Vehicle Automation Scenarios and Challenges cause for reflection

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Smart Systems for Safe, Clean and Automated Vehicles

Renzo Cicilloni
Head of Trento Branch
Smart Mobility

- Less Congestion
- Efficient Transport
- More Performance
- More Safety
- No Traffic Jam
- Intelligent Vehicle

AUTOMATED DRIVING
Levels of Automated Driving

Levels of automated driving as defined by e.g. SAE and VDA.

- Level 0: Driver only
- Level 1: Assisted
- Level 2: Partial Automation
- Level 3: Conditional Automation
- Level 4: High Automation
- Level 5: Full Automation

Driver might be able to do other activities while driving.
Where We Are?
How We Are Progressing?

Huge investments on technology

Investments are still needed for:
- Faster computation
- Miniaturisation
- Failsafe
- Lifetime
- Affordable cost

BUT

situation must be balanced by means of an integrated approach
Integrated Approach

Communication at roadside and data backbone
Enhanced and collaborative services
Data security
System integration on the car: i.e.
sensor fusion
System integration in the environment: i.e. traffic flow control
Infrastructure

- Functions and services for more eco-friendly and safer driving

- **Intelligent Transportation Systems** based on Car-to-car and car to infrastructure communication, enabling
  - Preventive safety apps
  - Traffic efficiency apps
  - Automated driving support

- **Vehicle in the cloud**, enabling
  - Enhanced services: connected navigation and dynamic maps, connected eco-driving
  - Collaborative services based on drivers’ communities: serious gaming, pro-active traffic notifications, car sharing, etc.
Intelligent Transportation Systems based on V2X

Status

• Pan-European Field Operational Tests have proven potential benefits
• Commitment by industry R&D, first prototypes are functional
• First projects on V2X for automated driving have started

Gaps

• There are still technical challenges, e.g. Scalability of communication in congested areas
• Deployment on next generation vehicles has several question marks
  • First set of applications, leveraging on business use cases (e.g. insurance, commercial/advertisement)
  • Embedded vs aftermarket solution
  • Link to Ecall platform integration
  • DSRC/802.11p and/or 4G/LTE
  • Security aspects
Vehicle in the cloud

Status

• Cloud based mobility services are becoming more and more popular
• Alternative mobility based on social interaction and real time information (e.g. car pooling, car sharing, multi-modality) is growing especially in metropolitan areas

Gaps

• Large sw companies are already supplying commercial solutions both on the smartphone and embedded platform market. Integration of public R&D results with proprietary solutions is still not solved.
• Deployment of smart mobility services depends on the availability of data and interoperability with all possible information sources
  • Public Services and Public Data (public transport, traffic etc.)
  • Users’ Community data (Privacy Policies of single users)
  • Proprietary data (vehicles, private infrastructure, service providers, etc.)
Standardisation still open especially in Europe
Interoperability (e.g. EU, US,) will impact on OEM and user
common, interoperable and standardised platforms and interfaces, for vehicle-cloud communication
Legal framework for testing and operability
Sometimes good judgment can oblige us to act illegally. Should a self-driving vehicle get to make that same decision?

Diagram of three alternative trajectories for an automated vehicle when an oncoming bus suddenly enters its lane. (Noah J. Goodall)
Thank you for your attention

renzo.cicilloni@crf.it