ARCHITECTURES FOR INTELLIGENT VEHICLES Pass 1 reading

The paper discusses the different types of architectures involved in intelligent vehicles. Further, a targeted architecture, which enables communication between the intelligent vehicle and the physical world, is explained. The two types of architectures are modular (which refers to individual function blocks that are interconnected) and layered (which has each layer dealing with one complex problem). The functions are separated as communication, sensors and control systems. An example of modular architecture given in the paper is Cooperative adaptive cruise control (CACC) to maneuver vehicles forming platoons on a highway. A layered architecture for platoons as well as sensors has been suggested in the paper. The platoon architecture involves the driver handing full control to the automated system upon reaching the highway i.e, the automated highway system created for the California authority. This architecture consisted of 5 layers. The layered sensor architecture was proposed for the BMW research project, and involves sensors to detect the traffic and obstacles, and map the environment in advance. Finally, the author suggests a universal architecture for cooperative driving, which is primarily modular based, with each module layered. For effective intelligent vehicles’ interaction with the physical world, the dimensions such as time, size of the participant pool and accuracy play an important role. The hardware block that controls and monitors the physical world is separated from the software block that handles the commands and uses the information. To avoid vehicles to take part in over one merge at a time, a lock protocol is suggested which locks the system once it engages in a cooperative merge process. Further safety enhancements are suggested by letting the driver initiate the merge process. The layered architecture is concluded to have an advantage as it is focused to one area of expertise at a time. This paper stresses on the importance of re-using existing systems to create intelligent vehicle systems in the future.