

Description of Software Architecture

The software architecture diagram for the autonomous vehicle system maps out what affects the system and how those things can affect the system. It provides a roadmap showing the functions of the system along with what can access and affect those functions. The diagram shows the important components of the system and how they interact with each other as well as showing where the system's data is stored and what has access to that data. This description will explain what affects the system and how the functions of the system are carried out to achieve the purpose of the autonomous vehicle system.

Emergency data, road paths, and weather conditions:

Emergency data is any data that stops the proper functioning of the software system. Road paths represent the route that the vehicle will travel and how the vehicle will be positioned on the road. Weather conditions represent the current weather of the environment. All of these things cause the system to update road and weather conditions. These updates are then sent to the navigation database. This data can then be accessed and put to use by the carrier.

Carrier:

The carrier can interact with the navigation database by accessing the data and using that data to carry out its functionality. The carrier, after accessing the database, can then send that data to the vehicle. That data is then checked using a boolean method to find out if there are any obstacles or adverse conditions up ahead.

If the data shows any obstacles or adverse conditions, the system then recalculates the trajectory ahead using the data sent by the carrier. The system then engages that new trajectory which is used by the vehicle.

If the data shows no obstacles or adverse conditions on the path ahead, the system then updates the vehicle display. This update is then accessed by the vehicle and the display is changed.

Vehicle:

The vehicle first uses a boolean function to check for a stable connection with the carrier that provides the data for the system.

If there is still a stable connection with the carrier, the vehicle will be able to stay connected. The continuation of the connection is then sent to the navigation database which is accessed by the carrier.

If there is no longer a stable connection between the vehicle and the carrier, the system will then warn the driver that the adverse conditions that the carrier keeps track of will no longer be displayed. This warning then updates the vehicle display to show that warning.

Driver:

The driver of the vehicle is only able to interact with the system in a couple of ways. The driver can choose to either enable or disable the autonomous vehicle system for their vehicle. Enabling the system allows the functions of the software to be carried out in real time so the system affects the trajectory of the vehicle on its path based on the data. Disabling the system means that the driver is able to have full control of the vehicle with no interventions from the system.

Detection devices:

There are various detection devices on the vehicle which monitor the condition of the vehicle, sense the driving conditions, and record the vehicle's surroundings.

The detection devices that record and monitor the current state of the vehicle are able to update the vehicle's display depending on the condition of the vehicle.

The detection devices that record and monitor camera and sensor readings are able to send that detection data to the trajectory system. This data is then used to recalculate the vehicle's trajectory and then that new trajectory is engaged for the vehicle.

The detection devices that record and monitor camera and sensor readings are also able to report any foreign objects found on the road to the system. This data then updates the road and weather conditions which are then sent to the navigation database to be accessed by the carrier.