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Accident Detection and Emergency Response System

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Abstract: Road traffic accidents continue to be a major cause of death and injury globally. Fatal accidents are increasing to 47.3% of all crashes up to 2023. To solve this, we introduce a new intelligent accident detection system that combines on-board IoT sensors with a machine-learning (ML) model to dynamically adjust detection thresholds depending on driving conditions. The system constantly tracks vehicle movement (e.g. acceleration, rotation, speed) and environment, employing an ML classifier to identify actual crashes versus regular driving scenarios. When it detects an accident, it notifies emergency contacts automatically and talks to nearby intelligent traffic lights to provide a green corridor for ambulances. We deploy the system on Arduino/Raspberry Pi platforms and compare its performance via the iFogSim simulator. Our performance measures are detection rate, false alarm rate, mean response latency, and network overhead. Experimental outcomes exhibit greater than 95% detection accuracy, minimal false positives, and timely alerting, greatly bettering static- threshold baselines. These outcomes indicate that adaptive IoT-ML systems have the potential to radically enhance emergency response while keeping the cost of networks and latency low.

Keywords: traffic accidents

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