

**CHENNAI – PONDICHERRY**

**Automatic Identification of Driver’s Smartphone Exploiting Common Vehicle-riding Actions**

**Abstract:**

Texting or browsing web on a smartphone while driving, called distracted driving, significantly increases the risk of car accidents. There have been a number of proposals for the prevention of distracted driving, but none of them has addressed its important challenges completely and effectively. To remedy this deficiency, we present an event-driven solution, called Automatic Identification of Driver’s Smartphone (AIDS), which identifies a driver’s smartphone by analyzing and fusing the phone’s sensory information related to common vehicle-riding activities, such as walking toward the vehicle, standing near the vehicle while opening a vehicle door, entering the vehicle, closing the door, and starting the engine. AIDS extracts features useful for identification of the driver’s phone from diverse sensors available in commodity smartphones. It identifies the driver’s phone before the vehicle leaves its parked spot, and differentiates seated (front or rear) rows in a vehicle by analyzing the subtle electromagnetic field spikes caused by the starting of the engine. To evaluate the feasibility and adaptability of AIDS, we have conducted extensive experiments: a prototype of AIDS was distributed to 12 participants, both males and females in their 20s and 30s, who have driven 7 different vehicles for 3 days in real-world environments. Our evaluation results show that AIDS identified the driver’s phone with an 83.3–93.3% true positive rate while achieving a 90.1–91.2% true negative rate at a marginal increase of the phone’s energy consumption.

**Existing System:**

The menace of distracted driving to public safety has drawn increasing attention from governments as well as mobile and insurance industries. The US National Transportation Safety Board legislated a nationwide ban on texting while driving, and almost all US states followed the same. Mobile service providers and device manufacturers have also introduced various services to reduce/prevent distracted driving. Despite the significant amount of efforts and resources invested and legislation, however, accidents related to distracted driving have not decreased thus far.

**Proposed System:**

First, entering a vehicle is detected by analyzing electromagnetic field (EMF) fluctuations, significant vertical accelerations caused by sitting-down motion, and vehicle door closing sounds (VDCSs). While each of these can be found in other daily activities, a sequence of these events takes place only when entering the vehicle. Second, vehicle entering directions (left or right) are differentiated by analyzing the body rotations monitored when entering the vehicle. We observed that users turn counterclockwise (clockwise) when entering from the left (right). Finally, seated (front or rear) rows are differentiated by analyzing subtle EMF changes monitored when starting the engine. The magnitude of such an EMF spike at the front row is likely to be much greater than that of the rear row because electronic devices are densely populated in front of the driver’s seat.