

| AI Application | | Non Safety functions e.g. Infotainment Out of Scope of type approval | Safety functions | | | | |
|-------------------------|---------------------------------------|---|--------------------------------------|---|---|-----------------------|--|
| | | | Driving Function | | | Non Driving Functions | |
| | | | Perception | Planning | Actuation | | |
| Conventional Software | Artificial Intelligence (AI) | Artificial Intelligence is a set of methods or automated entities that together build, optimize and apply a model so that the system can, for a given set of predefined tasks, compute predictions, recommendations, or decisions | Natural language processing | Out of Scope [Non-AI] Detection of other road users for AEBS, ACC Detection of road infrastructure for LDW, LKAS | Out of Scope Activation of FCW and AEBS based on ego vehicle position and other road users | Not Applicable | Out of Scope Detection of driver's face for ID (under conditions ensuring privacy) |
| Artificial Intelligence | Supervised Learning (SL) | Supervised learning is a type of machine learning that makes use of labelled data during training | Gesture control Voice Recognition | Detection of other road users for AEBS, ACC Detection of passive road infrastructure for LDW, LKAS | Trajectory prediction using drivable path prediction from labelled data (e.g. HD maps) | Not Applicable | Detection of drivers eye gaze / state for DMS Fault detection, Predictive Maintenance |
| | Unsupervised Learning (UL) | Unsupervised learning is a type of machine learning that makes use of unlabelled data during training | | Streamlining data labelling process for less safety critical systems like ISA. Extracting scenarios from real world data to support validation Generation of synthetic data for supervised learning / distortion of real world data | Trajectory prediction using Kalman filters, KalmanNet or Gaussian Process architectures, or other architectures | Not Applicable | [?] |
| | Semi Supervised Learning (SSL) | Semi supervised learning is a technique that "learns" from a mix of labelled data and data that is both unlabelled and unstructured. They build on a small set of known exemplars and then use this information to guide unsupervised learning. | | Streamlining data labelling process for less safety critical systems like ISA. | Shadow mode' used in development for training control algorithms | Not Applicable | [?] |
| | Reinforcement Learning (RL) | Reinforcement learning is a type of machine learning utilizing a reward function to optimize a machine learning model by sequential interaction with an environment | | Some manufacturers are starting to use RL for perception, could potentially be used in cooperative perception in the future. | Lane Centering or ACC systems may use RL due to the reduction in cost / data required to train the system | Not Applicable | Predictive Maintenance |