Detects Road Conditions and Relays Beneficial Information to Motorists Through an On-Road Radiofrequency Network

This smart cat’s eye system uses integrated radiofrequency identification (RFID) tags and low-power environmental sensors to communicate important traffic and road condition information to drivers, autonomous vehicles, law enforcement officers, or emergency crews, thereby establishing a simple and reliable infrastructure for an on-road smart transportation network. The application of advanced information technology to transportation brings tremendous potential for improvements in efficiency, safety, and flexibility for motorists, leading the smart transportation market to a projected $220 billion by 2021. Available autonomous vehicles use a combination of optical and infrared cameras, LIDAR (Light Detection and Ranging or a remote sensing method that uses light in the form of a pulsed laser to measure ranges), and ultrasonic sensors to mimic humans’ interaction with their environment while driving. These are expensive, use a lot of power, and are prone to malfunction or experience the same limitations a person’s vision might have.

Researchers at the University of Florida suggest a much less complex solution to alleviate driving problems associated with poor visibility or road cover: a smart cat’s eye. The “cat’s eye” for the road is a reflective marker typically used to indicate lanes and other road information. UF researchers have developed the Global Assistant for Transportation On the Road - Electronic Yellow Eye (Gator-Eye), a smart transportation system that offers a low-cost, feasible, and reliable infrastructure for providing active feedback of road conditions, accidents, or traffic situations to drivers and autonomous vehicles via an on-road communications network.

Application

Smart, reflective road markers and processors that incorporate RFID tags and low-power environmental sensors for vehicle navigation and hazard detection

Advantages

- Creates an on-road network to communicate critical information, granting a reliable resource for a vehicle to electronically determine its position, lane and surrounding conditions (such as icy roads, obstructive accidents or other hazards)
- Uses a network of RFID tags to relay the desired road condition and navigation information, ensuring low-cost communication that maintains performance and is easily accessible by drivers and autonomous vehicles even during harsh weather conditions with low visibility
Technology

The Gator-Eye units replace conventional cat’s eye reflectors along the road and include integrated radio frequency identification (RFID) tags with unique IDs that communicate important traffic and road condition information to vehicles that would also have RFID tags and an RFID reader. The tags may be passive, configured for identification, or be active, configured to provide sensor data, in response to interrogation by an RFID reader in a vehicle or waypoint. The tag could sense lane position, temperature, moisture, ambient pressure or traffic conditions. The RFID communication relays the information to motorists or autonomous vehicles regardless of on-road weather conditions or lane visibility. Waypoints (powered by traffic lights, for example) collect the real-time road data from the Gator-Eye systems and relay it to a central server. The processed information goes out to other vehicles, authorities, or emergency crews, notifying them about road conditions, accidents, hazards, etc.

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Inventors

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