



Advanced Vehicle Safety System(AVSS).

A system developed to ensure safety of you and your vehicles.



Presentation on “Advanced Vehicle Safety System”



Project Carried out at:
Department of ECE, K.I.T, Tiptur

Under the Guidance:
Prof.Lohith M S
Assistant Professor,
Dept. of ECE, KIT

Head of the Department :
Mr. Yogananda G S
Associate Professor, HOD
Dept. of ECE, KIT

Presented by

- | | |
|-----------------------|--------------|
| 1.Prajwal I | (1KI18EC031) |
| 2.Prajwal N | (1KI18EC032) |
| 3.Ranganathaswamy Y S | (1KI18EC035) |
| 4.Syed Arfath | (1KI18EC050) |

Contents

- Introduction
- Problem Statement
- Objectives
- Literature Review
- Proposed System
- Project Description
 - Hardware Requirements
 - Software Requirements
- References
- Conclusion

Introduction

With over 1.3 million people dying in road crashes each year, we now need a reliable and robust vehicle safety system more than ever. A system that is designed to be forgiving of human errors. Because according to studies human errors are the major reason for vehicle accidents which can be overcome by a reliable safety system. A system that can ensure safety of drivers, passengers and safety of the vehicle itself from burglaries.

Thus we decided to solve this problem by building a system that includes many advanced technologies such as Artificial Intelligence, Machine Learning, Computer Vision, Deep Learning and IOT to efficiently tackle the problem.

Problem Statement

- The Safe System approach to road safety aims to ensure a safe transport system for all road users. Such an approach takes into account people's vulnerability to serious injuries in road traffic crashes and recognizes. The system should be designed to be forgiving of human error.
- Approximately 1.35 million people die in road crashes each year; on average 3,700 people lose their lives every day on the roads. An additional 20-50 million suffer non-fatal injuries, often resulting in long-term disabilities.
- Various studies have suggested that around 20% of all road accidents are fatigue-related, up to 50% on certain roads.
- Every year around 3,597 people die due to potholes. The Ministry of Road Transport and Highways provided figures that over 9300 deaths, 25000 injured in the last three years due to potholes.
- Police data show motor vehicle theft the least-solved crime. 44,158 cases of motor vehicle theft reported in 2018; only 19.6% cases solved.

Objectives

- Vehicle safety has become an objective to save “people” from injuries in the event of road accidents.
- Nowadays, the driver safety in the car is one of the most wanted system to avoid vehicle accidents and vehicle thefts.
- Our objective of this project is to ensure the safety of driver and vehicles itself.
- We are detecting if the driver is sleeping through tracking different physiological behaviours such as blinking of eyes and yawning.
- We are ensuring the vehicle is in the correct path by tracking the lanes on the road.
- We are detecting potholes in the roads earlier to avoid potholes and crashes related to them.
- We are detecting faces of the intruders thus avoiding vehicle thefts.

Literature review

- *Drowsiness Detection*:- IEEE paper of Praveen Kumar K P and their crew from Sivasubramanya College, Chennai on “Driver assistance system using Raspberry pi & Harr Cascade Classifier”, provides a technique for finding drowsiness of the driver by using Harr Cascade Classifier in open-CV.
- *Pothole Detection*:- A research paper on “Detecting and Counting of Potholes using Image Processing Techniques” presented by the MTech students from Puducherry, show the various techniques used to find the pothole in images. By their research paper we came to know that 82-91% of accuracy in detection can be obtained by using Edge-Detection and Fuzzy C means Clustering algorithms.

Contd..

- *Lane Detection:* A Chinese Research paper on “ Lane detection of Curving road for Structural highway with straight curve model on vision” by Wang brothers, which provides a geometric technique to find the relative movement of the vehicle with the lane of the road.
- *Intruder Detection:-* The paper published by the final year students of Vellammal Engineering College, Chennai in the year 2015 on “Image Processing Based Intruder Detection”, which identifies the intruder by using neural network.

Proposed System

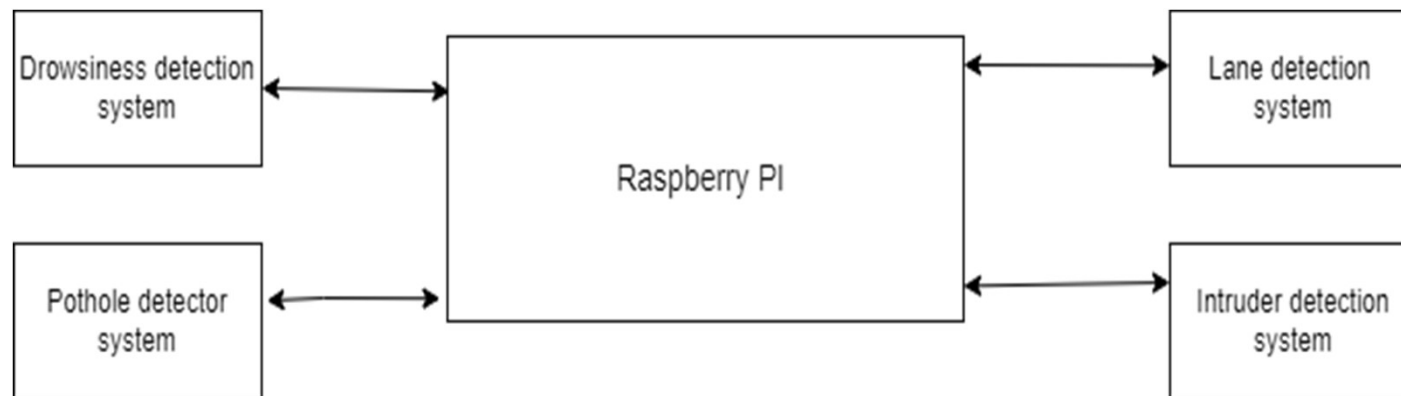


Fig a :- Advanced Vehicle Safety System

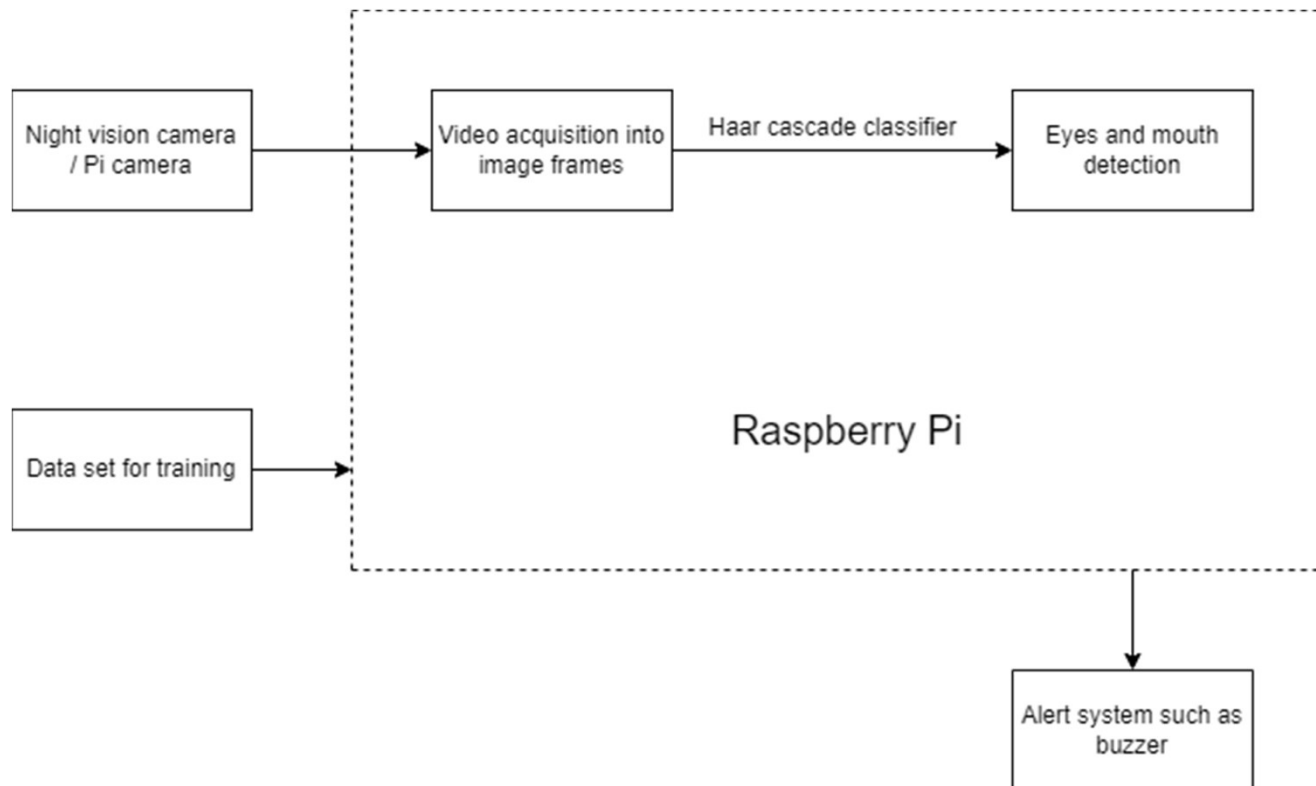


Fig b :- Driver Drowsiness System

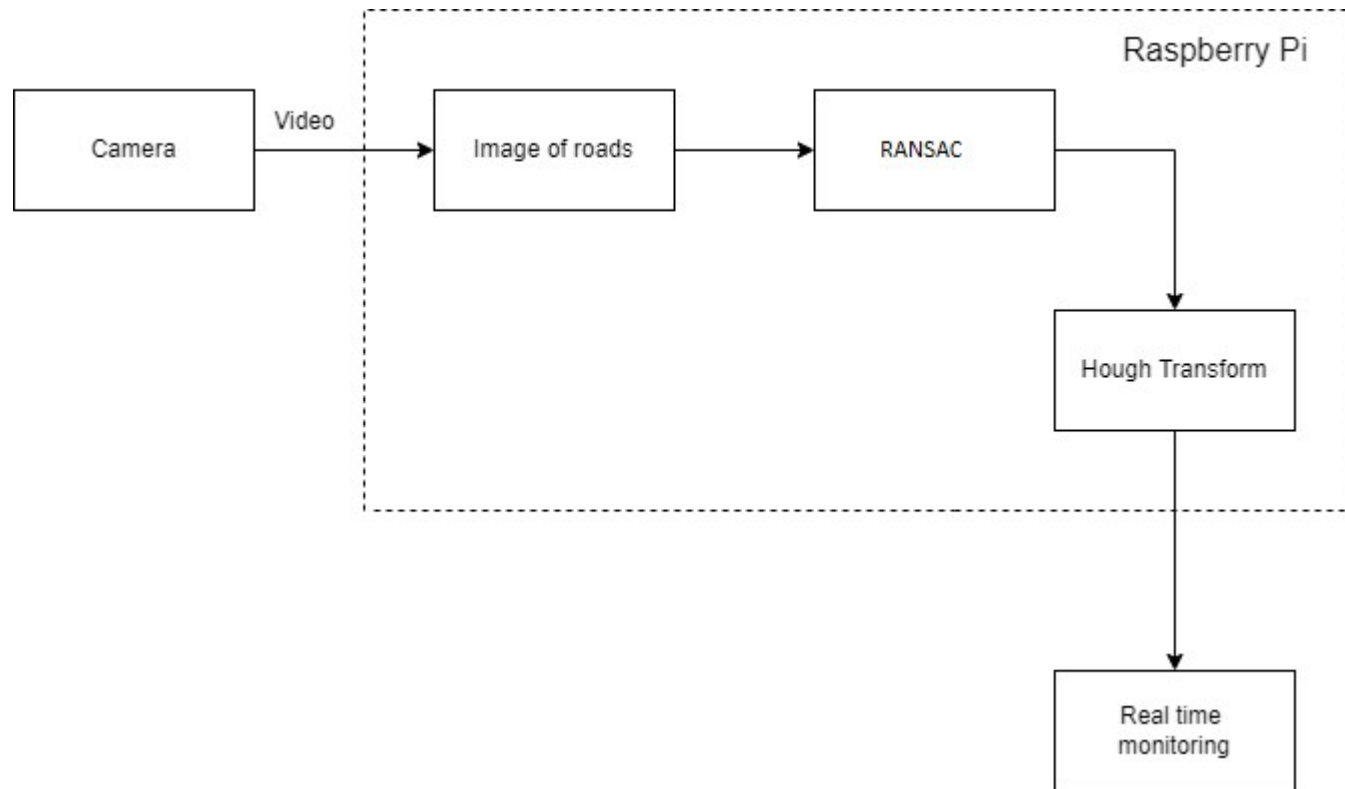


Fig c :- Lane Detection System

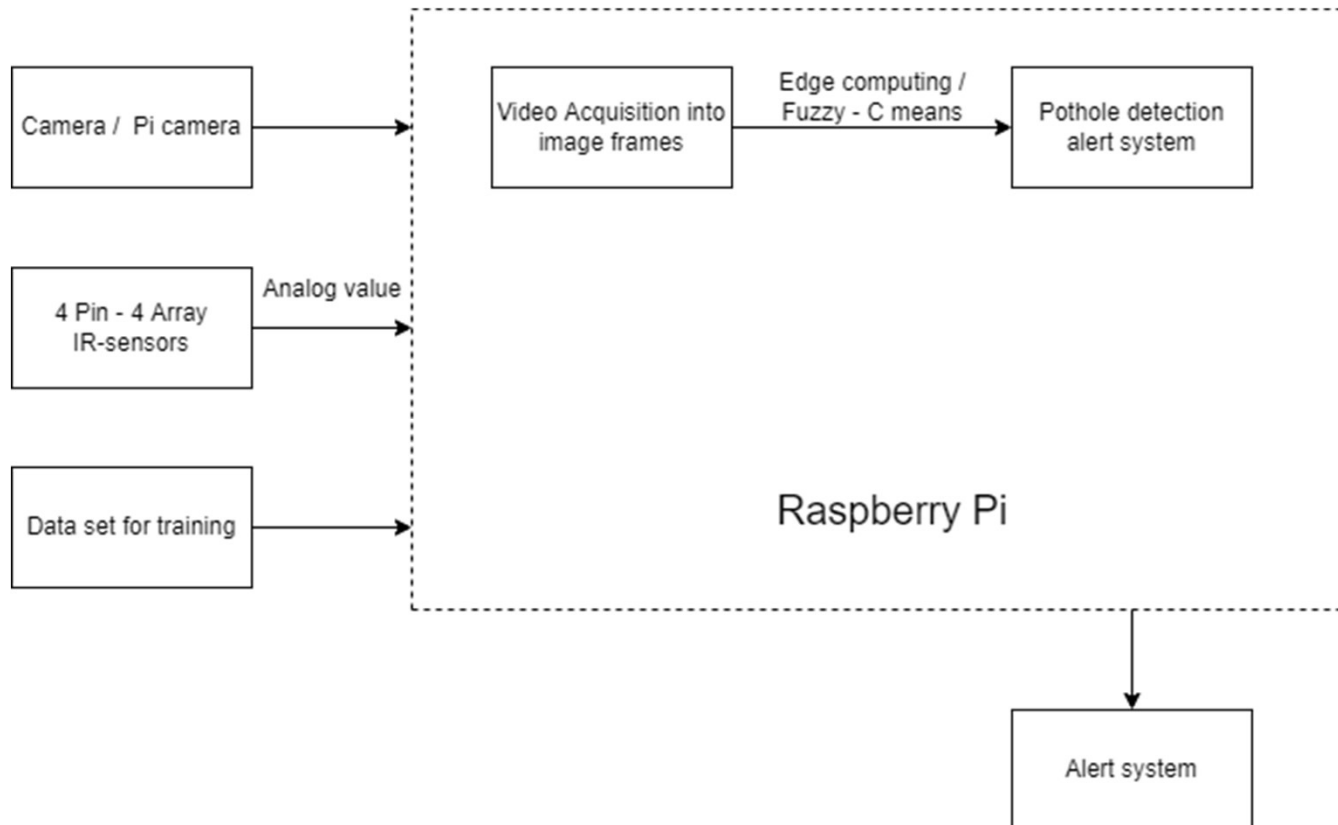


Fig d :- Pothole Detection System

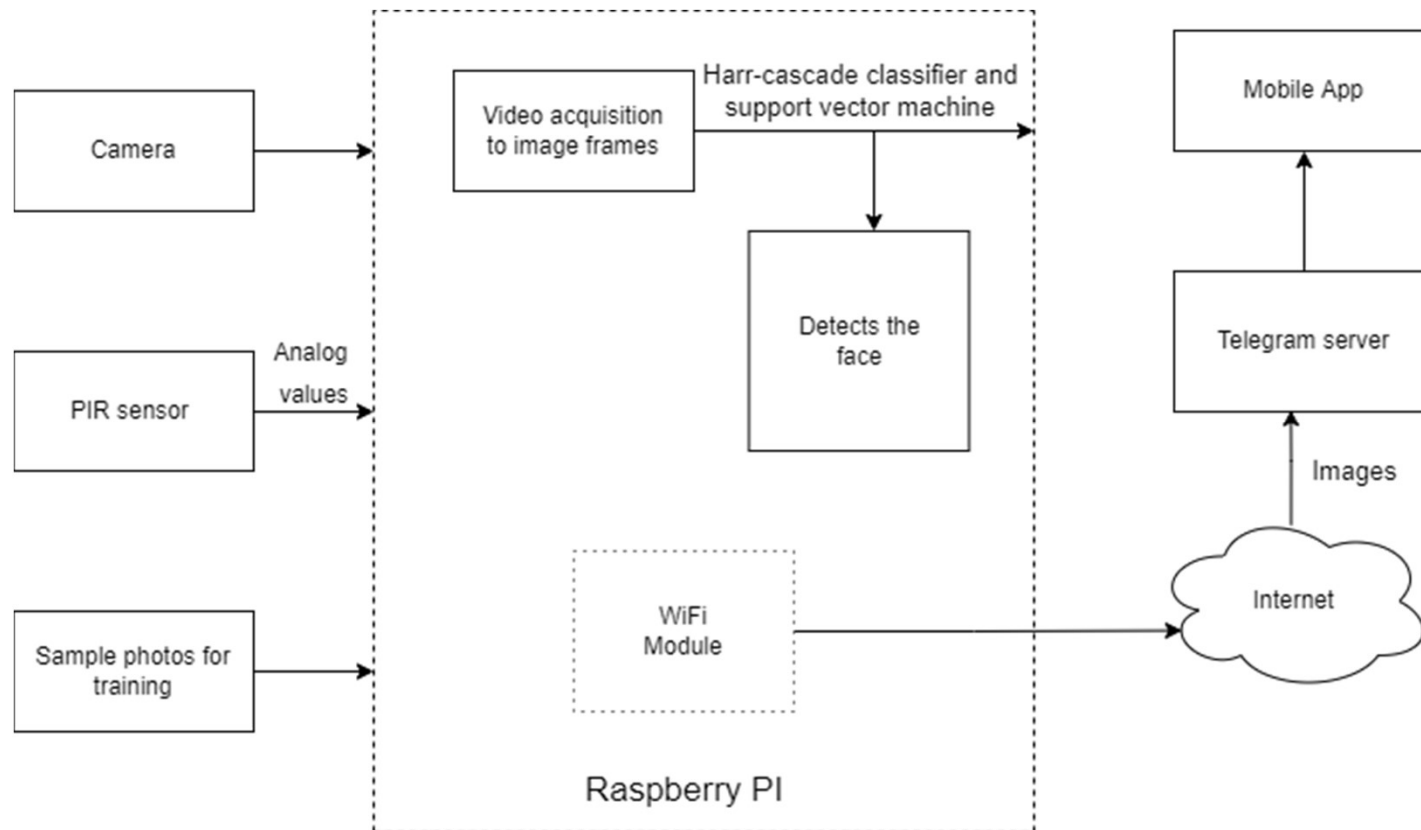


Fig e :- Anti Intruder System

Project Description

Hardware requirements

- Raspberry Pi-4
 - Broadcom BCM2711
 - 1 GB Ram
- Cameras - 4
- PIR sensor
- LEDs
- IR sensor(4 pin-4 array)
- Buzzers
- Jumpers
- HDMI cable/ VGA cable

Software requirements

- Raspbian OS, Ubuntu x86
- Programming Languages - Python
- Simulation tools - Visual designer for Raspberry Pi or Simulink
- Designing tool - Fritzing
- VCS - Git and Github
- Supportive python libraries -
 - Numpy
 - Open CV
 - Imutil
 - Scikit-learn, keras
 - Pytorch
 - Matplotlib, Seaborn
 - Rpi
- For analysis – Jupyter Notebook
- IDE - Visual studio or pycharm
- 3d Tools- For Prototyping the model

References

- Vigneshwar. K [1] and Hema Kumar. B [2] “Detection and Counting of pothole using Image Processing Techniques”.
- S.Adhav [3] and R.Manthira moorthi [4] and G.Prethija [5] “Image processing based intruder Detection using Raspberry PI”.
- Huifeng Wang[6] , Guiping Wang,[7] , Yunfei Wang[8] and others “Lane Detection of Curving Road for Structural High-way with Straight-curve Model on Vision”.
- Praveen Kumar V [9], Aravind P[10] , Nachammai Devi Pooja S [11] and their subordinates,” Driver Assistance System using Raspberry Pi and Harr Cascade Classifiers”(IEEE Xplore Part Number: CFP21K74-ART; ISBN: 978-0-7381-1327-2)

Conclusion

We are concluding that by using Advanced Technologies such as Artificial Intelligence, Machine Learning, Computer Vision, Deep Learning and IOT we can implement a efficient, reliable and robust vehicle safety system which can ensure safety of driver and passengers and security of the vehicles itself.



Thank you!