

Vehicle Telematics



Changing the dynamics of Road Surveillance.





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EXECUTIVE SUMMARY

Telematics – in particular the road surveillance of vehicles is assuming a dominant stand in the world of vehicle data reading and tracking. This changing pattern of increased importance to telematics instead of traditional road monitoring is critical for the growth of this industry and the subsequent success of the market leaders.

With the increase in road accidents year on year, it has become absolute necessary to take measures to curb them and use as much data monitoring as possible to increase safety. According to a website, road crashes cost the U.S. \$230.6 billion per year, or an average of \$820 per person¹. This figure is ridiculously alarming and the subsequent sections of this report will elaborate more on the fact that why companies are investing in road surveillance, driver behavior understanding and telematics related to it.

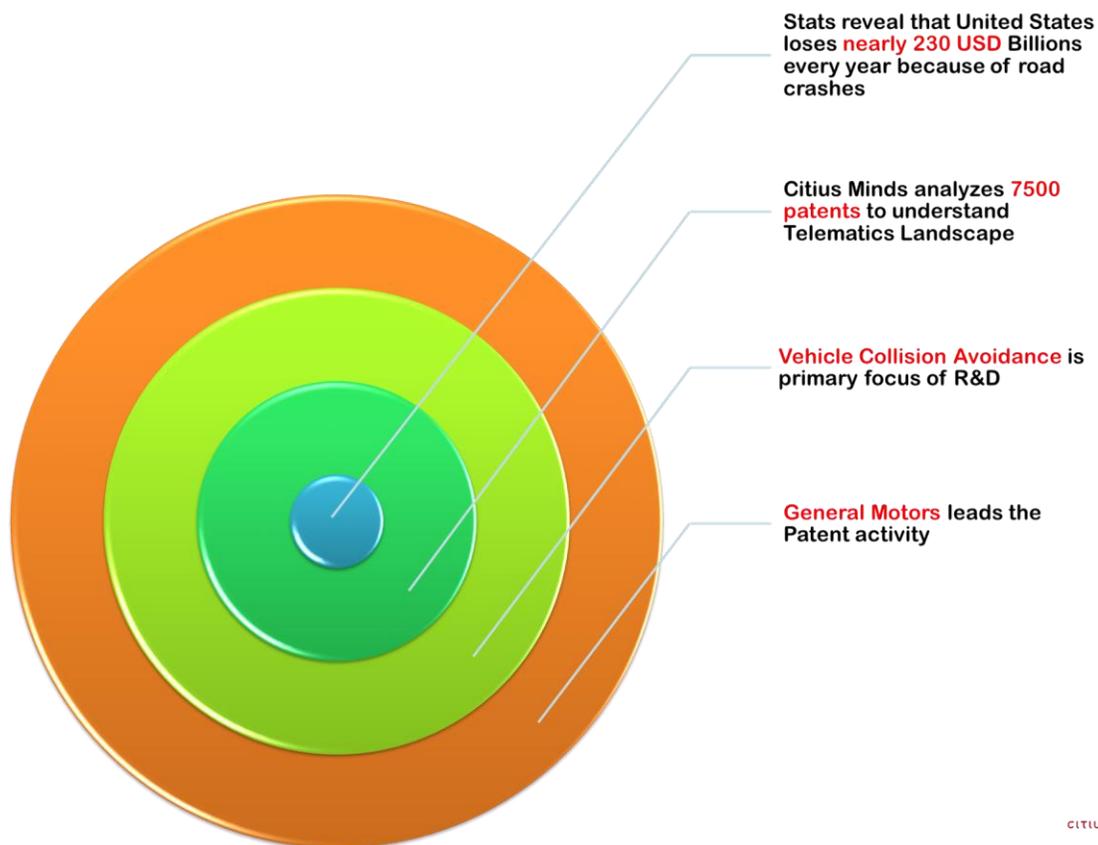


Figure 1: Highlights of the Landscape Report

¹ <http://asirt.org/initiatives/informing-road-users/road-safety-facts/road-crash-statistics>





Auto insurance companies are finding different ways to understand the driver behavior and encouraging safe driving. The incentives for car insurance are decided based on telematics by monitoring data related to vehicles. By using data analytics engine and utilizing mobile sensors, behavior based driving patterns are being understood. The usage of smartphone applications is increasing day by day and is also being considered a cheaper alternative to separate hardware devices used traditionally to understand the driving patterns.

Automobile companies are heavily investing in the R&D for vehicle telematics. Using our deep dive analysis on approximately 7500 patents in this field, we have identified General Motors as the leader in terms of issued patents and published patent applications. We have also identified Nissan Motors and Ford Motors also having a substantial share of patents related to this field. The highlight of their portfolio related to this field is that they have a high average patent strength and high average life time as analyzed by our experts. From our analysis of approximately 7500 patents and subsequent shortlisting of 1582 key patents related to this field, we have identified that the maximum IP generation activity has occurred in technologies related to Vehicle location and speed related data. General Motors has the highest number of filings with 80 patents/patent applications filed worldwide.

In the subsequent sections, we analyze how the shift in trend of vehicles to wards computer-based control systems over the last 15 years has led to vehicle telematics (combination of Telecommunication and Information Technology) play a critical role in the automobile industry.

Coming up in the Report





TECHNOLOGY BEHIND TELEMATICS

The biggest advantage with Telematics is that it can be applied to multiple industries like integrating with vehicles and also tracking the logistics in vehicle fleets. The principle areas of technologies it relies upon are wireless communication, Location based services including GPS location tracking and a computer platform for interfacing and understanding the electronics systems data. Another advantage of Telematics is the provision of data that can help the companies in improving vehicle and road safety. The use of smartphone apps these days has helped them in cutting down operation costs and the real time visualization of the critical data subsequently leading to efficient results.

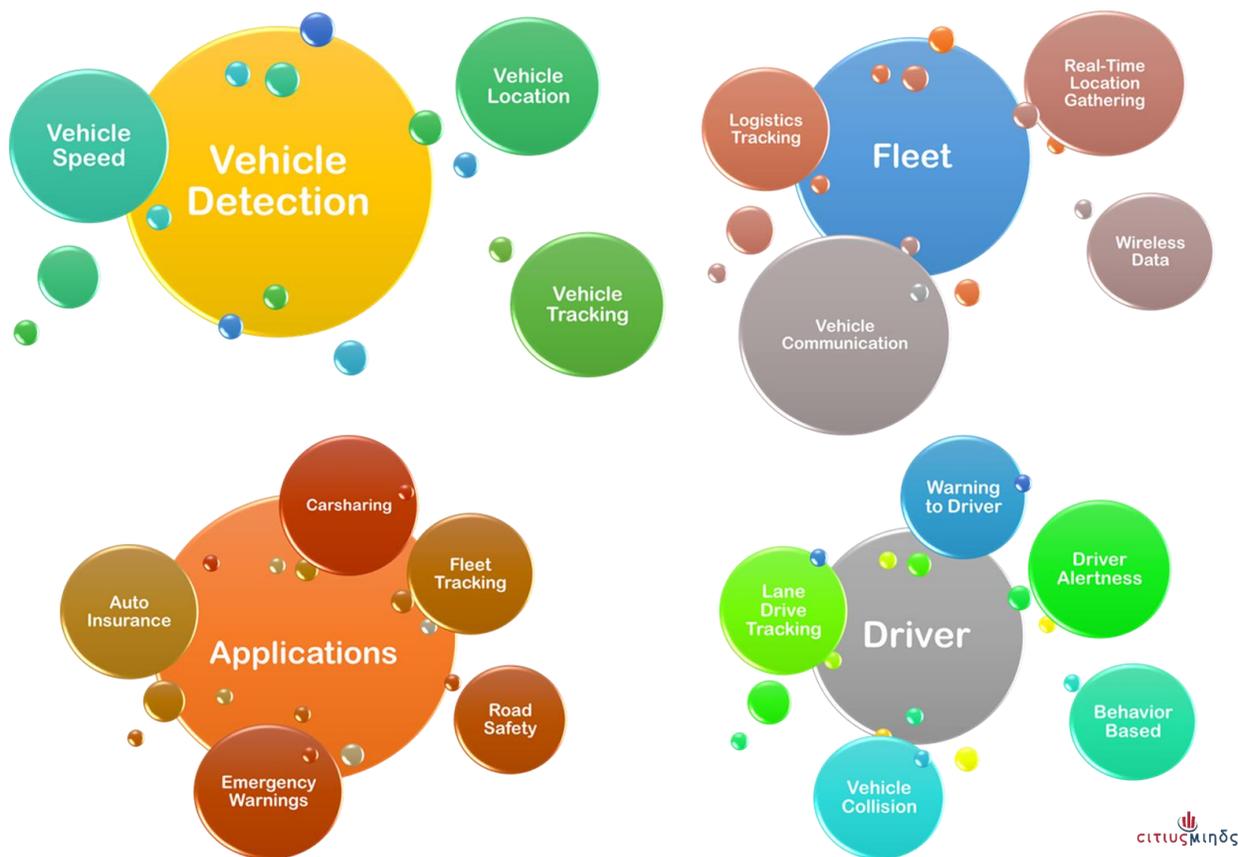


Figure 2: Technology Taxonomy of Vehicle Telematics





THE OVERALL LANDSCAPE

Citius Minds analyzed 7,502 patents and published applications in the vehicle telematics domain in phase 1 of the analysis. Following a detailed patent investigation of each and every patent, our analysts screened out irrelevant patents and came up with a finalized relevant set of 1582 patents and published applications worldwide. The phase 2 involved the analysis of these patents in coming up with relevant technology clusters in this domain. The table below broadly lists out the technology distribution of the analyzed patent portfolio of 1582 patents.

Taxonomy Cluster	Distribution %
Vehicle Collision / Warning to Driver	27%
Vehicle Location and Speed	21%
Logistics Tracking	17%
Driver Alertness	14%
Vehicle Communication	13%
Auto Insurance	13%
Sensors for Tracking	9%

Issuing warning to drivers by detecting collision tops the list of patents relevant to our study with almost 27% of patents focusing on this aspect. These numbers are credited to high-end research and development by the likes of General Motors, Ford, Nissan and Honda. Google is also making strong advancements in this field and likely so because of its driverless cars which encourages the concept of connected car through computer systems to ensure vehicle and road safety.

Toyota and Hyundai have also invested heavily in the technology areas like Vehicle collision avoidance, driver alertness and lane tracking or cruise controls. The results are clearly observed in the patenting activity of related categories in recent years.



1. PATENT FILING TREND

The number of patents/patent applications published in Telematics technology has increased constantly year on year till 2008. The slight dip observed in 2008-2010 is primarily because of the Market meltdown of 2008 which affected severely the R&Ds of many companies due to budget cuts and layoffs. However, the graph has shown an increasing rise since 2010 mainly due to the increased usage of smartphones and the development of applications for smartphones to further penetrate this ever so important market.

It is safe to assume that the dip after 2015 is mainly because many of the applications filed haven't been published yet. The number of patent filings are likely to keep on growing over the next five years.

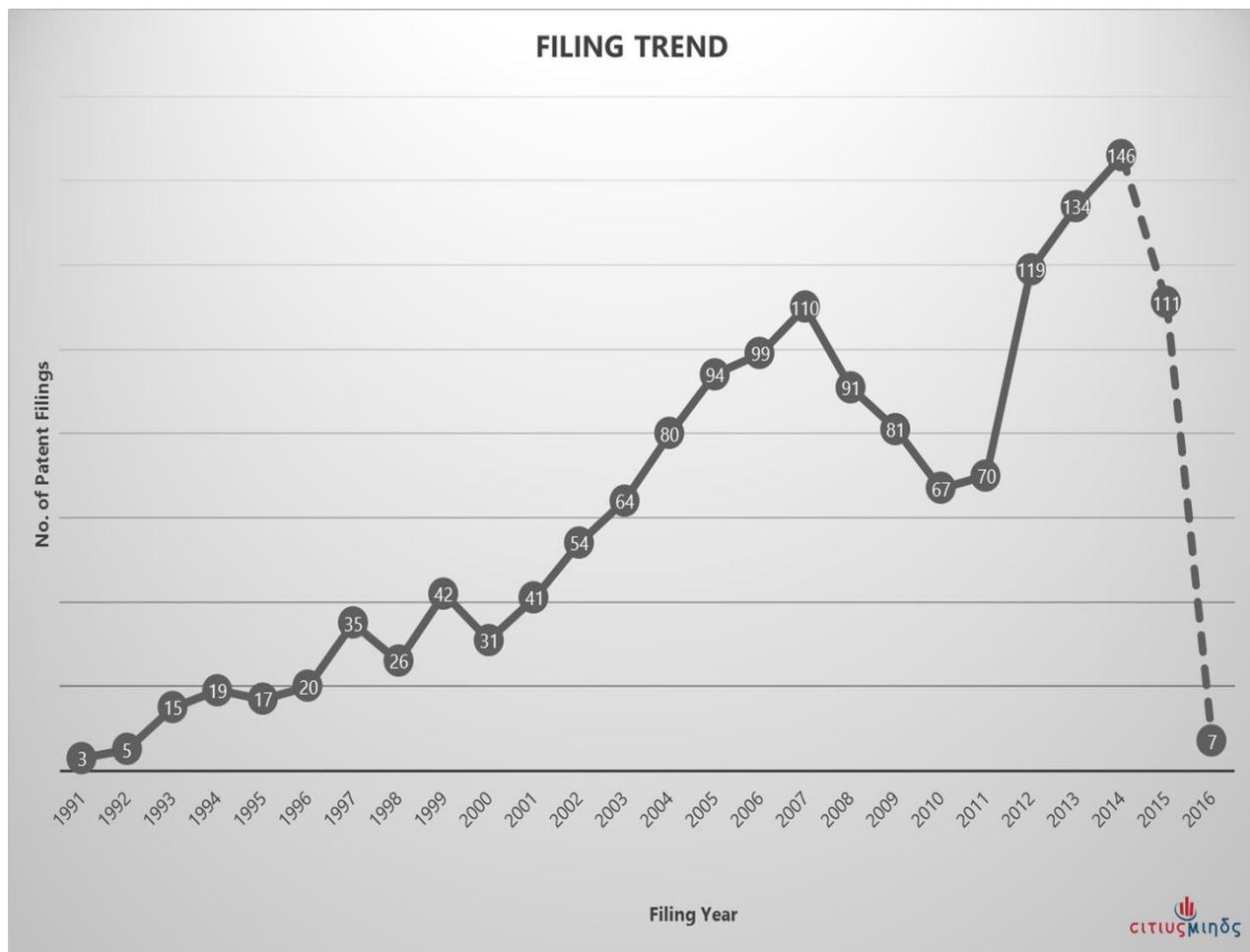


Figure 3: Filing Trend

2. ASSIGNEES

The technology domain of Vehicle Telematics is still in a way untapped largely due to the fact that the traditional computer based systems involved high operation and infrastructural costs. With increase in smartphones usage, more and more companies are spending on designing smartphone applications to utilize the sensors in the smartphones and collate vehicle related data and ultimately take measures to vehicle and road safety.

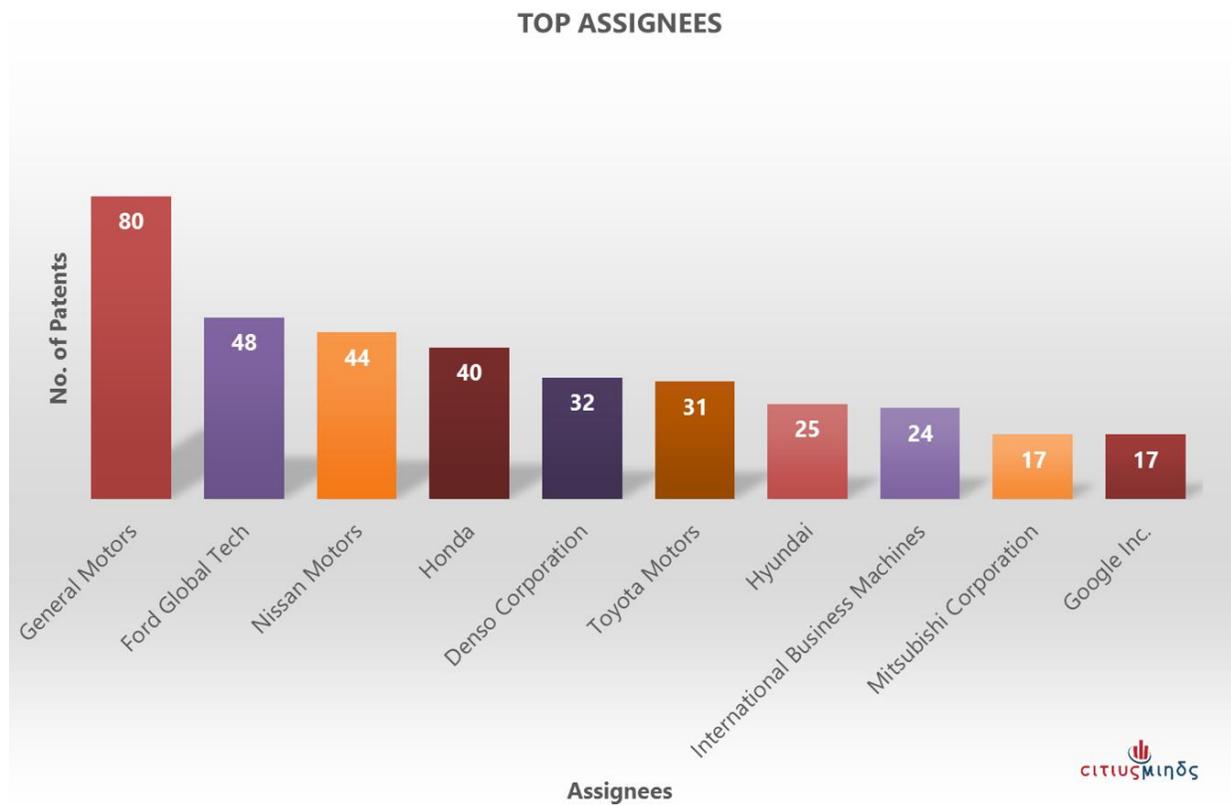


Figure 4: Top Patent Filing Companies

From the patenting activities it is clear that the inventions are running full blown, and research and development activities are leading to opening of doors unimagined in the field of vehicle telematics.

Among the vast spectrum of innovative companies responsible for the development of niche technologies in the field of road surveillance and vehicle telematics, it is interesting to note that Google is also an evolving patent filing company. With their keen focus on developing a driverless car, it is of no surprise that Google will continue to innovate and aggressively patent as much ideas as possible before launching their highly ambitious cars for the public.

3. GEOGRAPHICAL COVERAGE

Understanding the geographic trend, we identified that the maximum number of patents/patent applications relating to vehicle telematics are filed in USA. To sum up, 1099 patents/patent applications have been filed with the US Patent office. This is clearly due to the fact that top assignees like General Motors, Ford etc. have their R&Ds based in USA. Japan, Germany and China follow USA at 2nd, 3rd and 4th place respectively with 280, 244, and 238 patents/patent applications respectively.



Figure 5: Countries with patent protection in the field of Telematics

To briefly sum up, this is the patent coverage distribution for top Nine Countries –

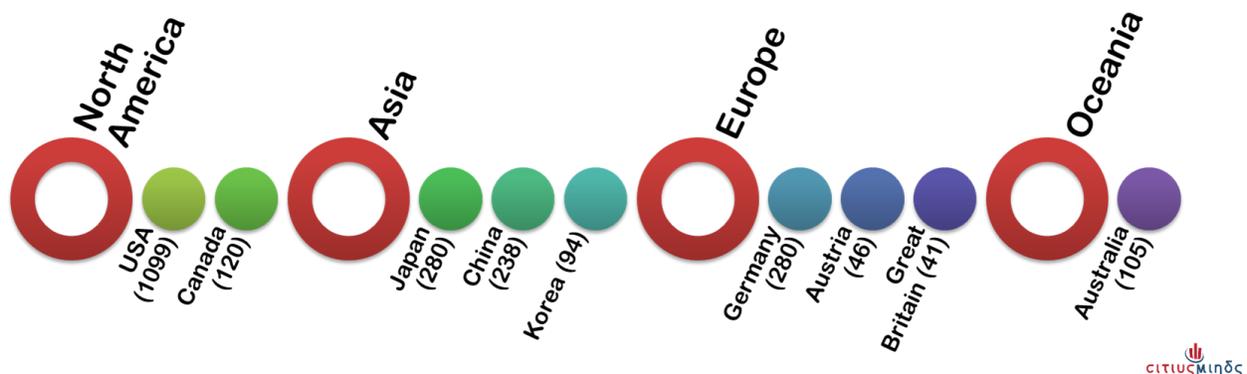


Figure 6: Patent Distribution of top 9 Countries

4. IMPORTANT PATENTS

Citius Minds analyzed the 1582 patents in detail to identify which patents hold intense importance in terms of technology it protects and its future scope. Our proprietary methods to rank and sort the most important patents helped us generate the most important patents. Our method takes into consideration factors such as Claim Language, infringement probability, remaining patent life, referenced by how many patents and future scope of the technology.

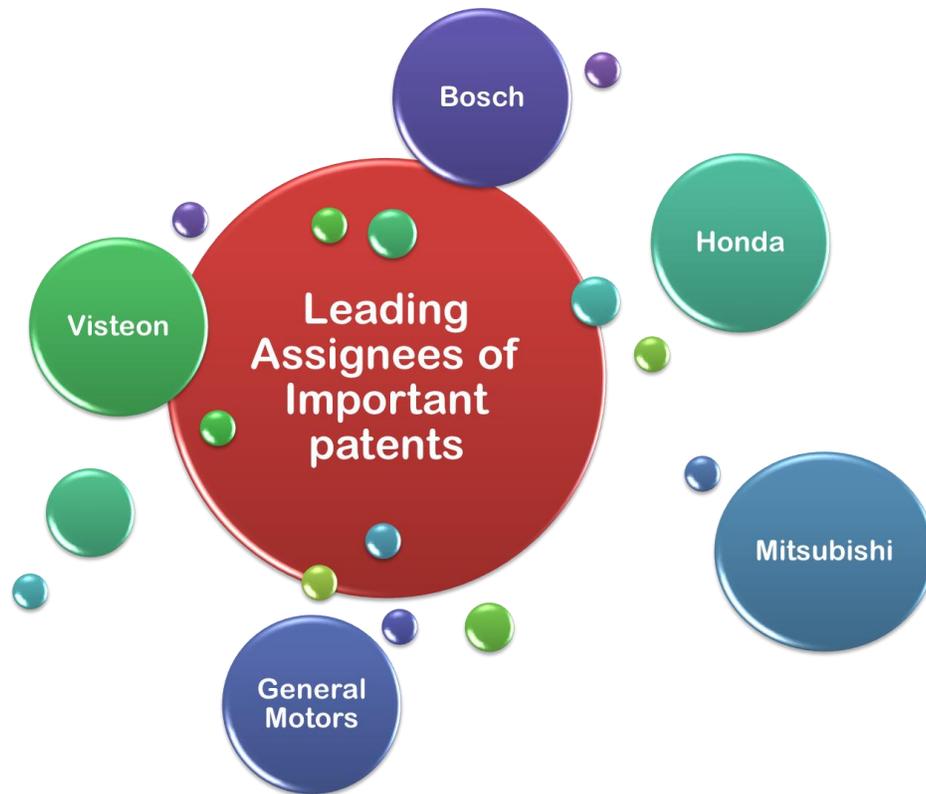


Figure 7: Leading Patent Owners of Important Patents

US 6,028,537²

The patent is assigned to Visteon Corporation, a spun off company from Ford. This patent discloses a vehicle communication and remote control system providing features such as automatic emergency response, theft deterrence, vehicle tracking and immobilization, two-

² patft.uspto.gov/US6028537



way communication, remote vehicle access, navigation and location information. Considering the fact that it was filed in 1997, no doubt that it has managed to tick all the boxes in terms of factors taken into consideration for identifying critical patent in this portfolio.

US 6,269,308³

The patent is assigned to Honda. It discloses a safety device for a running vehicle. The invention talks about a safety running system for a vehicle to prevent a subject vehicle from coming into contact with an oncoming vehicle on an adjacent lane of the road for opposite traffic. It is achieved by using an object detection unit such as a radar device.

US 6,282,491⁴

The patent is assigned to Robert Bosch GMBH. It discloses a telematics unit for an automobile with built in car radio and also has systems built into one housing assembly and is arranged to be mounted in a standard vehicle dashboard. Features such as anti-theft alarms and emergency calls to 911 in case of accidents are built-in into this housed device.

US 8,958,982⁵

One of the more recently filed patents which has been assigned to Mitsubishi Motors discloses a Navigation apparatus for vehicle. The navigation device uses an extraction portion of a target object and creates a guidance route from an already stored map database based on vehicle position, and outputs audio guidance based on guidance message. It helps the driver to concentrate on driving and understanding the route which is easier for him to correlate.

US 8,744,745⁶

The patent assigned to General Motors discloses invention close to recent trends in telematics i.e. the use of wireless mobile devices. The patent talks about a method for monitoring position of vehicle which involves providing navigational route between wireless mobile device and vehicle. The patents focuses on short range communication and is useful in situations such as locating a vehicle in a huge parking lot.

³ patft.uspto.gov/US6269308

⁴ patft.uspto.gov/US6282491

⁵ patft.uspto.gov/US8958982

⁶ patft.uspto.gov/US8744745



KEY PLAYERS

1. GENERAL MOTORS

GENERAL MOTORS

One of the largest automobile manufacturer in America, General Motors tops the list of companies with most patent filings related to vehicle telematics. Although patent filings started in 1999 related to telematics, in 2005, the company formed a subsidiary GM Global technology LLC and started filing rigorously in this domain by heavily investing in the R&D. What is even more important is the fact that they have also sought for patent protection worldwide and not just United States.

They have come up with a smartphone application for Fleet Management with a name of OnStar RemoteLink Mobile App⁷.

The product aims to solve the fleet management problem in a big way:

“GM offers fleet telematics solutions designed to help reduce costs, improve productivity, and enhance driver safety. There is a wide array of vehicle information available to ensure that you are getting the business intelligence you need to improve your fleet operations. Relying upon the OnStar technology available on most vehicles, these solutions are very cost effective as no additional hardware expense needs to be incurred. The vehicle data is sourced from the factory-installed hardware and, therefore, is reliable and tamper-resistant.”

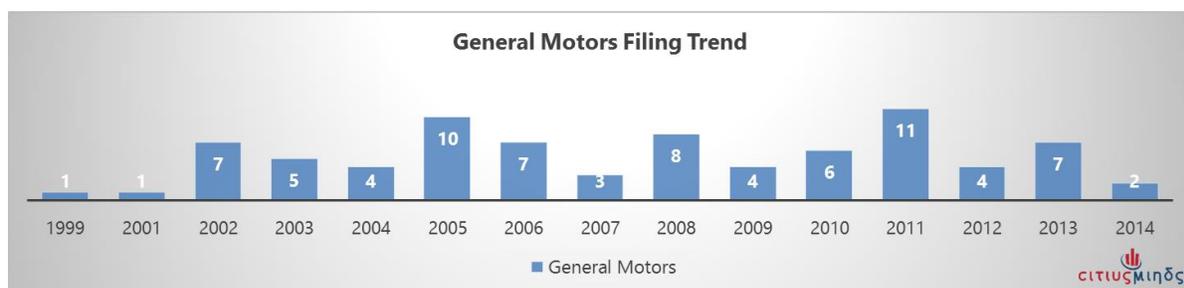


Figure 8: Patent Filing trend for General Motors

⁷ <http://www.gmfleet.com/technology/connected-vehicle.html>

2. FORD MOTORS



A well-established automotive brand, Ford has been focusing a lot on smartphone connectivity to cars off late and it shows in their patent filings as well. The timeline of their patent filings dates back to 1997 where they filed the first patent related to this domain. However, the more aggressive patent filings started in the last four years. As the smartphone technology and application based products are on the rise, this makes total sense as to why Ford wants to be at the enfore of this technology explosion.

Again from the product portfolio we observe how important fleet management is and that is why telematics is deployed at the crux of the technology. With the technology branded as “Sync Connect”⁸.

“Ford has been notable in the vehicle connectivity space for its emphasis on so-called “brought-in” solutions using its SYNC platform. Until now, SYNC has always relied on drivers connecting their phones via either Bluetooth or USB to provide services like 911 Assist and vehicle health reports. Starting in spring 2016, Ford is rolling out a new built-in cellular-connected telematics system dubbed SYNC Connect starting with the 2017 Escape.”

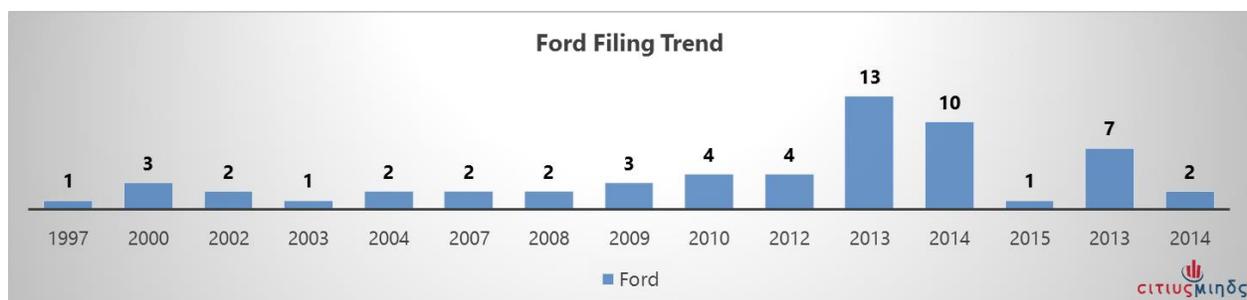


Figure 9: Patent Filing trend for Ford

⁸ <http://www.forbes.com/sites/samabuelsamid/ford-steps-into-the-vehicle-telematics-space-with-sync-connect>

3. NISSAN MOTORS



Japan tops the list with most patent filings from Asia and the primary reason is because of Nissan Motors – a global trusted brand worldwide which has originated from Japan. Also is renowned for being the sixth largest automotive manufacturer after Toyota, General Motors, Volkswagen Group, Hyundai Motor Group, and Ford⁹. The patent filings have been pretty spread across the past 20 years. The recent years does not indicate full blown focus on telematics and part of that reason is because of their tie up with Microsoft, Azure in particular to power up the telematics in their cars. However, the portfolio of 44 patents do have some interesting and strong technologies patented.

In January this year, Nissan announced partnership with Microsoft Azure to power their new Car models¹⁰.

“Nissan LEAF models and Infiniti models in Europe will have Connect Telematics Systems (CTS) powered by Microsoft Azure. Since the Nissan LEAF’s launch in 2010, more than 200,000 have been sold worldwide, making it the world’s best-selling electric vehicle. Nissan selected Azure to meet customers’ expectations about in-vehicle mobility solutions, create additional ways to interact with their vehicles, and enhance safety.”

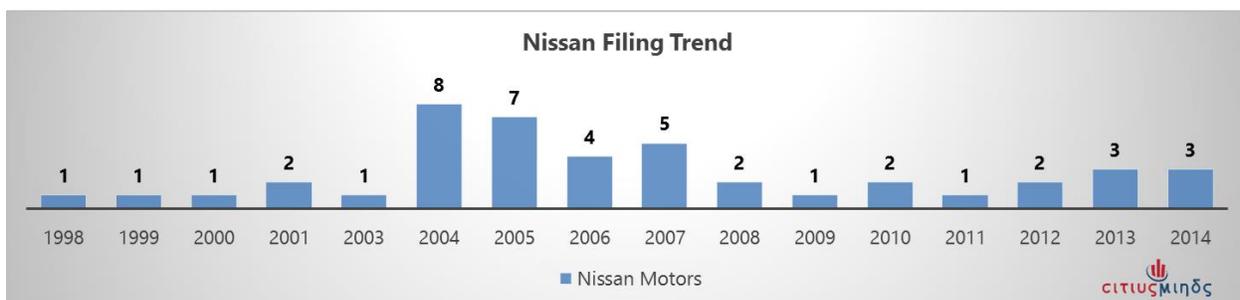


Figure 10: Patent Filing trend for Nissan

⁹ <http://www.oica.net/wp-content/uploads//ranking-2013s-2.pdf>

¹⁰ [nissan-selects-microsoft-azure-to-power-nissan-telematics-system](http://www.nissan-europe.com/press-releases/2014/01/nissan-selects-microsoft-azure-to-power-nissan-telematics-system)



TOP APPLICATIONS AND PRODUCTS

Offering an alternative approach to implementing telematics instead of traditional hardware are the smartphones these days. With immense capabilities embedded in a smartphone, companies are wholly committed to utilizing all the sensors and coming up with feature loaded smartphone applications.

1. CAMBRIDGE MOBILE TELEMATICS¹¹

An app that understands the driving behavior and then decides the auto insurance premium is very popular. As CMT Puts it, "DriveWell, focuses on driver education and improvement, and provides an accurate, scalable, and highly customizable telematics solution for automobile insurance providers and their customers. The app not only measures driving behavior, but also helps users become better drivers."

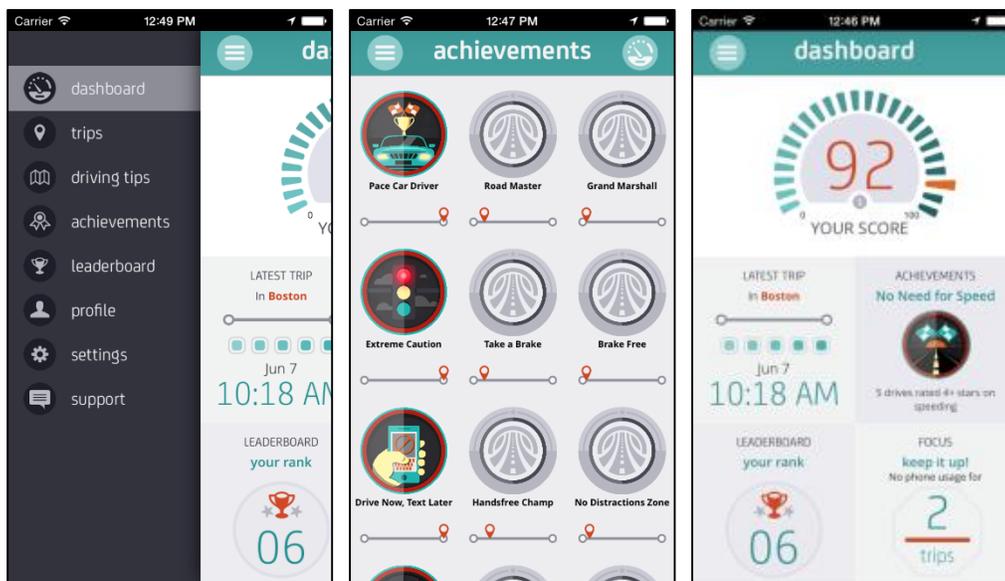


Figure 11: DriveWell App Screenshots

2. FORD TELEMATICS¹²

Ford telematics solution has been designed specifically for Ford commercial vehicles. With the Ford Telematics the key focus area is to understand and monitor. This monitors a wide range of performance metrics including vehicle location, speed, hard braking or acceleration,

¹¹ <http://www.cmtelematics.com/product/drivewell/>

¹² <https://www.teloqis.com/ford>



excessive idling, seat belt use, oil life and engine temperature – all in real time and all meeting the brief of the scope of this Landscape study.

Features and Benefits include:

- a. **Driver Safety & Compliance** - Gain real-time and actionable insight into your fleet of vehicles and assets, through custom dashboards.
- b. **Fleet Management** - The most reliable, scalable and comprehensive GPS fleet tracking software on the market will improve operations, asset utilization and driver safety for fleets of all sizes, as well as those with a mix of makes and models. Gain real-time and actionable insight into your fleet of vehicles and assets - on one dashboard.
- c. **Vehicle health and fuel consumption** - Leveraging the vehicle systems already built into your Ford vehicle, you get access to actionable reports that keep your fleet on the road and productive.

3. UBER¹³

Uber has taken the cab riding with storm ever since it burst onto the scene. Currently valued even more than Daimler, Uber is working constantly to bring in new features for safety. According to an Uber Blog post, the DUI arrests have also decreased by upto 10% in Seattle and California. This has ultimately led to lesser accidents. Now Uber's Driver app has smartly integrated features for driving behavior utilizing GPS, Gyroscope, and Accelerometer sensors of the smartphone and informs about certain driver patterns like Braking and smooth acceleration stats.

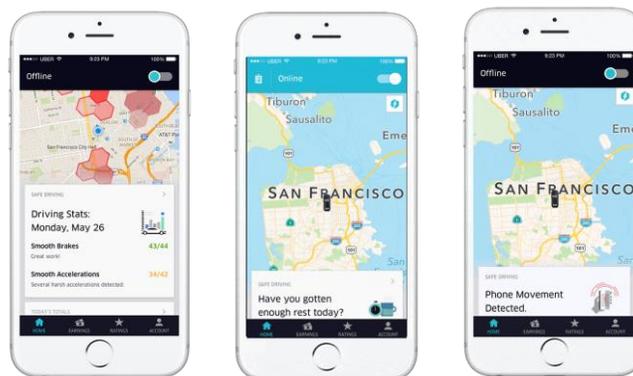


Figure 12: Uber App New features – Screenshots - iPhone

¹³ <https://newsroom.uber.com/safety-on-the-road-july-2016/>



With this new features, drivers can be alerted while driving if they go above the speed limit. Uber can also tell if they're touching their phones during the trip, suggesting that they're doing something they shouldn't be, like texting while driving. Drivers will also be provided with a summary of their driving behavior after each trip.

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Our Services Include:

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- *Patent Validity Analysis*
 - *Patentability Analysis*
 - *Patent Infringement Analysis*
 - *Freedom-to-Operate Analysis*
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Our analysts also perform in-depth custom landscape analysis reports. Feel free to drop us your query at info@citiusminds.com. You can also call at +1-(312) 957-7066.

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