

Innovative trends: Advanced driver- assistance systems Autonomous Vehicles

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Outline

- Introduction - Electric vehicles
- Automotive industry trends
- Machine learning for autonomous vehicles
- Other innovative technologies

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Introduction - Electric vehicles

Strongly stimulated by :

- The depleting fossil fuel reserves
- Pollution

Other advantages:

- Comfort
- Cost effective
- Low maintenance
- Safety!
- Highly upgradable

Disadvantages:

- High price
- Poor battery/ Poor autonomy
- Undeveloped charging infrastructure

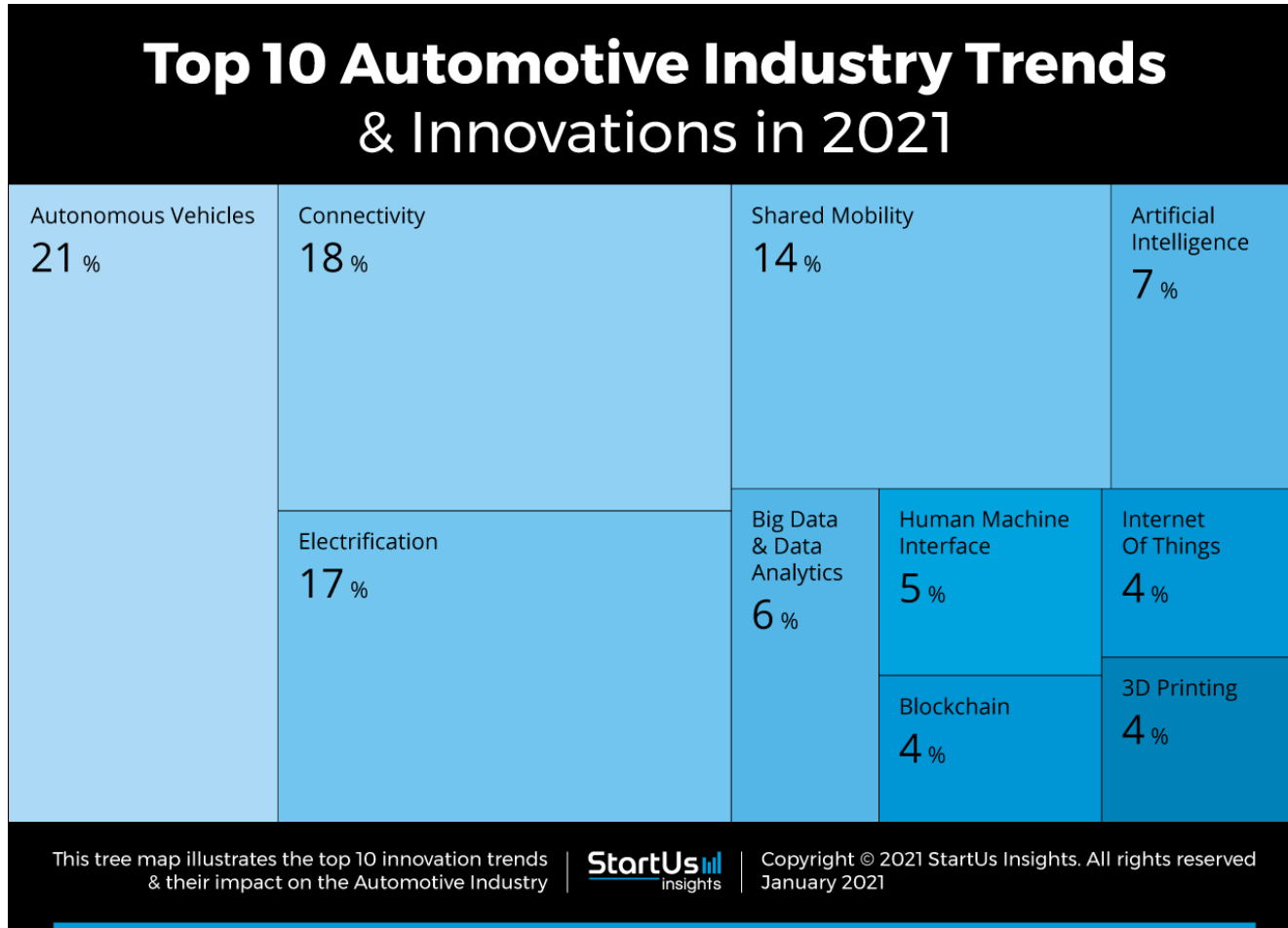
Death in car accidents

- Deaths per day worldwide: 163,898
<https://worldpopulationreview.com/countries/deaths-per-day>
- Death per day in car accidents: 3,700
<https://www.asirt.org/safe-travel/road-safety-facts/>
- 2.25% of deaths is because of car accidents!
- The major factor in 94 percent of all fatal crashes is human error
https://www.nhtsa.gov/sites/nhtsa.gov/files/documents/13069a-ads2.0_090617_v9a_tag.pdf
- Period life expectancy at birth in the mid-19th century was around 40 years for males and 42 years for females.
https://www.osfi-bsif.gc.ca/Eng/Docs/DEIP_Gallop.pdf
- How will 2.25% be considered when driving care is taken automatically?

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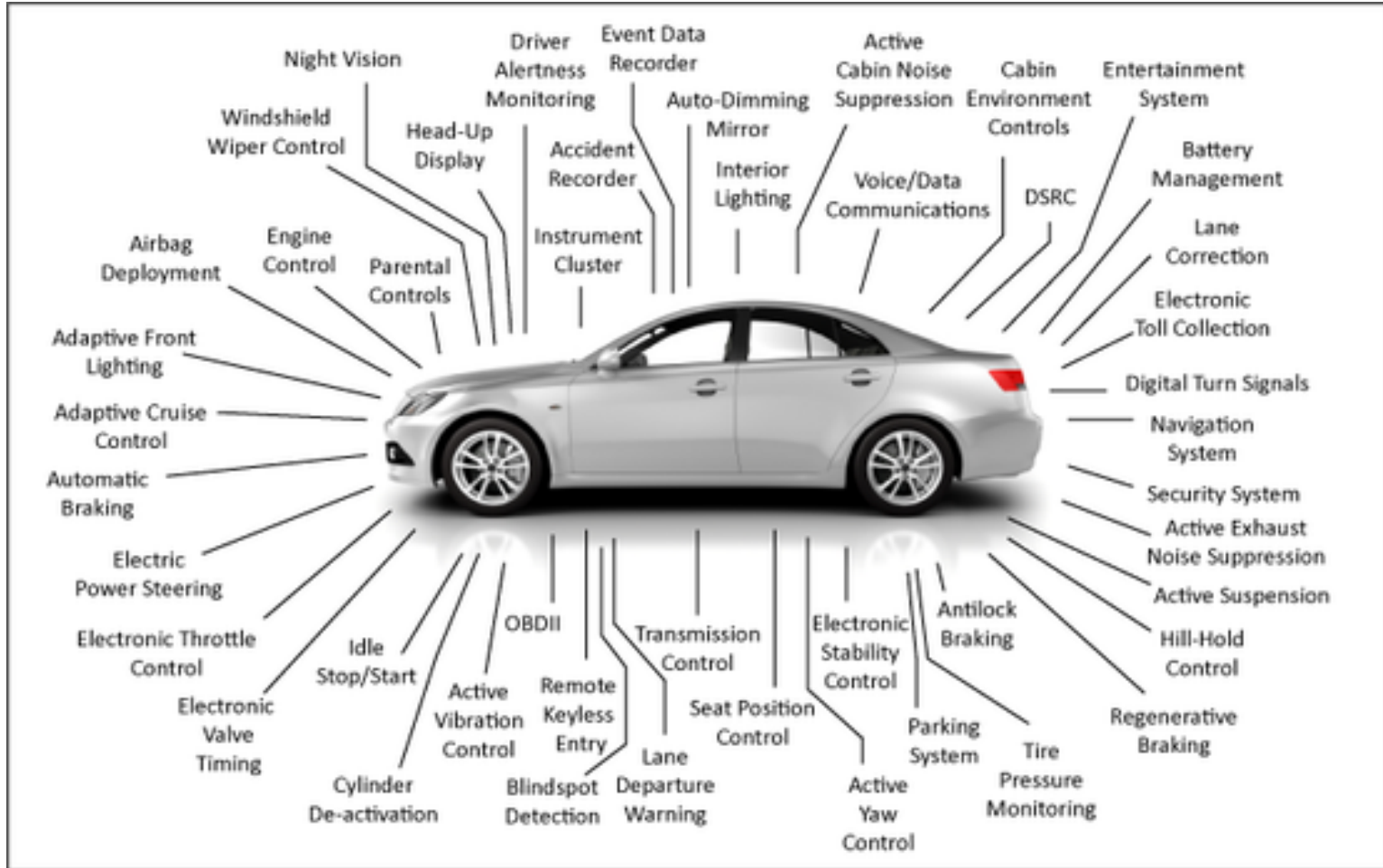
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Automotive industry trends



<https://www.startus-insights.com/innovators-guide/automotive-industry-trends-10-innovations-that-will-impact-automotive-companies-in-2020-beyond/>

Computer monitored systems in current cars



<https://www.chipsetc.com/computer-chips-inside-the-car.html>

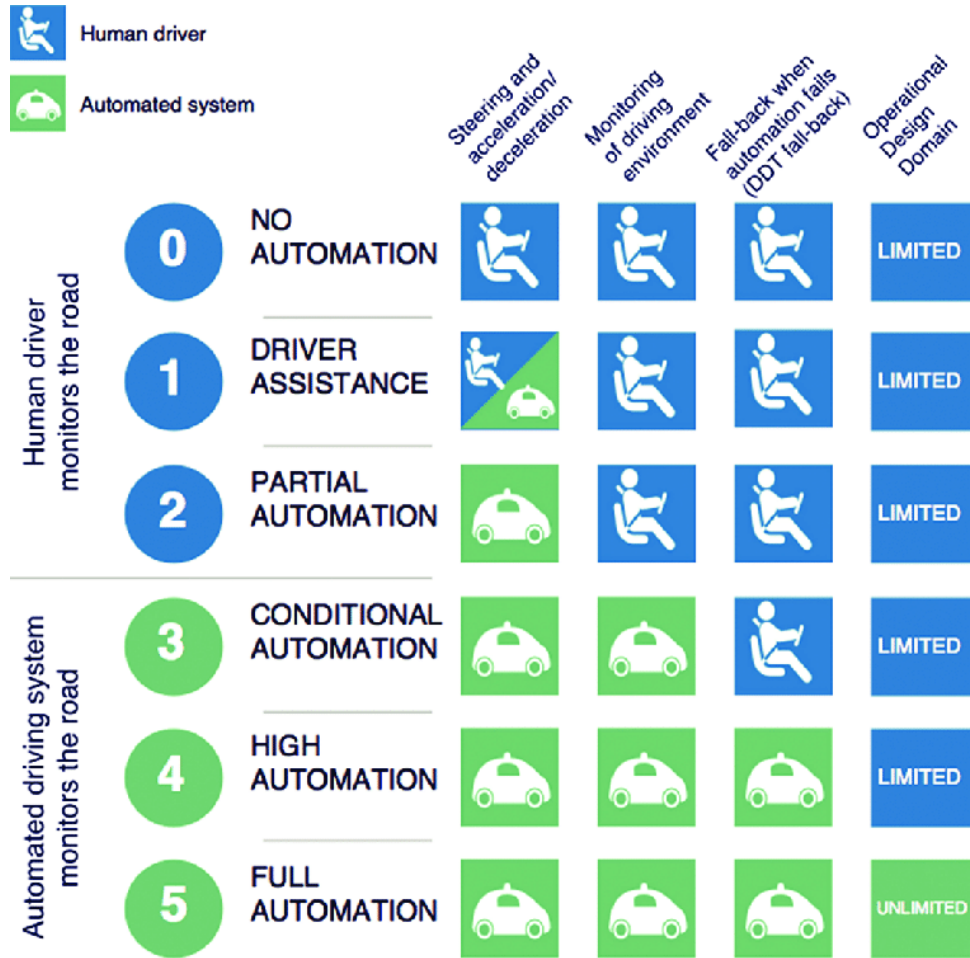
Biggest semiconductor suppliers for automotive industry

- Freescale / NXP
- Renesas
- Infineon
- STMicroelectronics
- Bosch
- Texas Instruments
- ON Semiconductor
- Samsung
- MIPS
- Qualcomm
- Toshiba
- Micron Technology

Companies providing full integrated computer systems for autonomous cars

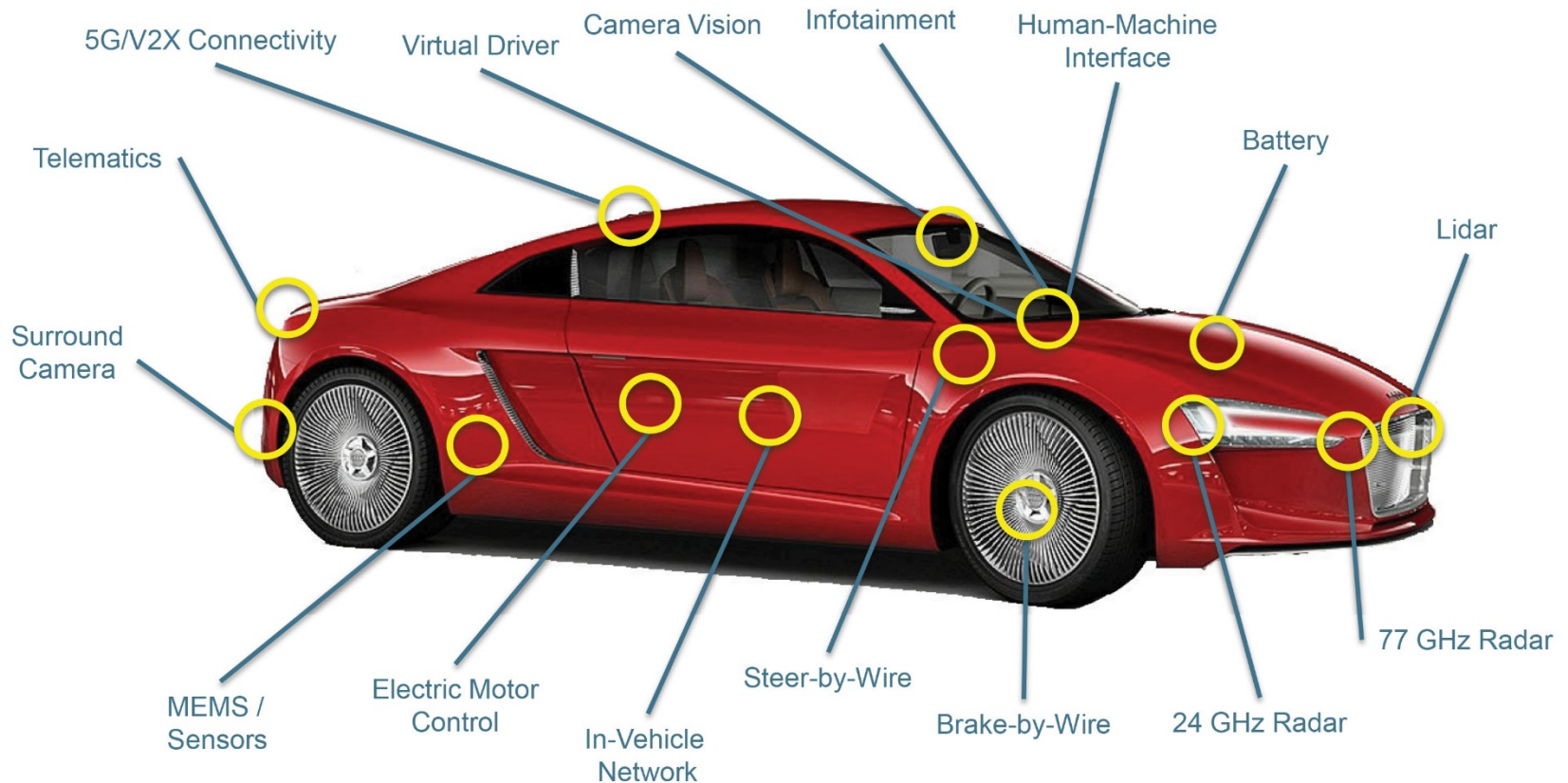
- Tesla
- AMD
- Ford
- Lyft
- Google / Alphabet (Waymo)
- Nvidia
- Intel

SAE J3016 levels of driving automation



Alex Serban, Erik Poll, Joost Visser, A Standard Driven Software Architecture for Fully Autonomous Vehicles

Innovations for the autonomous cars



<https://www.eeworldonline.com/sensor-processor-innovations-move-autonomous-vehicles-forward/>

Strategic partnerships

- Apple and Magna (started with BMW and Daimler)
- Microsoft and Volvo
- dSPACE and BMW
- Google and Fiat Chrysler
- Uber and Carnegie Mellon University
- Lyft and General Motors

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Innovative trends – Pedestrian behavior prediction

- The US-based startup [Intvo](#) develops a pedestrian behavior prediction technology. Unlike two-dimensional (2D) and three-dimensional (3D) object detection technologies that consider limited parameters, their solution checks for head position, eye contact, and leg movements of the pedestrians, weather conditions, and assigns a risk level. This reduces false positives in pedestrian detection and enhances the safety of autonomous vehicles.

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- **Udelv**
- The US-based startup [Udelv](#) provides autonomous vehicles for last-mile deliveries. It combines advanced AI algorithms and hyper-speed teleoperations for human-assisted guidance in unique situations. The startup's vans have a payload capacity of approx. 360 kg (800+ lbs) and reach speeds up to approx 100 km/h (60 mi/h). The vans deliver groceries from nearby stores and send out a push notification when the order arrives.

Connectivity

- **Apex AI**
- The US-based startup [Apex AI](#) enables automotive companies to implement complex AI solutions. *Apex.OS* runs on automotive electronic control units (ECUs) and offers robust, reliable, and secure APIs to develop autonomous mobility solutions. *ApexAutonomy* offers modules to build 3D perception, localization, and control to enable autonomous vehicles. Lastly, *MARV.Automotive* is a configurable and extensible data management platform that reliably transmits data from the vehicle to the cloud.

Thank you

References

- <https://www.startus-insights.com/innovators-guide/automotive-industry-trends-10-innovations-that-will-impact-automotive-companies-in-2020-beyond/>