AutoGuardian: Monitoring of Automotive Data to Help Forensic Analysis

da Silva Chermont, Mariana

Almeida Rodrigues, Bruna

Forensic analysis of traffic accidents in Brazil occurs only in 3% of the cases. This fact is due to the cost required to perform the analysis, involving the expert and materials, in addition to activities related to the process itself, which often cannot be used without contamination of a scene or concrete evidence. Thus, often cases involving traffic accidents end up relying on eyewitness testimony. Analyzing the problem, we designed a system similar to existent airplanes black boxes that computationally reconstructs facts of a car accident from data collected by sensors attached to the vehicle. We implemented a prototype with the inertial measurement unit MPU6050 sensor to check the steering wheel angle, the pedal's potentiometers, the collision sensors placed on the front and on the sides of the vehicle, and the mechanical sensors in headlights. In addition, a GPS was installed to store the vehicle position. We developed a software that presents the collected data in real time and stores it on a SD card for later analysis. Tests were conducted integrating sensors to Intel Galileo that is responsible for reading the data connected to a real-time visualization system implemented to validate the calibration of the sensors, sending data thru the serial port and displaying it in a graphical interface. Tests show that the system stores the data precisely and efficiently, offering a solution that is faster, cheaper and because we don't rely on pre-existent car technologies, more available than current telemetry systems. We plan to integrate the system to maps tool to provide a more realistic visualization and add a camera to record images in pre-determined intervals. We believe that the deployment of this system will benefit drivers and insurance companies.

Awards Won: