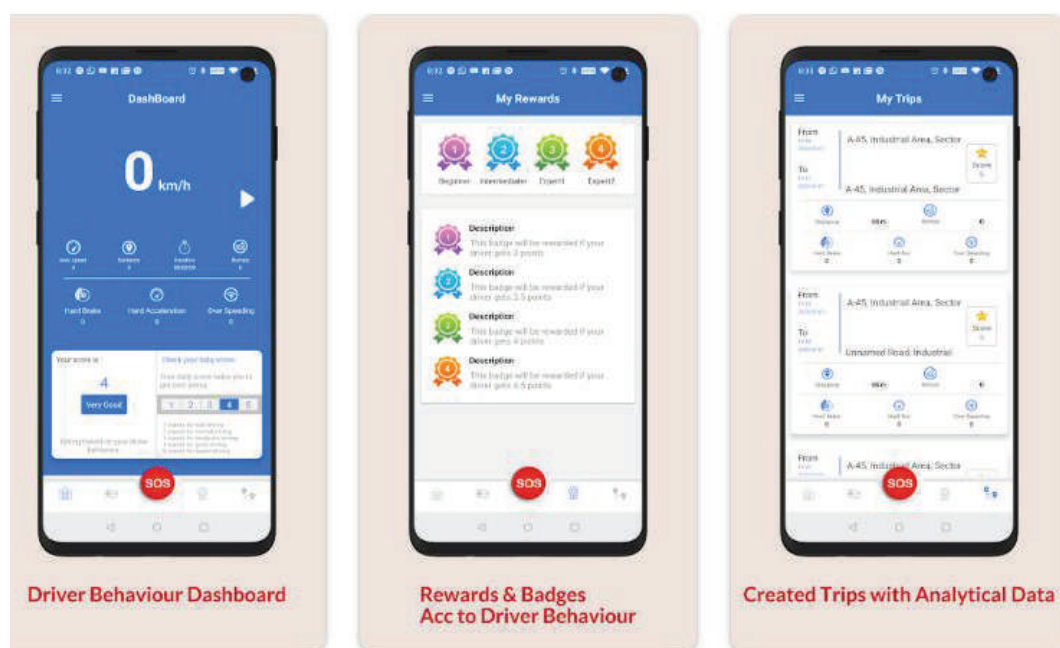## The Mechanics Making It Possible

Since Usage Based Insurance (UBI or telematics) relies on driving data it is important to understand what, how and why data collection, analysis, and insights for computing your vehicle's insurance. The more data points a system can gather, the more efficiently it will understand the driver's behaviour and efficiency. Thus, creating an effective reward-based model. A typical UBI insurer collects the below data:

- Miles driven
- Time of day
- Speed
- Acceleration
- Hard cornering
- Hard braking
- Accidents
- Phone use while driving

All these data points have their own value in the UBI equation. For instance, speed, hard acceleration, hard breaks, cornering etc. indicate responsibility while miles driven, and stops indicate usage load. Through these factors a system can also detect sudden changes in driver's behaviour indicating intoxication or use of vehicle by multiple drivers.

Now that we understand what needs to be tracked let's see how we can track these data points. While some cars have in-built capabilities like BMW ConnectedDrive or OnStar, any car can be easily tracked using an external data aggregator. We can plug an IoT device in the car's onboard diagnostics (OBD-II) port or simply use a smartphone app all like Allstate Drivewise, BytEdge's SmartDrive or Farmer's Signal.

Driver Behaviour Dashboard

Rewards & Badges Acc to Driver Behaviour

Created Trips with Analytical Data

Some companies also use a tag device that can be attached to the windshield or rear window and pairs with your smartphone via Bluetooth. For example, Liberty Mutual Insurance RightTrack. This further enhances the smartphone's capabilities to gather required data.

The choice of data collected, and the technology used depends in the usage-based model a company wants to use. Below are some of the prominent ones:

- Pay as You Drive (PAYD): Charging based on distance travelled
- Pay How You Drive (PHYD): Evaluating driving behaviour like acceleration, braking, etc. to determine premium amount
- Pay as You Go (PAYG): Using telematics devices and/or phones to understand both distance and driving behaviour

The choice of model depends on the technical capabilities of the company, user's consent, and ease of market penetration. For instance, in the US, it is easier to find cars that already have a data collection mechanism but the same won't hold true for Georgia or Belarus.

It's more than what meets the eye!

The subtle thing behind UBI is that it's not just about insurance. The world today is a big narration of a story where data is the protagonist. UBI gives a simple yet powerful excuse to insurance companies to get their hands dirty in the stream so profoundly leveraged by the big apple, jolly good fellows and the blue screen of death. Here are some of the many advantages of telematics (UBI) car insurance:

- Drivers can learn about their habits and how to ensure their on-road safety.
- The idea of lower premiums can encourage people to drive cautiously, limit phone use while driving and adhere to speed limits.
- Identifying potentially intoxicated driver can help authorities limit accidents by being proactive instead of reactive.
- It helps in exercising parental control which can even boost sales of cars for younger drivers
- Businesses involved in commercial use of vehicles can assess driver's performance and even reward good drivers.
- Eliminate non-driving factors in car insurance rates, such as credit score, income, occupation, education, etc.
- Insurance companies can create attractive offers and improved need-based insurance policies for specific car owners.

What other possibilities vehicle data might open is only limited by our imagination. One wild thought can be to use the behaviour data of good drivers to refine self-driving programs.

Keeping speculation aside, even the direct benefits are too good to be left uncapitalized.

Why it isn't mainstream already?

With so many advantages in favor we ought to ask ourselves as to why this technology is not synonyms with buying a car. Surely the insurance and automobile giants have enough resources to make it happen. Well, as with any other technology, Usage Based Insurance suffers from its own complications.

Privacy and Security Concerns:

Some drivers are uncomfortable with their data being shared for the sake of insurance. It's even possible to misuse this data as one can easily know about a person's whereabouts if the PII guidelines are not taken care of. In the 2021 Telematics Consumer Survey conducted by Arity, 35% of respondents shared their concerns about how driving data is used or shared and 34% of respondents were also concerned about whether a fair assessment criterion will be deployed.

Need for Transparency:

We can't all be happy with an algorithm telling us we are bad drivers! Consumers demand openness in such cases to self-check whether they are treated fairly or not. The Consumer Federation of America (CFA) holds the view that telematics could even end the use of non- driving factors while deciding premiums, but it hasn't seen regulators doing their part of removing discriminatory fields from the forms.

In a recently published white paper, the CFA says that telematics programs currently lack rules for pricing transparency and consumer privacy. The organization says that telematics could help insurers end the use of non-driving factors in pricing, but regulators must make sure that UBI programs don't create new forms of unfair discrimination in auto insurance. The CFA is suggesting that state regulators take certain steps like the below to promote fair use of UBI:

- Make it mandatory for insurers to showcase the actuarial basis for the data that's collected and analyzed
- Ensure consumer consent is taken explicitly for use of data
- Prohibit any exchange of telematics data for non-insurance purposes
- Require insurance companies to test minimize any negative impacts on protected classes (based on race and ethnicity)
- Consumers should have the option to review their telematics data and use it for claims settlement
- Tech companies working on telematics algorithms should be licensed as insurance advisory organizations thus, making them subject to state insurance regulations

Even though this is for the US based consumer we can expect the same expectations and guidelines for companies across the world very soon.

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He is a Visionary IT Transformation Leader with over 20 years of experience to transform organizations to achieve competitive advantage and efficient operations. He has significant experience in consumer/retail, manufacturing, high tech, and automotive domains. He has worked with – Procter & Gamble, General Electric, Xerox, Caterpillar, Anheuser Busch, Best Buy, Smuckers, Texas Instruments, HP, and many more.

Product Pricing:

It'll be difficult to convince customers to invest in data collection hardware or even sign up for the scheme unless considerable discount is offered on the premiums (i.e., at least from 10% to 15%).

As per LexisNexis 2013 Insurance Telematics Study, 72% of drivers are more willing to opt or telematics solutions if they get at least a 10% discount for the first 6 months.

This means the first movers in the market will have to invest in hardware and offer discounts and those who enter after-market maturity can still maintain their share without investing heavily in marketing, discounting and hardware at the same rate.

A hope for a better tomorrow

All said and done, we can be positive about the future of UBI. An ever-increasing need for greater connectivity and intelligence in vehicles coupled with the rise of connected cars means that soon we can even stop considering hardware as a limitation. Moreover, insurance companies can alert authorities in case of emergencies like accidents or brake failures. Hence, there is an increasing willingness of governments to mandate such services in the interest of road safety, which is already happening in the European Union and Russia.

While the insurance big daddies have strong global distribution networks the new age startups have flexibility and core tech expertise on their side. Maybe we are eventually moving to a fairer competition in insurance as well.

At BytEdge, we have created SmartDrive to help insurers collect all the necessary data for Usage Based Insurance schemes. The app doesn't rely on any external device like an RFID tag hence, it significantly reduces the technical challenges and costs involved in the process.

As we can see in the screenshot above, through a mobile app user can share driving related data with the insurance companies, access past data and enjoy rewards for good driving behavior. This effectively gamifies the whole process keeping users engaged with the app and the company. ❏

Telematics System Debugging Techniques

✎ **PRAMOD PRAKASH JAGTAP**
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Telematics system consists of many interfaces to vehicle side and external systems. There are many external systems and sensors data required to be transmitted to central server/cloud for providing customer centric features and for correlation with vehicle parameters/analytics for example: Driver state monitoring systems(DSMS), Tire pressure monitoring system(TPMS). The major two links involved by the central processor in telematics unit-TCU is vehicle side link and gsm network link. There are many design considerations essential to make vehicle side, network side work seamlessly considering many challenges in wireless networks and as well in vehicle CAN communications. The system should have capability for developers, aftermarket team to debug the system components and links and further also should have essential log files/packet data files for the subject matter experts to analyze the faults remotely and avoid the downtime of the system.

Generic Connected Car Architecture and System Debugging points is shown below in figure-1

- Vehicle Side Interface – J1939/69, ISO 14229-UDS CAN Interface, RS-232/485, GPIOs, USB/Ethernet.
- Modem Interface with Network: GSM/GPRS-2G/3G/4G/5G Modem Interface to network
- GSM network interface to Internet gateway-source and destination communication and Security layer checks
- Server data packet communication logs

Vehicle Side Interfaces: As number of features are getting added in cars/commercial vehicles-CVs many communication interfaces are added to telematics unit as well. Major system interface based on CAN communication with related standards. The CAN parameters and diagnostics trouble codes with variable cycle frequency from various ECUs exists which is scanned by the telematics unit at fixed durations and transferred to the cloud/server. The data acquisition in TCU is very important step and needs debugging of same through "candump" type of(Linux) commands. The values in candump need to be stored along with timestamp and printed on serial port for comparison with the data out from the TCU. The CAN log files can be captured during validation stages and run on the CAN simulators/tools and compared against the TCU log files for data comparison. Further the timestamp of the parameters in CAN logs vs TCU logs vs server logs should be done to make system data correct along with any data anomaly corrections to be done. Below figure 2 shows

This will ensure correctness of the data that has been captured and the sent to remote server.

Apart from vehicle CAN many external systems send data to TCU through various ports like RS-232, RS-485, USB etc. The node IDs of the interfaces along with parameter value and timestamp needs to be print and logged in memory and needs to be compared with server captured data with timestamp. Similar approach needs to be followed for any wireless sensor links like bluetooth, wifi. The system logs-A values can be compared with data out –B which is modem out packets compared at modem output and further at server end. The data captured in system logs –A should be equal or approximately equal to parameters captured value as sampling frequency can be different.
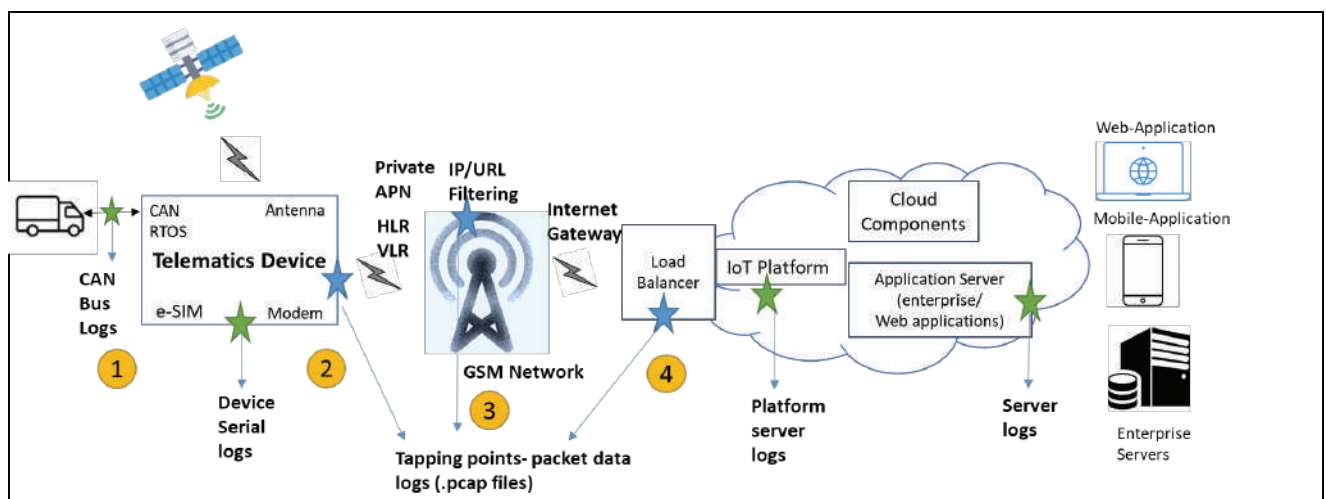

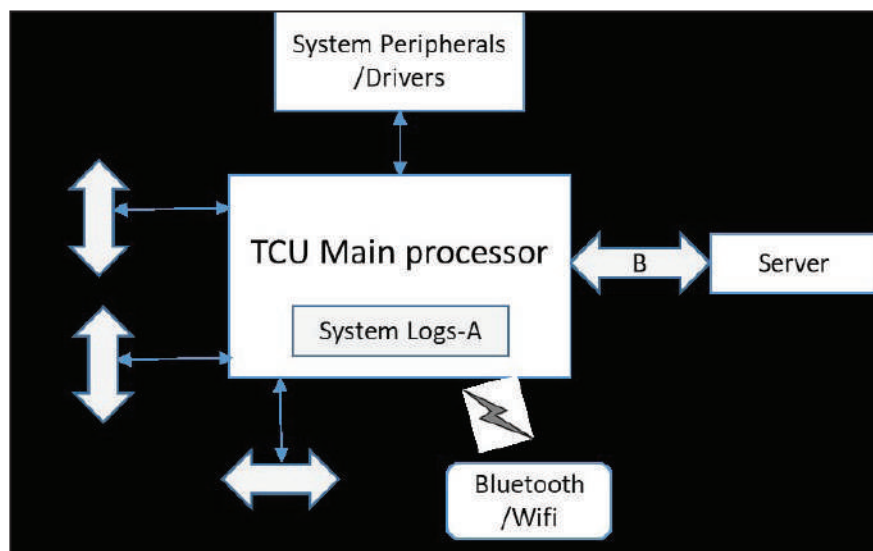**Figure.1** Generic Connected Vehicle Architecture and system debugging points

Figure.2 Vehicle side TCU Interfaces and Data logging for debugging

Modem Interface with Network: TCU comprises of modem along with SIM/e-SIM and antenna which provides GSM/GPRS communication with 2G/3G/4G/5G network support. Figure 3 shows major modem interfaces and debugging points through log files. Most of latest generation TCUs support lot of debugging capabilities including packet data capture at output port, logging communication between SIM, Modem and Main processor through serial port. The packet data communication from modem can be captured in .pcap/supported network debugging tools file format for in depth analysis and trace the issue in network path. The entire communication between every nodes needs to be logged in system log file along with timestamp to trace the exceptions if any during communication.

The 3GPP (3rd Generation Partnership Project) Gsm communication standards provides various communication commands/methods which is used to send the data over mobile network. The request response communication for major AT commands used in code should be logged in system log file. This will provide information regarding the successful/unsuccessful packet/sms/call communication. Also for each AT commands the exceptions/error code are provided which needs to be handled by modem firmware or in the application software layer as per requirement. Exception commands like AT+CMEE? (Error codes) needs to be executed for detail information on the errors between TCU modem and mobile network.

For example: Response from network >> +CME =532   //corresponds to "SIM not ready"

Such responses need to be stored for debugging any network issue happened during the vehicle trip duration. These commands can be executed from remote server/web application (admin rights) through SMS or IP channel for debugging. Remotely issued debugging AT commands can give many useful information related to SIM and internet communication profiles such as SIM registration status(AT+CREG?), data packet info (AT+CGREG?), established socket information (AT^SISO?) etc. Same

established IP channel can also be used to pass other commands to change device related configurations such as update rate of packets, device sleep time, Info about I/O terminals etc.

The data packet constructed by modem needs to captured at modem output in. pcap/equivalent files for debugging. Figure 4 shows sample .pcap file which can be viewed in Wireshark network monitoring tool. The packet size should be optimized to have seamless data transfer till server. There are many ways by which data packets can constructed as per sampling frequency, FMS –fleet management system application requirements, network constraints, platform/ server architecture-streaming etc. The modem data packet logged in file will provide information about data flowing through OSI model (Open System Interconnection model).

For example, One can understand the issues in three way TCP handshake and related errors like server reset and equivalent timeout adjustments at source and destination (platform/load balancers). Also the security layer TLS data flow and equivalent errors can be observed at corrected.

GSM Network Interface to Internet Gateway: The mobile communication architecture consists of many nodes including RF interface – BTS, BSC, MSC, HLR, VLR, Internet gateway etc. Packet data passes through each nodes gets translated into equivalent network protocols like BGP (Border Gateway Protocol), GTP (GPRS Tunneling protocol) etc. Mobile network operators provide customized private APN
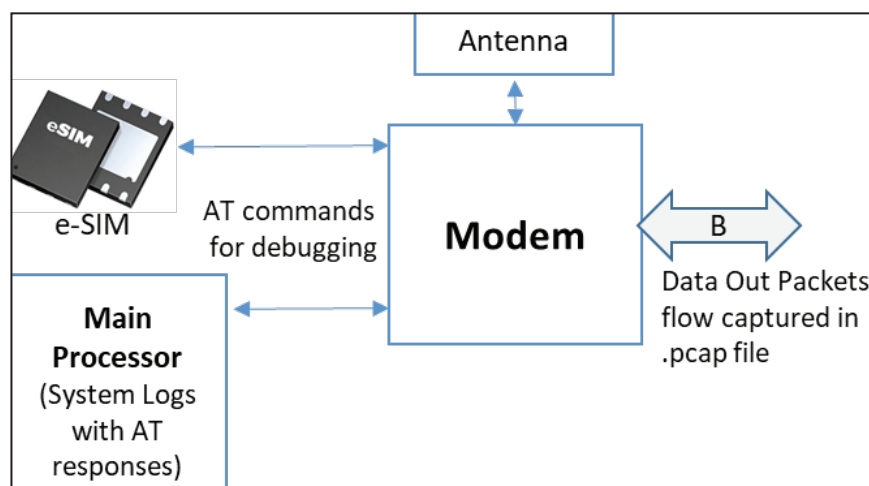

Figure.3 Modem interfaces with AT command responses and data packet logging

for M2M SIMs for every organization. This restricts data packet from the TCU devices to be restricted to specified URLs/ IP whitelisted at network firewall/ filtering devices. The network firewall/ filtering device. pcap logs can be enabled during validation trials/ issue resolution analysis. Network logs provides DNS-Domain Name System communication info as well as information about source IPs

Figure.4 Data packet communication. pcap file capture at modem/network node/server input /server output nodes

and destination server IPs used in communication and many other useful information about network. The network provides static/dynamic source IPs (as per the selected SIM configuration by organization) to TCUs on which the communication happens with destination server IPs. However, DNS system provides end IPs as destination server IPs. These data packet logs are similar to figure 4 however the source and destination in each stage will be different. IP assigned to devices will not visible in the server side logs because this is a private IP provided by the network operator. In server side communication only public IPs will reflect which are commonly known as Natted IPs. NAT (Network address translation) is a protocol which map multiple local private IPs to a single public IP before transferring the information. In Case if data packets logs are captured at filtering device source is from network and destination is DNS resolved server IPs

Server Data Packet Communication logs: The cloud server will receive the packets from the internet gateway. Normally these are received by load balancers at cloud end. The debugging data packet communication can be logged in .pcap file during validation/required trials/ system debugging. The source IP received at server node is NAT IPs for security and

destination IPs as end server ones. The data communication provides important information about server resets, source disconnection, network disconnection information required to understand how system performs with different data packet/ file communication and accordingly source and destination sync up can be performed like timeouts adjustments at server end. Further data communication between load balancer to web application server, enterprise servers (ERP/SAP/ EAM/etc.) can be tapped in similar way to check the packet flow, load /stress analysis, security threats/issues.

End to End System Debugging: The suggested data packet logs can be enabled at major nodes mentioned in the architecture to provide end to end debugging with various log files mentioned above to design and develop effective end to end connected

vehicles platform. There should be mechanism to get TCU system log files over the air (Logs Over the Air) for system traces at any given point of time. This requires logs to be captured simultaneously at each node and study the packet and vehicle CAN communication with TCU system logs traces with timestamp. However data packet logs .pcap logs can be enabled during validation stages and if any issue persist with specific TCU/network channel as required. This will provide necessary information for the SMEs (subject matter experts) to get into the network layer communication (TCP/UDP/HTTP/TLS etc.) details and resolve the issues from the field effectively with proper root cause analysis The suggested debugging methodology will provide better communication insights throughout the path and resolves any errors by taking corrective actions on affected nodes/links. ❏
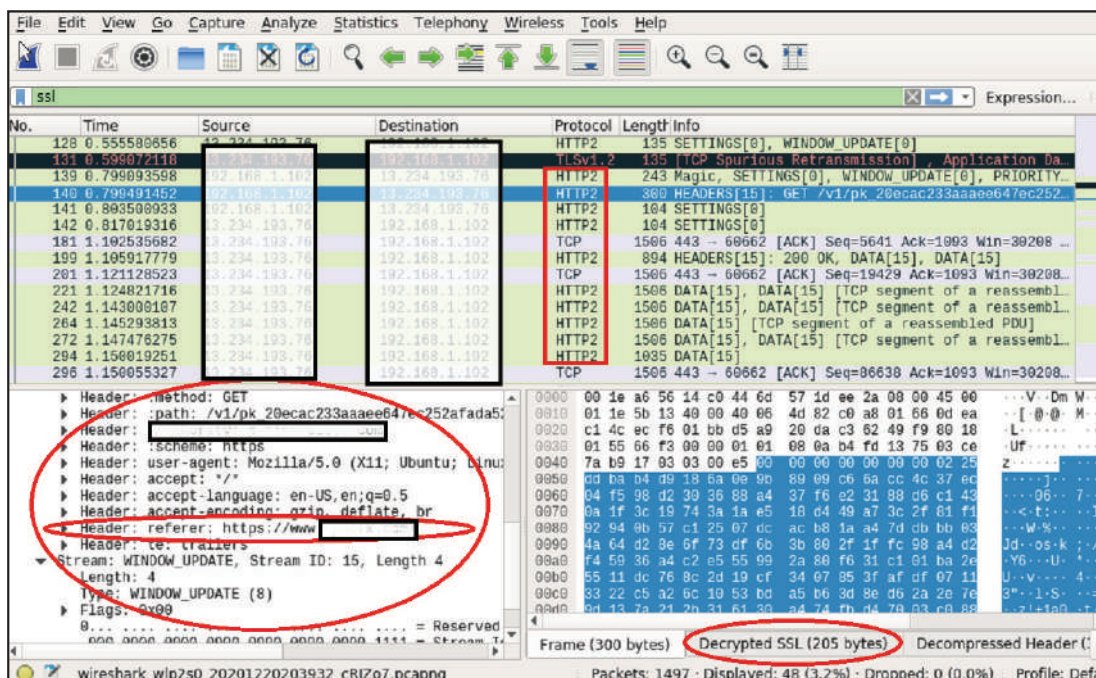
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INSURTECH: MORE PROMISE LESS PERIL

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InsurTech is making way into insurance industry globally. The pandemic has significantly accelerated technology penetration across industries, thereby leading to significant technology deployments and implementation of digital solutions at insurers across the globe.

India has been at the forefront of innovation, accelerating the use of digital platforms across all segments of society. As a part of Digital India initiative, India is pushing for digitizing its financial services and is taking important steps towards financial inclusion. This process of digitization has significantly increased the amount of data collected and thus creates avenues for new opportunities.

Insurers have an opportunity to play a key role by co-creating and adapting their offerings to the new "Digital Environment" and orchestrate these ecosystems.

This leads to an important question:

"In this connected world, should Insurers be leveraging technology?"

Or

"Should technology companies offer insurance?"

Well, there is no straightforward answer to this. In this inception of digital era, It is critical that the Insurers, InsurTechs and Regulators work together towards building the Industry for Connected world, where the ultimate winners should be the end consumers.

The Indian insurance sector has significantly low penetration, as compared to the developed and other emerging economies. Insurance penetration levels in the rest of the world is at 7.3% and in the emerging Asian economies at 5.9% of GDP.

India's insurance penetration level is at 4.0% (Life Insurance at 3.0% and General Insurance at 1%). So, there is a huge gap between Insurance Coverage and Asset Value, which highlights the high-risk state of the country.

Having said that, Indian Insurance Industry has shown significant growth in last 5 years, with Non-Life Insurance industry growing at CAGR of 18%. Rapid adoption of Internet in India has caused insurance industry to undergo these changes that are driving these key paradigm shifts.

Additionally, technologies like IoT, AI and Big data analytics are being used to optimize the operations, profiling the risk and creation of new value added products and services.

IRDAI, India's Regulatory body is doing a great job and has played an active role in supporting innovation in the insurance industry. Formation of regulatory sandbox was a significant step to promote innovation. Since it's formation, almost 250+ proposals have been submitted for approval. Recent approval to use PAYD (Pay As You Drive) and PHYD (Pay How You Drive) for Motor Insurance, brings Connected Insurance and use of IOT Technology to the forefront.

INDIA'S MOTOR INSURANCE STORY:

Motor insurance continues to be the most important line of general insurance business, with nearly 40% share of the gross underwritten premium. Post Covid, Insurance industry has seen good growth in Health Insurance space too, but Motor insurance still continues to lead.

In India, we have approximately 35M Cars, 10M Commercial Vehicles and 200M 2-Wheelers. The numbers of construction or agriculture equipment are not included.

Gross Annual Premium underwritten for motor insurance in India is around USD 10B. But state of things are such that only 42% vehicles are covered under insurance. There are 58% vehicles that are not insured. Assuming, we had 100% coverage, total annual premium underwritten would be around USD 25B.

With a population of almost 1.4 billion and the soaring aspirations of India's young populace, there is a huge opportunity for Auto industry and insurance companies to tap large volumes of prospective consumers. Digital offerings are being looked upon to increase the outreach and come up with new innovative products in order to increase penetration in Tier-2 and Tier-3 cities.

Insurance regulator's plan on easing the minimum entry capital requirement for setting up an insurance company, along with tax incentives and lower solvency margin is a positive move in this direction. This will aid in expanding the reach of the insurance industry and open avenues for mini insurers with limited product offerings for specific geographies.

To bring things into perspective, US has a population of around 300M and has 600+ Insurance companies. In India, we have population of 1.4B, and have only 35 Insurance Companies. So, we have extremely low insurance penetration, and there is a big gap between Insurance Coverage and Asset Value.

CONNECTED INSURANCE - A DIGITAL HOPE:

Technology has revolutionized the way businesses operate, and the insurance sector is no exception. Disruption in distribution, automation of claims management and data collection/analysis are helping businesses to drive organizations forward with increased efficiency and achieve greater scalability.

In this digital era and disruption in insurance distribution, "DIY" approach is emerging as the trend how insurance is being consumed. But this approach caused insurance loyalty to take a big hit. Insurance premiums from various companies are available at a click of a

button and customers opt for the cheapest option available. So, to stay relevant, insurers have to continuously strive to predict risks more accurately and sharpen pricing strategies, thus providing better value to their customers.

Connected Insurance offers a promising approach and Usage Based Insurance (UBI) is being globally accepted as future of Vehicle Insurance. Data from actual industry deployments indicate that the benefits of well-designed UBI programs can justify the investment. Also, acceptance of UBI products across the globe strengthens insurers trust in UBI to transform businesses by generating more revenue and saving costs.

Usage Based Insurance/Connected Insurance introduces a direct and constant channel of communication between the insurer and the insured. Insurance is evolving into a digital service, complete with sensor data that provides analytics and feedback to drivers and Insurance companies.

"Standard Product Pricing" or "One-Size-Fits-All" has made insurers struggle to generate operating profits and net incurred loss ratios are high. Connected Insurance helps insurers to move away from an **'Asset-Driven' Approach and adopt 'Risk-Driven' Approach.**

Moreover, Insurers know that if they do not adopt Connected Insurance, and learn how to use this data in the next five years, they may be out of business as they may be left with all the high risk customers.

Thus usage of UBI helps Insurers to control claims, enhance pricing, increase profitability, and differentiate and personalize their products and services.

A research conducted in US studied a correlation between Risk Profile and Loss Ratios derived from traditionally priced policies. The drivers with lowest UBI driving score had a loss ratio of approximately 135%, compared to a loss ratio of approximately 38% for the top scorers.

INSURTECH: GOING BEYOND CONVENTIONAL:

With Connected Insurance, there are multiple factors that help to bring down costs and reduce Claim Ratio and eventually lowers the Loss Ratio.

There are five major factors that help reduce cost:

- Acquiring Low Risk Customers
- Improved Customer Engagement
- Improved Claims Management (Process Digitization, Reduced FNOL)
- Risk Analysis and Reduction
- Offering Personalized, Value-Added Services

Let's look at them in detail:

Acquiring Low Risk Customers:
In case of Connected Insurance, Risk selection occurs both at the acquisition and renewal stage. Dynamic Risk Profiling is done. Self-selection of insurers by the customer is now so prevalent that risky drivers are less likely to buy Connected Insurance products. These products determine risk more accurately at an individual level.

Improved Customer Engagement:
Driving is a sub-conscious activity and people develop Automatic Driving Behaviour. Connected Mobility helps in development of a low risk "Automatic Driving Behavior" by giving insight into driving profile.

Connected Insurance greatly improves driving behavior, as premiums are based on driving patterns and behavior. Unlike traditional products, that place customers into predetermined risk segments, PAYD/PHYD can be more transparent and fairer and are based on real-time data feed.

Accurate data and continuous feedback help substantially for a driving behavior change.

Improved Claims Management:
Automated Incident Reporting and crash alerts improve customer experience and combined ratios substantially. In India, First-Notice-Of-Loss (FNOL) is around

48-72 hours. During this period, lot of changes are fraudulently done to the vehicle for which insurance company has to pay.

In case of Connected Insurance and usage of IOT, an accident can be detected early, thereby reducing FNOL, providing better claims descriptions and engage the right repair network. This process optimization helps in reduction of fraudulent claims and thus reducing costs for Insurance Companies.

For the drivers, the benefits are tangible: rapid response in case of crash and faster claims resolution.

Risk Analysis and Reduction:
Real-Time data and added security features in vehicles make both vehicles and drivers more secure. In India, once stolen, only 5% of vehicles are recovered back. Using connected technology can help in tracking the vehicle real-time, thus improving the chances of recovering it. Insight into the risk profile of the vehicle and its driver will help insurance company to make more informed decisions, fix leakages and reduce frauds.

Offering Personalized, Value-Added Services:
Connected Mobility and use of IOT unlocks lots of opportunities for insurers to provide unique, innovative, value-added services. They are also generating new opportunities for interaction and stronger ties between customers and insurers, which in turn impacts engagement positively.

Therefore, Connected Insurance would help in enhancing revenues, reducing costs and nurture a steadily growing customer base. Structuring insurance products around customer personas, behaviors and preferences has already proved to be a path towards better customer engagement and satisfaction. ❑

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Blitz scaling Usage Based Insurance with Smartphone Telematics

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Usage-based Insurance refers to the Connected Car (Telematics) technology used by Auto Insurers to provide accurate prices or new services to their customers. With evolving regulations and demand, Insurers are also introducing UBI in several emerging markets in the world.

Smartphone-based Telematics as the technology option for Usage-Based Insurance is a growing trend. Conventional UBI programs have relied on wired GPS or OBD dongle-based solutions to gather data from vehicles. They are still in use due to their reliability in capturing data from the insured vehicle without the driver's intervention. But these come at the cost of adoption and logistical friction that has prevented mass adoption. App-based Telematics measures driving behavior using the driver's smartphone sensor and GPS data. With no device, the solution becomes scalable, affordable and frictionless.

UBI is a strategic initiative for Insurers in a competitive environment, and hence the speed with which an Insurer can launch, get adoption, and scale their UBI program is key. This article offers some Technology best practices for Insurers to scale their Usage Based Insurance initiative via Smartphone Telematics across the phases of Build, Adopt and Scale.

Build and Launch Fast with Telematics SDK:

Most Digitally forward Insurers offer a Loyalty App that offers ability for Customers to buy, renew Insurance as well as initiate and track Claims. Once an Insurer decides to offer a Smartphone based UBI Product, the best approach is to incorporate a Telematics SDK into the existing Loyalty App rather than develop a separate UBI App.

Telematics SDK from a Smartphone Telematics solution provider typically incorporates core smartphone sensor data capturing, processing and analytics inside a library that can be easily incorporated inside the Insurer's App.

SDK should also handle the crucial usability aspects related to Smartphone telematics including:
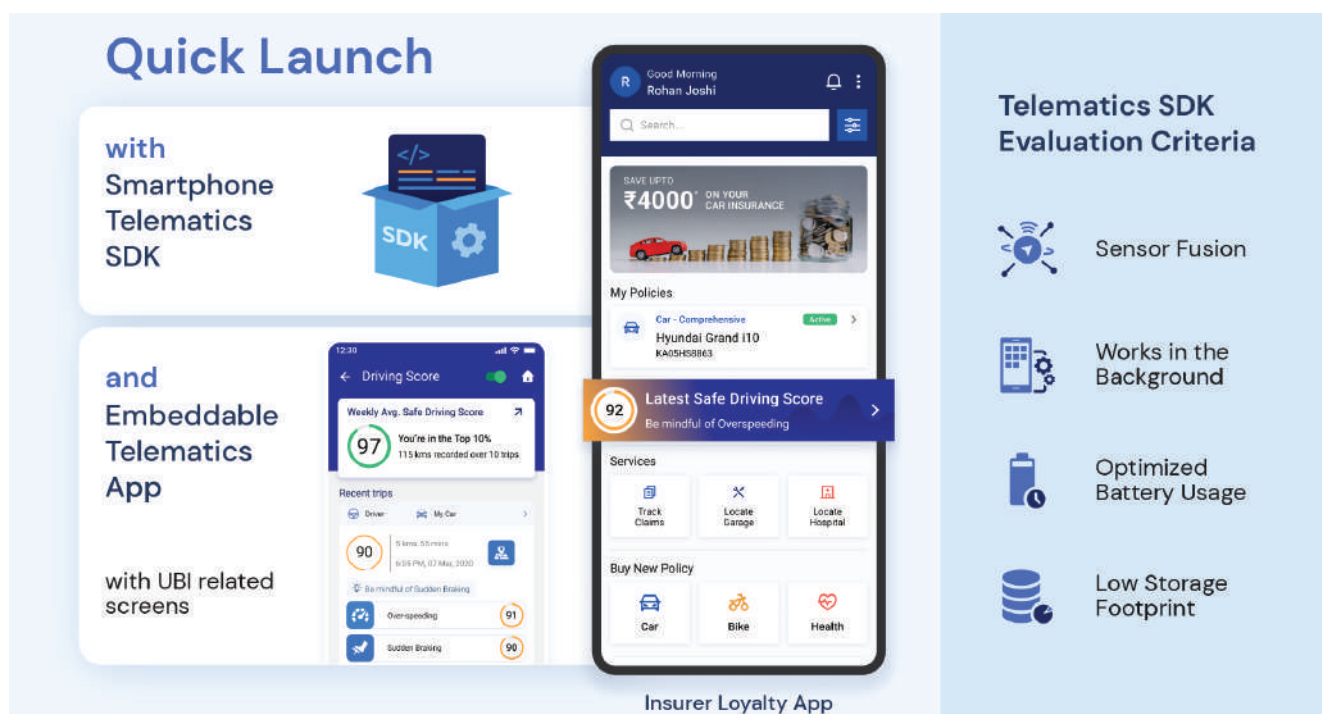- Sensor fusion and axis correction

Figure.1 Fast time to Market with Telematics SDK and Embeddable Telematics App

techniques to make best use of accelerometer and gyroscope sensors besides GPS data for accurate driving behavior detection

- Ability to auto-detect trip start/stop when User is driving and multi-trigger approach to gather data in background without App being open
- Optimized use of Smartphone Battery while still ensuring accuracy of data capture and driving behavior analysis
- Low storage footprint to not bloat the size of the Host App
- Support integration with multiple Platforms including native Android, iOS and other multi-platform frameworks like Flutter

SDKs still require Insurer's technical team to integrate the APIs and develop customized User Interface which may take from anywhere from few weeks to few months depending upon the technical team's readiness.

An even faster methodology to quickly launch a UBI initiative is to use Embeddable Telematics App inside the Loyalty App. Embeddable Telematics App is an SDK along with the required User Interface screens pre-built for the common UBI product scenarios such as Pay-As-You-Drive or Pay-How-You-Drive. With quick customizations, Embeddable Telematics App provide a truly low-code way for an Insurer to launch best-in-class Smartphone telematics within a few weeks.

Overcoming Challenges related to Onboarding and Data Accuracy

Insurers need to be mindful of a few specific technical challenges they will encounter in field while using Smartphone Telematics for UBI

Self-service Onboarding

For Smartphone based telematics, it is expected that the App will work in the background and detect the trips automatically without user intervention. Modern Smartphone OS are designed to optimize Smartphone battery and don't allow App to collect GPS and other sensor data in the background.

Hence, User needs to grant certain specific permissions to the App in order for the UBI App to work seamlessly. These permissions vary from Smartphone Make
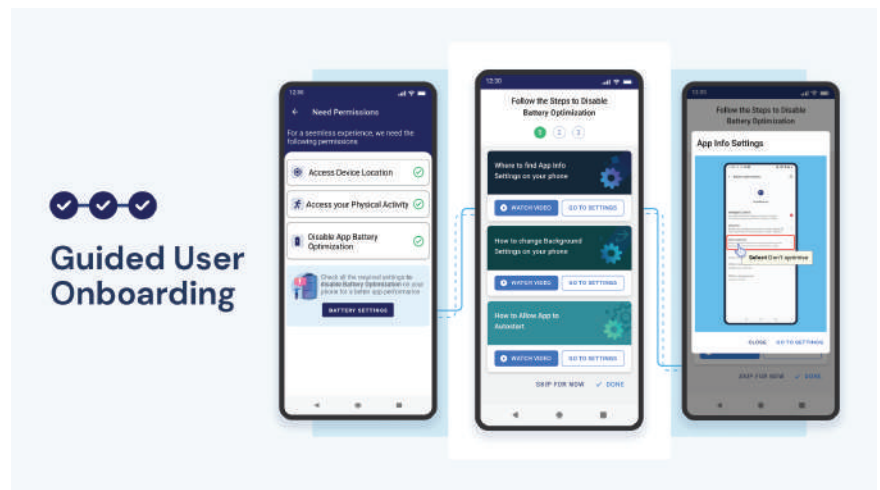

Figure.2 Guide Users to easily provide necessary permissions

Figure.3 Automatically Classify Trips recorded in Insured Vehicle

and OS version. In emerging markets with fragmented market share of Android Smartphone Makes with their own variants of Android, this issue is even pronounced.

To address this challenge, Embeddable Telematics App needs to have an onboarding process that automatically detects specific Smartphone Make and OS version and provides a guided flow to the User for granting the various permissions. Server side mechanisms can track the permission status dynamically for each onboarded user and notify user if some setting is missing. These mechanisms ensure that Users are successfully self-serviced and reduce the burden of customer support in successfully onboarding the Users.

Automatic Tagging of Trips in Insured Vehicle

Since Smartphone Telematics App shall record journeys of Users in any automotive

vehicle, App needs mechanism to identify trips which have been taken by the Insured in her own vehicle, as those are the ones which are of interest to the Insurer from UBI perspective.

- Best practices around solving this technical challenge include the following:
- For vehicles with Head-unit or Infotainment Unit with Bluetooth interface, App can automatically identify journeys in User's own vehicle
- Alternatively, a small, low power BLE Beacon can be placed in the vehicle to achieve this Auto tagging and ensure that only valid driving data from that vehicle is scored.
- Yet another alternative is to use Artificial Intelligence techniques to classify the trips taken in own vehicle vis-à-vis other modes of transport such as taxi, bus and train etc. These AI models learn
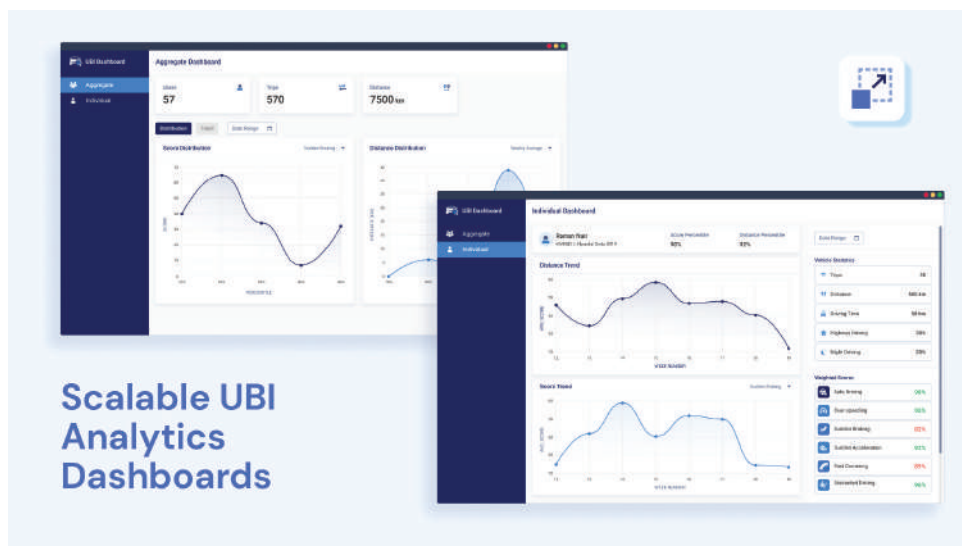
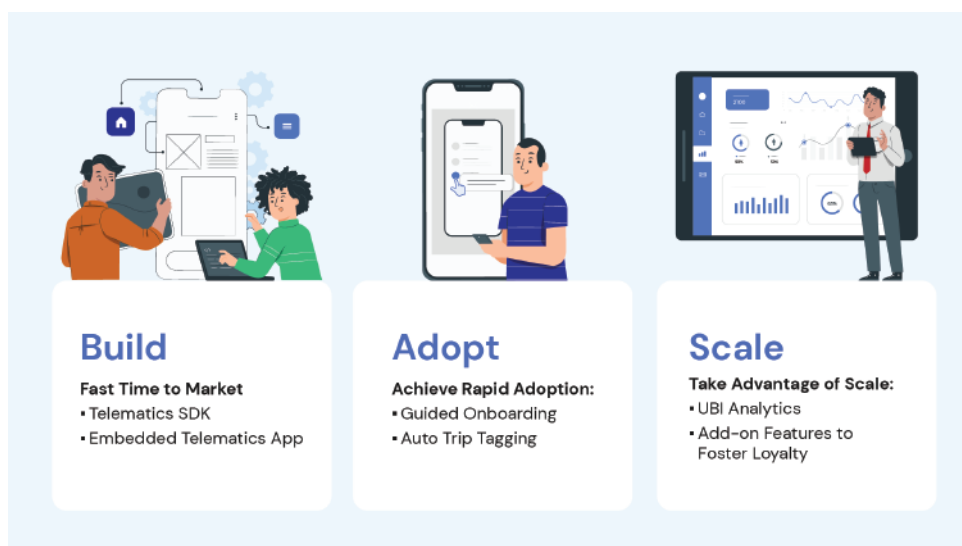**Figure.4:** Scalable, Self-Updating UBI Analytics Dashboards

Figure.5: Smartphone Telematics Technology Best Practices

the pattern of driving behaviour of the Driver in her own vehicle over an initial number of journeys and then use that model to auto classify the subsequent journeys.

At-scale Analytics and

Engagement Features to drive Retention

After an Insurer has quickly launched and smartly gained adoption of customers using the best practices discussed above, Smartphone Telematics presents the real opportunity for the Insurer to really blitz scale the initiative.

At scale, Smartphone telematics generates a treasure trove of data that Insurer can leverage for building under-writing models that better predict risk. At this stage, Insurers Underwriting and Actuarial teams need scalable business intelligence dashboards that offer aggregated insights derived from granular data of entire customer base. Ideally, such UBI dashboards should provide fast and updated Analytics sandbox that Insurer's analysts can use to slice-and-dice driving behavior trends across a variety of dimensions including demographics, location, driving risk variable and so on. Correlation of such risk scores with Claims data will enable Insurers to fine tune premium pricing that matches the true risk and build a long-term competitive advantage.

At the same time, a scalable Customer/App Analytics engine can enable product teams to understand App usage patterns of different customer segments and offer add-on In-App features that encourage Users to engage with the App. These include customized tips for Eco-driving based on Driving Behavior, personalized Driving behavior alerts and Leaderboards/micro-rewards to gamify the Driving Behavior Score. Insurers can offer Value Added services based on Smartphone Telematics such as Automatic Crash Detection and emergency support. All these features along with the core UBI offering drive customer retention and loyalty.

With Smartphone Telematics embedded inside Insurer's Loyalty App and carefully nurtured using the best practices described above, Insurance is not something the customer buys and forgets but becomes a constant companion.

By deploying the above best practices, early moving Insurers can successfully launch and scale UBI initiative in emerging markets and achieve sustainable lead over competition. ❏

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Switch Mobility and Chalo join hands to deploy 5,000 electric buses across India

Switch Mobility Ltd., the electric vehicle division of Hinduja Group flagship Ashok Leyland and Chalo, a transport technology company entered into a strategic collaboration for the deployment of 5,000 state-of-the-art electric buses across India. This partnership, one of the largest commitments for electric buses worldwide, builds on Switch's already strong order book covering three continents with established operators in India, Continental Europe, and the United Kingdom.

The MoU with Chalo has been signed for an initial period of three years and the buses will be deployed across districts and cities in India where Chalo operates. Switch will supply variants of the recently launched EiV12 as part of the supply agreement. The delivery and operation of these electric buses will support India's plans to decarbonize public transportation. Switch Mobility is well placed to meet this demand with its combination of engineering expertise and technological innovation from its manufacturing hubs in India and the UK.

Under this partnership, Switch and Chalo will jointly invest to deploy electric buses in cities where Chalo is present. Chalo will deploy its consumer technology solutions such as the Chalo App and the Chalo Card, offering conveniences such as live bus tracking, digital tickets, and travel plans; and also determining routes, frequency, schedules, and fares. Switch's responsibilities include the supply and maintenance of state-of-the-art electric buses.

Tata Motors signs definitive agreement for the acquisition of Ford India's Sanand plant

Tata Passenger Electric Mobility Limited (TPEML), a subsidiary of Tata Motors Ltd, and Ford India Private Limited (FIPL), have signed a Unit Transfer Agreement (UTA) for the acquisition of FIPL's manufacturing plant situated at Sanand, Gujarat, which inter-alia includes: (i) entire land & buildings; (ii) Vehicle Manufacturing Plant along with machinery and equipment situated therein; and (iii) transfer of all eligible employees of FIPL's vehicle manufacturing operations at Sanand, for a total consideration, exclusive of taxes, of Rs 725.7 Cr.

FIPL will continue to operate its Powertrain Manufacturing Facility by leasing back the land and buildings of the Powertrain Manufacturing Plant from TPEML on mutually agreed terms. TPEML has agreed to offer employment to the eligible employees of FIPL's Powertrain Manufacturing Plant in the event of FIPL's cessation of such operations.

HEADLINES

- Hero Electric partners with Jio-bp for ease of EV charging
- Tata Motors wins order of 921 electric buses from Bengaluru Metropolitan Transport Corporation
- Mahindra unveils five electrifying SUVs under two brands based on the purpose-built INGLO platform
- Switch Mobility Ltd. unveils India's first and unique electric double-decker bus – Switch EiV 22
- Hindustan Petroleum and Honda join hands to boost electric mobility
- ElectronEV to enter commercial electric vehicles segment
- Volvo Buses India launches Volvo 9600 platform, inspired by European design

Mahindra and Volkswagen explore strategic alliance to accelerate electrification of Indian automotive market

The Volkswagen Group and Mahindra & Mahindra Ltd. announced they intend to expand their cooperation. Both companies signed a Term Sheet on the supply of MEB electric components for Mahindra's new, purpose-built electric platform INGLO, deepening the Partnering Agreement from earlier this year. The cooperation intends to have a volume of more than one million units over lifetime and includes the equipment of five all-electric SUVs with MEB components. In addition, the two companies will explore further opportunities for collaboration, opening the perspective towards a broader strategic alliance to accelerate the electrification of the Indian automotive market.

Mahindra showcased their new electric SUV family at the Mahindra Born EV vision unveil event in Banbury, United Kingdom. The electric SUVs will be launched on the all new INGLO platform architecture and envisaged to be equipped with MEB components including the electric drivetrain, the battery system and Volkswagen's unified cell. The Term Sheet covers all major commercial and technical terms along with a path to the potential localization of the battery system. The final supply agreement will be negotiated in a continued constructive and legally compliant way by the end of 2022.
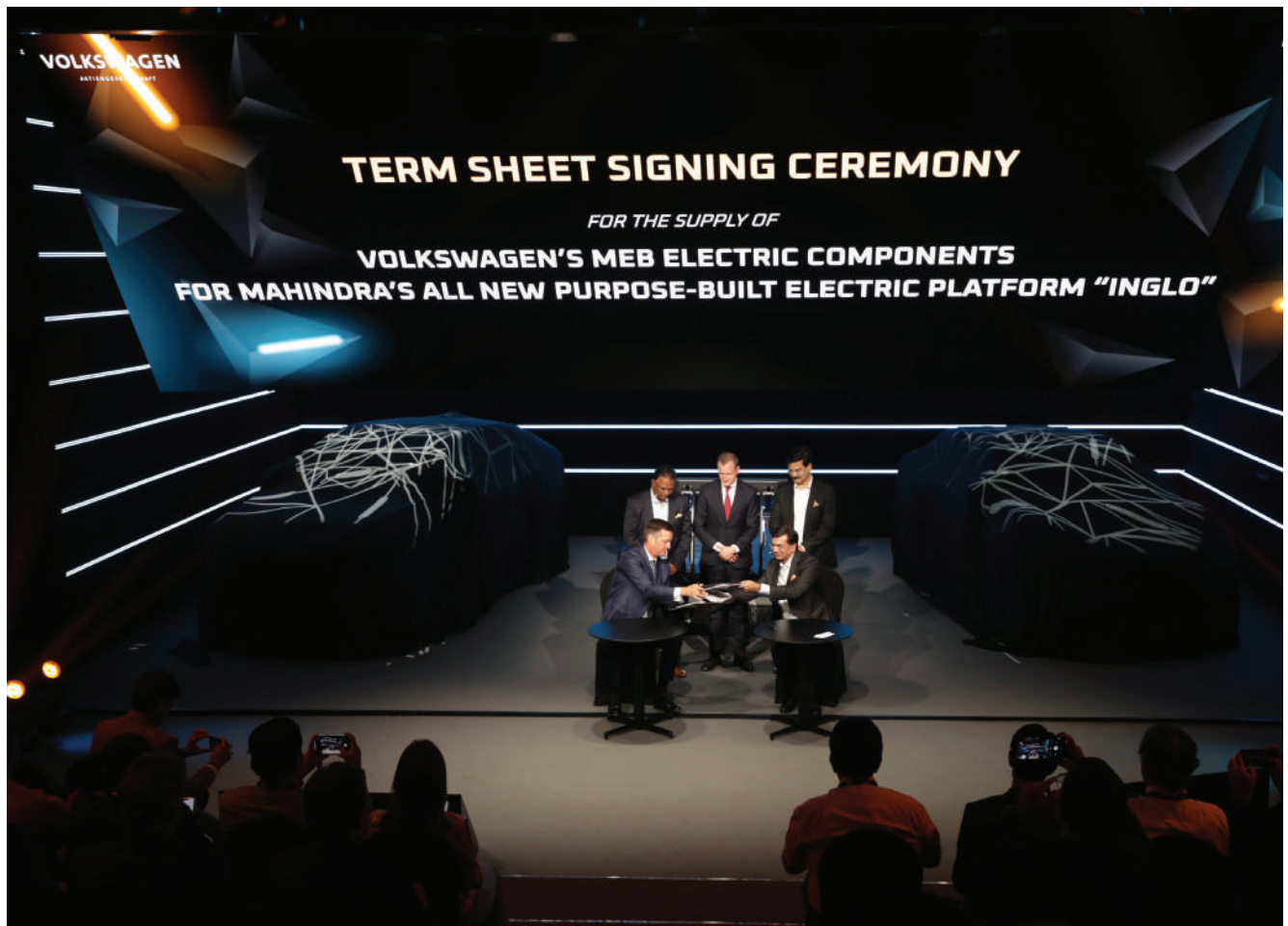
Neuron Energy Pvt Ltd. set to expand its footprint through a tie-up with E-Ashwa

Neuron Energy Pvt Ltd, a bootstrapped start-up successfully establishing itself in the battery manufacturing segment supplying Lithium-Ion and Lead Acid batteries to the EV sector in India, announced its strategic tie-up with EV Giant E-Ashwa Automotive. The purchase order includes 600 battery packs per month and 10,000 battery packs annually. It is therefore estimated that the deal will close at a whopping Rs 2 crores a month and Rs 30 crores annually.

With rising eco-consciousness among general people coupled with rising prices of fossil fuels and ICE vehicles getting tough on the pockets to maintain, electric vehicles are becoming more appealing as an alternative. So eco-friendly batteries are designed to provide an efficient and clean source of electricity for electric vehicles. These batteries provide a variety of benefits that will revolutionize the Indian electric vehicle industry. Additionally, these batteries offer superior performance, with faster charging times and extended ranges.

14 **15**

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15+
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- Automotive OEMs
- Mobility Service Providers
- Tier 1, Tier 2 & Tier 3 Suppliers
- IT Companies
- TSPs
- Chip Manufacturers
- Semiconductors
- System Integrators
- Software/Hardware
  Providers

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