Project Proposal

ADAPTIVE DRIVING ASSISTANCE SYSTEM

Submitted by

Name of the student:	**Kritarth Chauhan**
Roll No:	**IU1841090006**
Name of the student:	**Vandit Patel**
Roll No:	**IU1841090013**
Name of the student:	**Aakash Patwa**
Roll No:	**IU1941091032**

INSTITUTE OF TECHNOLOGY AND ENGINEERING
INDUS UNIVERSITY

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1 Definition and Objectives of the Project

Adaptive Driving Assistance system is a group of electronic technologies that assist drivers in driving functions. Through a safe human-machine interface, it increases car and road safety. It uses automated technology, such as sensors and cameras, to detect nearby obstacles, and respond accordingly.

1.1 Objectives

- ADAS employs a variety of sensors in conjunction with machine learning to aid drivers in avoiding errors in judgement, which in turn provides better passenger safety.
- It has a single driver support system that provides braking and steering assistance.
- The vehicle will come to a halt, if an obstruction is detected.
- Headlights will be controlled based on the amount of light available, for better visibility for the driver.
- The turn indicators will be turned on, before changing lanes.
- It will be Making decisions based on traffic signal status detection.

2 Scope of Project, Deliverables

Great changes have taken place in automation and machine vision technology in recent years. Meanwhile, the demands for driving safety, efficiency, and intelligence have also increased significantly.

Adaptive driver-assistance systems are specially designed to assist vehicles during driving and parking. The primary function of these systems is to enhance the safety of cars on the road.

Growing demand for vehicles is expected to enhance the need for the market. Other factors, such as increasing government regulations associated with safety increasing the prevalence of safe driving experience, can decrease traffic congestion.

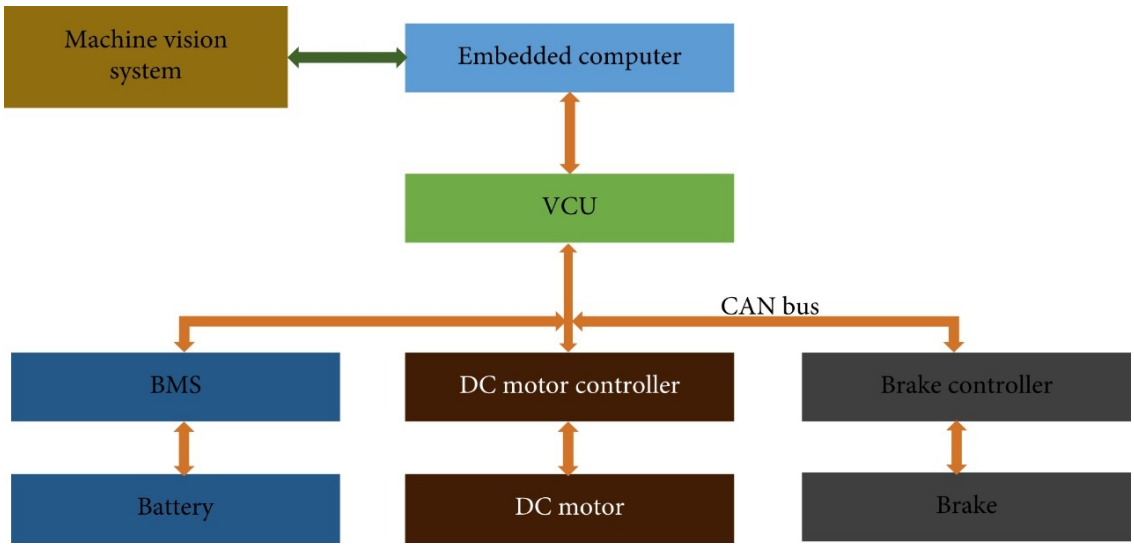
Compared with traditional transportation, ADAS is superior in ensuring passenger safety, and improving driving control.

3 Design Specifications

Hardware	
Components	**Specifications**
Video Capturing Device	Raspberry Pi Camera Module
Light Intensity Identification Sensor	Photo diode
Master Controller Device	Raspberry Pi 3b+
Slave Controller Device	Arduino Uno
Driver	L298N Dual H Bridge
Car Chassis	DC Servo Motor with Wheels and casing
Input Power Source	12V DC Battery

Software	
Components	**Specifications**
Master Controller Programming Software	Raspbian
Slave Controller Programming Software	Arduino IDE
Machine Learning Implementation Software	Python
	OpenCV4
Simulation Software	Tinkercad

4 Design Flow



5 Implementation Plan

We would like to classify our implementation plan into 2 clusters which is the hardware implementation and software implementation.

Initially we plan to execute the hardware assembly, so that we can replicate the basic framework of a car model which in turn will aid in developing and testing of the software side.

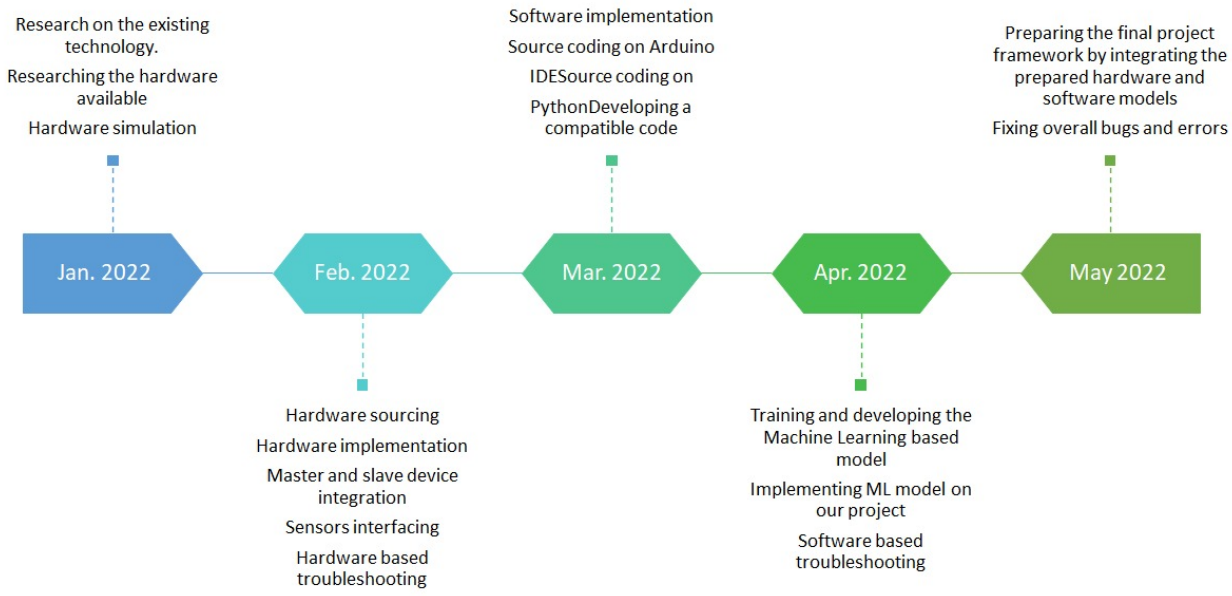
For the hardware assembly, we intend on developing a paradigm of a car which would host a set of sensors, the data of which will be processed by raspberry pi which is used as a master device and an Arduino which is used as a slave device. The data collection and processing will help in achieving higher accuracy for decision making machine learning process.

Onto the software side, for the processing and controlling part, we will be interfacing with the coding software's namely Python and Arduino IDE. We also intend on using image processing for our project for which we would be operating on openCV4. The machine learning and image classification part will also be developed here.

6 Project cost

Sr. No	Components	Approximate Price
1	Raspberry Pi 3b+	3000
2	Raspberry Pi Camera Module	2000
3	10000 mAh Power Bank	1000
4	Car Chassis	750
5	Arduino Uno	600
6	16gb Memory Card	390
7	L298N Dual H Bridge	300
8	Flex Cable for Raspberry Pi Camera	200
9	Raspberry Pi Clear case	110
Total		8350

7 Schedule


Research on the existing technology.
Researching the hardware available
Hardware simulation
Jan. 2022
Feb. 2022
Hardware sourcing
Hardware implementation
Master and slave device integration
Sensors interfacing
Hardware based troubleshooting
Software implementation
Source coding on Arduino
IDESource coding on
PythonDeveloping a compatible code
Mar. 2022
Apr. 2022
Training and developing the Machine Learning based model
Implementing ML model on our project
Software based troubleshooting
Preparing the final project framework by integrating the prepared hardware and software models
Fixing overall bugs and errors
May 2022