

Title: Automatic Speed Detection using MPU6050 Sensors in a Demo Car Prototype**Group Members: Guoao Li, Haotian Fu****Abstract**

The rapid advancement of AI technologies and smart systems in recent years has underscored the need for accurate and efficient sensor-based applications. In automotive systems, sensors play a critical role in enhancing vehicle autonomy, particularly in speed and direction detection. This project aims to design and implement a demo car prototype using MPU6050 sensors for automatic speed and direction detection. The motivation for using the MPU6050 sensor lies in its ability to measure both acceleration and angular velocity, making it a versatile component for real-time motion tracking.

The proposed system will integrate the MPU6050 sensor with an embedded microcontroller to continuously monitor the car's movements. The sensor's readings will be processed to detect acceleration patterns and changes in direction, enabling the system to adjust the vehicle's speed automatically. The ultimate goal is to demonstrate how modern sensors like the MPU6050 can be applied in automotive AI systems to facilitate smoother, more responsive control in dynamic environments.

In terms of the system overview, the project will consist of three main components: the MPU6050 sensor, a microcontroller for processing sensor data, and the motor control unit. By leveraging the sensor's gyroscope and accelerometer data, the system will calculate changes in speed and direction in real time. The motor controller will then adjust the car's movements based on this information, creating an intelligent, automated control system.

The goal of this project is to showcase how integrating modern sensors into AI-driven systems can lead to innovative solutions for automotive applications, including enhanced vehicle autonomy and intelligent navigation capabilities.

References:

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