

Road Traffic Gesture Autonomous Integrity Monitoring Using Fuzzy Logic

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Abstract : Occasionally four cars arrive at the four legs of an intersection at the same time or almost at the same time. If each lane has a stop sign, all four cars will have to come to a stop. In such instances, gestures are used to communicate approval for one vehicle to leave. Nevertheless, the autonomous vehicle lacks the ability to participate in gestural exchanges. In view of this, an in-vehicle traffic light system to monitor and establish communication among autonomous vehicles and classic car drivers has been implemented using fuzzy logic and evaluated on a self-organizing network comprising eight ESP32 microcontrollers that run the same program. A single GPS sensor connects to each microcontroller that, in turn, manages three light-emitting diodes. The ESPNow broadcast feature is used. No internet service is required. The system requires no large-scale or long-term storage, such as the driving cloud platform, making it backward compatible with classical vehicles. Simulations were conducted based on the order and arrival of vehicles at three junctions. Results have shown that autonomous vehicles at four-legged intersections can now communicate with human drivers at a much lower cost with precise position classification and lane dispersion in under 30 seconds. This technology presents an opportunity to turn every four-legged intersection into a signalized intersection at no cost to governments.

Keywords : advanced driver assistance system (ADAS), extended blind-spot detection, gesture recognition, in-vehicle traffic light

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