

Vehicle Accident Prevention Alert System Using Machine Learning

Prathamesh Jadhav¹, Krushna Pawar², Suhas Barangule³, Nikhil Kapare⁴

*1,2,3,4 JSPM'S Jayawantrao Sawant College of Engineering, Hadapsar, Pune, Maharashtra, India
Under the guidance of Vijaya Avati, Asst. Professor, Department of Mechanical Engineering, JSPM'S Jayawantrao
Sawant College of Engineering, Hadapsar, Pune, Maharashtra, India*

Abstract – *The project shows the use of Machine Learning in real-time problem. In Project we are detecting the eye blinks using python programming and various libraries like Tensorflow, OpenCV etc. The Program detect eye blinks continuously and gives the alarm if drowsy condition occurs. The accidents are reduced which are caused due to drowsy conditions.*

Key Words: Machine Learning, Transfer Learning, Tensorflow, OpenCV..

1. INTRODUCTION

As we see that India's Population is growing and with that the vehicles on the roads are increasing and accidents are also increasing. The accidents are harmful for persons as well as environment. According to google every year 5 lakh average accidents occurs and 40% of accidents are occurs due to drowsy / half-sleepy conditions. The drowsy condition is mainly occurring in buses, trucks, commercial vehicles etc. The drowsy condition occurs due to long hours of driving. In project by using transfer learning which is part of machine learning is used to detect the eye blinks continuously. In transfer learning the machine learning model is created by using another existing machine learning model. The model gets all the learning of existing model. This saves time which is invest in creating model from scratch. The program is then implemented in raspberry pi.

EXISTING MODELS

Previous and current projects related to vehicle accident prevention alert uses sensors and combination of sensors and object detection. In our project we are directly created eyes detection machine learning model which continuously detects the drowsiness and save money by no need of sensors. We are not saying we firstly created eye detection model but we are firstly developing and implementing the model in actual practice. We trained model with 84000 images which involve good, bad, clear, blur, with glasses and without glasses. The model is trained with 93.33% accuracy. As accuracy is very high it detects eyes in good and bad both conditions. We are trying to make prototype small as possible so it is easy to handle.

1.1 OBJECTIVES

The objectives of the project are as follows:

- To learn real world problems using machine learning model.
- To develop, test and analysis the machine learning model.
- To develop a core engineering student understand and analyze how AI is important in real world problems.
- To discover career alternatives.
- To develop a prototype of model.
- To develop cost effect project.

LITERATURE SURVEY

- **Smart Vehicle Accident Prevention System (Akansha Saraswat, Ankush Mehrotra, Anshika Vishnoi, Naman Kumar Singh, Kamakshi)**

The result obtain is based on following parameters: - face segmentation, detection of eye blink, yawn detection. The system proposed in this paper is acceptable level of performance and an average accuracy of 93.18%. Real time data processing and high accuracy distinguish this system for the similar systems.

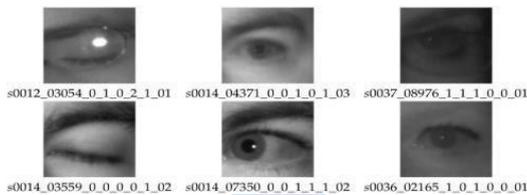
- **Vehicle Accident Detection System (Dr. Deepa Deshpande, Sarjil Tikki, Sagar Aglawe, Rutuja Joshi, Minal Darakh)**

The four-input factor are: - Object detection, driver drowsiness, conditions, and mutual object detection. In this paper the output is based on multiple factors such as speed, weather conditions, nearby vehicles density and driver fatigue. The output factors are alarm, automated brake and deceleration.

2. METHODOLOGY

1. Data Preparation: -

- For the project we required images of eyes for creating model and we find data from “http://mrl.cs.vsb.cz/eyedataset” we got 84000 images.
- The images are named with parameters of like image id, gender, glasses, eye state, reflection, lighting condition and sensors id.
- Then we segregate the data based on parameter eye state which is 4th index and by using program we segregate the data in ‘open eye’ and ‘close eye’ folder.
- And our data is prepared for model training.



2. Training, Validation and Testing of model

- For creating a model from root is very lengthy process so, to avoid that we use the concept of transfer learning to create a model.
- Transfer learning is a process of transferring all knowledge of another trained already created model in our new model. We are only getting input from model not output.
- For creating a model, we use TensorFlow which is python library.
- We create two folder name ‘train’ and ‘test’ and in which we put 80 % images in train folder and 20% images in test folder.
- After that by using TensorFlow we train the model and after that validate model by giving path of train folder. 6. After that we test model on test folder.

3. Model Creation and Evaluation

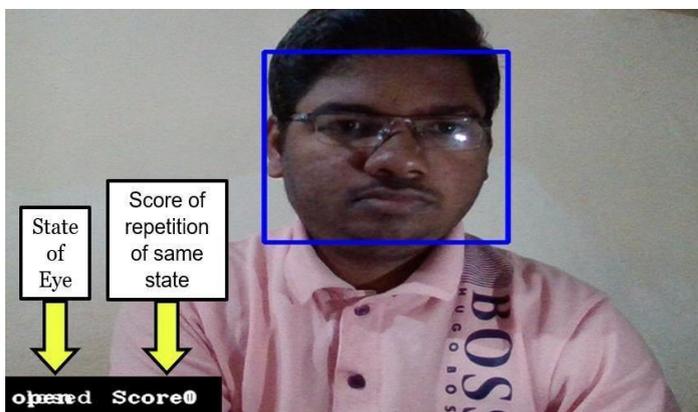
- we create the model based on train and test results.
- And evaluate the model to get train, validation and test accuracy and losses results.

4. Main program for detecting eyes state using model

- For creating main program, we use cv2, TensorFlow, NumPy, and we libraries.
- We give conditions for alarm as if eyes are closed for 15 seconds alarm will start and as eyes open the alarm will off.

5. Implementation in raspberry pi

- Components used: -
- Raspberry pi 3b+



• Camera:



• USB cable: -



• Alarm



4. RESULT AND CONCLUSIONS: -

The project is created with the help of python programming, machine learning and raspberry pi. The model is trained with 84000 images and its accuracy is 94% which is very high. The project help in reducing accidents efficiently.

5. ACKNOWLEDGMENT

It is our proud privilege and duty to acknowledge the kind of help and guidance received from several people in preparation of this report. It would not have been possible to prepare this report in this form without their valuable help, co-operation and guidance.

We express our sincere gratitude to our guide, **Prof. Vijaya Avati**, Department of Mechanical Engineering, JSCOE, Hadapsar, Pune for guiding us in investigations for this Project and in carrying out experimental work. We hold him in esteem for guidance, encouragement and inspiration received from him.

Our sincere thanks to **Prof. (Dr.) Pradeep A. Patil**, Head of the Department of Mechanical Engineering, JSCOE, for his valuable suggestions and guidance throughout the period of this report.

First and foremost, we wish to record our sincere gratitude to Management of this college and to our beloved **Principal, Prof. (Dr.) R. D. Kanphade**, Principal, JSPM's Jayawantrao Sawant College of Engineering, Hadapsar, Pune for his constant support and encouragement in preparation of this report and for making available library and laboratory facilities needed to prepare this report.

The Project on “**Vehicle Accident Prevention Alert System Using Machine Learning**” was very helpful to us in giving the necessary background information and inspiration in choosing this topic for the Project. Our sincere thanks to **Prof. (Dr.) Mahesh Gaikwad**, Project Coordinator for having supported the work related to this Project. His contributions and technical support in preparing this report are greatly acknowledged.

6. REFERENCES

- [1] Bhavani Shankar, Charan H V, Chitrashwa R, Hemal Jayachander, Accident Prediction System Using Machine Learning, IRJET, 2022
- [2] Pankaj Chourasia, Sakshi Choubey , Riya Verma , Vehicle Accident Detection, Prevention and Tracking System, IRJET, 2020
- [3] Dr. Deepa Deshpande, Sarjil Tikki, Sagar Aglawe, Rutuja Joshi, Minal Darakh, Vehicle Accident Detection System, IRJET, 2020
- [4] Prof.S.S. Patil, C.S.Tupe, S.B.Solomon, K.H.Doke, H.S.Pawari, VEHICLE ACCIDENT PREVENTION SYSTEM, IRJET, 2019
- [5] Akansha Saraswat, Ankush Mehrotra, Anshika Vishnoi, Naman Kumar Singh, Kamakshi, Smart Vehicle Accident Prevention System, IRJET, 2018
- [6] R.Saranya, R.Arun Kumar, VEHICLE ACCIDENT PREVENTION USING SENSORS, IRJET, 2017