

MAConAuto: Framework for Mobile-Assisted Human-in-the-Loop Automotive System

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Abstract—Automotive is becoming more and more sensor-equipped. Collision avoidance, lane departure warning, and self-parking are examples of applications becoming possible with the adoption of more sensors in the automotive industry. Moreover, the driver is now equipped with sensory systems like wearables and mobile phones. This rich sensory environment and the real-time streaming of contextual data from the vehicle make the human factor integral in the loop of computation. By integrating the human's behavior and reaction into the advanced driver-assistance systems (ADAS), the vehicles become a more context-aware entity. Hence, we propose MAConAuto, a framework that helps design human-in-the-loop automotive systems by providing a common platform to engage the rich sensory systems in the vehicle and the driver.

Department of Motor Vehicles, mood (both negative and positive emotions) can lead to driver distraction, delaying the response by a few seconds [3]. To adapt to this change in driver response, a HITL ADAS should use the phone and wearables to detect the driver's mood and trigger the LDW alarm early enough to accommodate the latency in the driver response. From the previous example, we can draw the following conclusions. We note that the response time for each driver to the LDW alarm may not be known a priori, and a fixed threshold (per mood) may not work for all drivers. Even for the same driver and the same mood, the driver's response