The Future of Auto Infotainment: Vehicle-to-Vehicle Communication, Machine-Human Integration and More

Vehicles of the future may very well completely remove the feeling of isolation experienced by most drivers and passengers today. Sometimes called vehicle telematics, in-vehicle electronics, on-board technology, or infotainment, the internet-capable vehicle is becoming a reality through the combination of GPS technology, cellular networks, computers, and more and more the cloud.

The integration of the digital world with our vehicles is a fast-growing trend. According to a recent Pike Research report, 80% of all electric vehicles will have telematics by 2017.[i] What's more, the European commercial use of in-vehicle telematics systems is predicted to triple between 2011 and 2016. As companies adopt fleet management systems and passengers increasingly demand greater functionality in their vehicles, telematics systems certainly become more commonplace than innovation in the years to come.[ii]

Interaction Concepts Boost Intuitive Operation, Functionality, Driver Safety

Sony's MirrorLink Technology

Systems to intuitively and hands-free control the vehicle for ease of operation of both on-board systems and mobile apps and social media is one of the biggest growth trends in the industry. Ford and Nuance Communications, for instance, recently talked about the trends that are shaping how they're approaching the world of in-vehicle connectivity.

Ford and Nuance have already been working together for some time on SYNC, the voice activated in-car connectivity system from Ford which will premiere in the new B-MAX in Europe later in 2012. The voice recognition is integral to Ford's Emergency Assistance feature, but will go further by providing ways for drivers and passengers to be more connected to the outside world.

They've been working on more sophisticated ways for the system to interpret natural speech, such as that shared between friends, including the ability to understand the user's intent from key words and phrases without exact commands.

Using cloud-based systems, SYNC will provide a more intuitive interaction with on-board features, including vehicle environment services, music, social media, and entertainment.[iii]

Honda has also recently been active in the voice command space, having just recently launched their HondaLink in-vehicle connectivity system which features the Harman Aha application. HondaLink will allow drivers to access thousands of cloud-based programs and media feeds using an intuitive audio-system based interface so that they can put away their smartphones and drive more safely. HondaLink will also be available via steering wheel mounted controls and in-dash audio system controls.[iv]

Technologies such as that offered by Tobii will also allow drivers to interact more intuitively with their vehicles. The eye-tracking technology utilized by Tobii will allow automakers to control real-time digital content, including infotainment content, navigation information, and more with just their eyes. This allows drivers to maintain the hands-on-the-wheel and eyes-on-the-road driving principles while interfacing directly with the content they're most interested in. This should reduce driver distraction and provide quick and easy access to the information drivers want and need when they need it.

Tobii works by applying technology they have developed for a computer interface system. This Gaze feature allows computer users to use their eyes to zoom and focus on maps, images, and any other information on the display, making the mouse pointer and mouse superfluous. When used in the automotive setting, Tobii works by displaying information on the windshield of the vehicle, tracking the movement of the eyes so that information is readily available in the line of view without distracting the driver. The driver then uses look and click technology to interact with the information to select choices from menus.

The system will also be useful for preventing accidents. By using the eye tracking system, Tobii can determine when

Tobii Eye Tracking Advanced Driver Assistance

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a driver is drowsy or distracted by following the movement of the driver's eyelids and direction of their gaze. It can also detect the point of attention of the driver. All of this information is then used to alert the driver of impending dangers based on their current level of awareness and alertness.[v]

While all of these innovations are extremely exciting, without one standard method of intuitive reaction between vehicle and driver, it may be difficult for an individual to transition smoothly from one car to another. The types of adjustments needed to move from a visual operation system to a voice-activated one requires a bit more thought and concentration than adjusting seat height and rear-view mirror angle. As such, it will be increasingly important for the industry to harmonize their methodology for driver comfort and safety.

Integration of Mobile Devices Growing in Many Directions

Connecting a vehicle to the outside world will be easier than ever in the not too distant future. MirrorLink is one of the leaders in the field with their AV units which aim to be the heart of mobile interactivity for vehicles. It has a 6.1 inch touchscreen and two USB ports allowing drivers to plug in smartphones and navigation systems for a customized interface. iOS apps via iPhones and iPods are also served up through the MirrorLink AV unit allowing drivers and passengers to interact with videos and games.[vi]

Mobile device makers and software engineers are also keenly interested in how they can contribute to the telematics field for greater connectivity while on the road. Apple, for instance, previewed its newest mobile operating system, iOS6, on June 11, 2012 (available in the fourth quarter of 2012), which includes enhanced native maps and navigation and an improved Siri personal assistant. Automakers are responding by offering "eyes free" access to Siri in their vehicles, with nine on board so far. Using Siri, drivers can push a button on their steering wheel to access their iOS device for information on local gas stations, driving directions, or to send text messages.[vii]

VNC Automotive from RealVNC is also a player in this space. Their real time display replicates a mobile device's read-out to create a head unit infotainment system, giving drivers access to information like navigation applications, music libraries, radio stations, traffic updates, and the internet. Drivers are able to interact with

their mobile devices using the head unit's touchscreen, the vehicle's bezel keys, steering wheel buttons, as well as voice commands.

Going one step further, VNC Automotive even allows drivers to connect to their remove desktop PCs, enterprise systems, and even cloud-based applications. RealVNC hopes this kind of technology will be used by vehicle manufacturers to extract telemetry information, or even be used by marketers to provide location-based advertising for nearby gas stations, parking, restaurants, coffee shops, and more.

Advances in mobile technology like this are sure to spur on competition in the infotainment sector from navigation solutions such as TeleNav as well as from suppliers like Harman and Garmin. Certainly this will also continue to push development in the mega-ecosystem space from companies like Microsoft, Google, and Nokia. However, again, without standardization, consumers may be left feeling frustrated by the different methods required for connecting their mobile devices as they move from one vehicle to another.

Vehicles Interacting Independently for Greater Safety and Efficiency

Some have raised concerns that by integrating even more information into the driving experience – data that could potentially distract the driver – safety could be significantly compromised. But as companies like Tobii are proving, this just isn't the case. They believe that by integrating things such as navigation information, road conditions, and speed limits collected from GPS devices and social media such as Twitter, driving will only become more safe and convenient.[viii]

One example of how automakers are proving the improved safety of vehicles via digital connectedness is through advances in the ability of vehicles to talk to each other and to the road. After all, if vehicles can tell each other where they're going and when ahead of time, accidents can be prevented and congestion could be reduced.

That's the thinking of the Transport Protocol Expert Group developed by European standardization groups. In the case of research going on at Ford, test vehicles are able to receive information such as speed limits, construction warnings, and passing restrictions from digital road signs using both UMTS and W-LAN vehicle-to-infrastructure communication (C2I). By utilizing real-time communication which is

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displayed on the vehicle's dashboard, the driver is able to plan routes for increased safety and time-savings.

Ford is also partnering with BMW to test vehicle-to-vehicle communication. Using their Mondeo test vehicle, Ford has demonstrated the transmission of data including status of brakes, speed, and vehicle indicators from car to car in order to communicate the level of danger in any given driving scenario. Using this intersection assistance system, the vehicle assesses the level of danger, and warns the driver in order to avoid accidents at intersections.[ix]

Daimler has also headed a project to look into how to allow vehicles to more easily share experiences through their consortium known as Testing Safe Innovative Mobility in Germany (simTD). Their aim is to create car-to-X data sharing systems which will allow for links between vehicles and other interfaces. This should help to improve automotive communication infrastructure for added safety and greater enjoyment of driving.

For instance, simTD is exploring how to allow vehicles to notify one another of upcoming danger spots, issue warnings at intersections by communicating from vehicle to vehicle, or even systems that would take control of the vehicle to avoid last-minute accidents using shared information about road conditions, driver alertness, and so forth. The hope is that vehicles will be able to independently prepare for situations even several kilometers down the road using this communal pool of information via the cloud.

Even more futurist is the possibility that roads 15 years from now may be free of signs and traffic signals. As vehicles are able to share information and predict each other's movements, external traffic controls will become unnecessary, while at the same time creating safer traffic conditions. This may look rather uncoordinated, but it should allow for more efficient, smooth flow of vehicles, especially in crowded cities.[x]

Verizon is also zeroing in on the machine-to-machine market. They recently purchased Hughes Telematics, a leading company in the connected car technologies market, specializing in the hardware and software for in-car technologies such as remote door locking, voice commands, and remote diagnostics. Hughes systems have even been featured in State Farm Insurance's Drive Safe & Save program.[xi]

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Intuitive, Hands-Free Interactivity the Way of the Future for Vehicles

As you can see, there are hundreds of innovations being tested in the infotainment space, most of which are enhancing the driving experience by putting vital information in front of the driver when they need it most, and allowing them to interact with it in a safe manner. While this increase in human-machine interactivity will make the roads safer and the drive much more enjoyable, if the industry is really going to take off, more standardization is required in order to streamline production and make the movement from one vehicle to another simpler and hassle-free for the driver. Hopefully the future holds greater harmonization of app integration, mobile device connectivity, and streamlined methods for intuitive operation if all of the devices and systems.

<div align="right">Maryruth Belsey Priebe</div>

A student of all things green, Maryruth has a special interest in cleantech and green buildings. In recent years, Maryruth has worked as the senior editor of The Green Economy magazine, is a regular blogger for several green business ventures, and has contributed to the editorial content of not one, but two eco-living websites: www.ecolife.com and www.GreenYour.com. You can learn more about Maryruth's work by visiting her site, www.jadecreative.com.

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