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AUTOMated driving Progressed by the Internet Of Things

AUTOPilot
Vehicle centric and Cloud approaches

Cellular NW or Ad Hoc

Network layer

Application layer

IOT Common Service Layer

internet

IoT Device

IoT Device

IoT Device

IoT Device

IoT Device

IoT Device

IoT Device
New connectivity paradigm: Cloud and IoT

• V2X approach - vehicle centric
  • limited scope: only device with compatible connectivity
  • Limited functionalities – missing connected devices diversity – “mere” data (no filtering / augmentation)

• Cloud IoT approach – augmented data provided as a service
  • Connectivity agnostic
  • Semantics enhancing device representation (metadata)
  • 2 levels management: device and context
    • “Augmented” data representation out of the context management
    • E.g. traffic jam or other hazards / traffic : environment events from individual Things’ data
  • Easy cross domain service integration - aggregation
  • Standardised data models - platform openness – higher cyber-security
IoT to transform automated driving

Vehicle IoT integration

Local Dynamic Map (LDM)
Autonomous driving functions

Data fusion

In vehicle sensors

AD+IoT Communication (3G/4G, ITS-G5, LTE-V2X)

IoT Device

IoT platform
Interconnecting things based on existing and evolving interoperable information and communication technologies

IoT eco-system
Objects of the physical world, which are capable of being identified and integrated into communication networks

how does it work?

1. Objects provide data to IoT platform using IoT standardized protocols
2. Objects are created virtually in the IoT platform
3. AUTOPiLOT IoT platform develops applications using data from IoT data sources
4. AUTOPiLOT applications enable services that support autonomous driving

AUTOMATED VEHICLE MANUFACTURING
HIGHWAY PILOT
PLATOONING
URBAN DRIVING

AUTOMOUS DRIVING progressed by IoT

no V2V / V2I
Perspective of IoT for automated driving

• Current use cases (AUTOPILOT)
  • Enhance driving environment perception for the AD DDT and RT HD maps update
  • Provide SaaS/PaaS for mobility (OEM vehicle management platform or MaaS)

• Future usages
  • Driven by usage of AI and data analytics in the IoT cloud platforms
  • Enabled by future Cellular network performances:
    • Massive IOT providing more information for the AD functions – (mMTC)
    • Higher data rates (eMBB) allowing high volume data representation (videos)
    • Lower latency (URLLC) and MEC enabling
    • use of IoT for RT DDT in the vehicle and DDT combined with Infrastructure control
IoT and Security for Automated driving

• Cyber-security - Standards
  • IT security standards: ISO/IEC-27000 series - ISA/IEC-62443 series:
  • IoT security: OneM2M - TS-0003, TS-0008, TR 0012, TR 0016

• Security for the means of communication - Standardised – built-in (TCUs)

• Data integrity
  • Identifying data source – authentication
  • Solving false information with data fusion, data analytics or AI

• Functional Safety
  • Existing and next generation of standards
    • ISO 26262 - Road vehicles – Functional safety
    • UNECE – WP29
Thank you

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