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# Drive a Vehicle by Head Movements: An Advanced Driver Assistance System Using Facial Landmarks and Pose

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## Abstract

In this paper, we propose an Advanced Driver Assistance System (ADAS) for people with disabilities. Our first prototype is a facial landmark and pose estimation system coupled with a drive-by-wire hardware. This is a Ford Fusion Plugin Hybrid research vehicle, and drive-by-wire conversion is done by Dataspeed, Rochester Hills MI. Our early prototypes were based on open-loop control, but

later we have developed a facial landmark detection based Artificial Intelligence (AI) system controlling the steering column using the drive-by-wire feature of the vehicle. With the help of this system, people with disabilities are expected to drive motor vehicles with increased comfort and safety. In future versions of the system, we are planning to add more automation and assistance features for other use cases.

## Keywords

**Advanced Driver Assistance Systems (ADAS)**

**Drive-by-wire systems**

**Facial landmarks**

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