iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 8 **Issue:** VII **Month of publication:** July 2020

DOI: https://doi.org/10.22214/ijraset.2020.30433

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue VII July 2020- Available at www.ijraset.com

Road Safety Mechanism to Prevent Overtaking Accidents

Anjaly Ajith[1], Biphin Joseph[2], Jimalu Elsa Johnson[3], Jinsmon Joseph[4], Sandeep Thomas[5], Vinu Thadevus Williams[6]
[1, 2, 3, 4, 5, 6]*Department of Computer Science, College of Engineering Kidangoor*

Abstract: Road traffic accidents are being recognised as a major problem in developing countries. A mechanism to prevent these road accidents is the need of the hour. It is hoped that the mechanism which we introduced can prevent accidents occurring due to overtaking. In order to accomplish the task, we use a camera which is fixed on the rear view mirror of our vehicle which collects the footage of the opposite lane up to 100m. This footage is used to detect any obstacle present using real time computer vision. If an obstacle is present, driver will be alarmed so. This will ensure overtaking only at safe conditions
Keywords: Alert system, Overtaking, Opencv, Object detection, Real time

I. INTRODUCTION

We know that road accidents are the major cause of death all over the world. According to a global survey conducted across the world, around 1.2 million people lose their lives in road accidents. Also around 20 to 50 million are injured.
This paper comes up with an idea to reduce the accident rate by setting up a camera on the rear view mirror and capturing the footage of opposite lane. This mechanism enables drive with ease and gives better driver experience. Using this mechanism, we can overtake huge vehicles without any fear.

II. PROPOSED METHOD

A. Architecture

The System mainly composed of image processing module, object detection module and obstacle identification module. Image processing module processes the image for feeding into the neural network. Object detection module detects objects and finds their position in each frame. Obstacle identification module selects a Region of Interest, compares object with the predefined obstacle class, calculates the distance, identifies obstacles and provides alert signal.

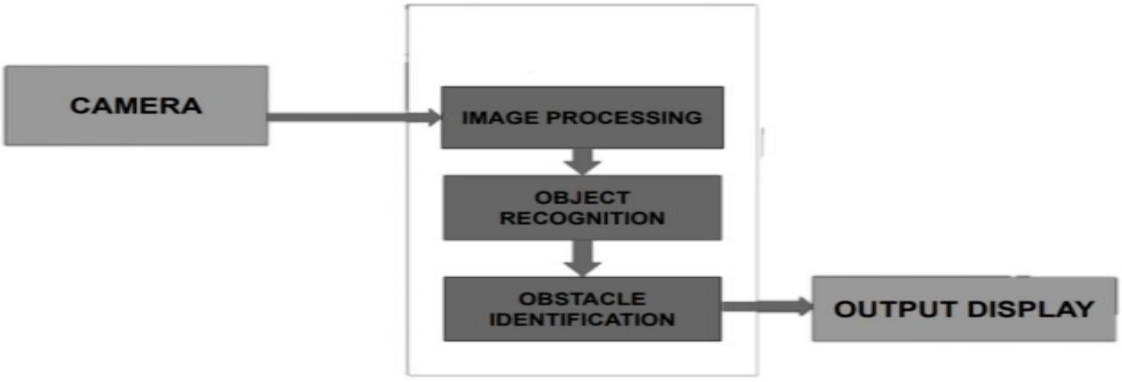


Fig 1. Architecture of proposed system

B. Modules of the System

The system is divided into four modules. They are:

1) *Image Processing Module:* We use a camera which is fixed on the rear view mirror of our vehicle. It collects the footage of the opposite lane up to 100m. These footages are used to extract various image features using real time computer vision.
2) *Object Detection:* Image parameters obtained for image processing system is used to detect various objects present. Video footages are processed frame wise and each frame is fed in to the neural network which is pretrained to detect various objects present in the image .This pretrained model will detect the object and returns its class id along with the confidence value of the particular class and the coordinates of the object in the frame .We take 0.2 as the threshold confidence value for assigning a class id to a detected object and the coordinates and class id is given as an input to the obstacle identification module.

3) *Obstacle Identification and Decision Making:* Objects identified during object detection phase are classified based on their features in order to decide whether they are an obstacle or not. If an obstacle is identified, driver will be alarmed so. Distance is calculated by performing a mathematical function on the bottom edge y coordinate value of the of the bounding box of the identified objects. Various predetermined parameters are chosen based on various observations to select the ROI from the frame. Then the class ids found in this region is compared against the possible obstacle classes. If a match found and it's distance is greater than 50m it is considered as an obstacle and an output signal given so. Otherwise an output informs user that the circumstances are favorable for safe overtaking, is displayed.
4) *Hardware Module:* There is a camera which captures the footage from the opposite lane and then gives the visuals to the processor, Jetson nano. The output then is given by the digital driver assistant display

III. TECHNOLOGIES USED

1) *OpenCV:* OpenCV supports some models from deep learning frameworks like TensorFlow, Torch, PyTorch and Caffe according to a defined list of supported layers.
2) *Visual Studio Code:* Visual studio code is a source-code editor which includes support for debugging, embedded Git control and GitHub, syntax highlighting, intelligent code completion and code refactoring. It is highly customizable, allowing users to change the theme, preferences and install extensions that add additional functionality.
3) *Tensorflow:* TensorFlow is an open-source software library for dataflow and differentiable programming across a range of tasks. It is a symbolic math library which is used for machine learning applications.

IV. RELEVANCE

A. Around 1.2 million people lose their lives in road accidents every year and another 20 to 50 million are injured. An economical mechanism to prevent these road accidents is the need of the hour. Research at Nottingham University determined the following statistics when studying police records of overtaking accidents.
B. 35% hit a vehicle turning right as the overtaking vehicle attempted to pass.
C. 16% hit a vehicle travelled in the opposite direction.
D. 10% side swiped the vehicle being overtaken.
E. 6% hit a vehicle that was turning at a junction.
F. 14% involved undertaking.

V. CONCLUSION

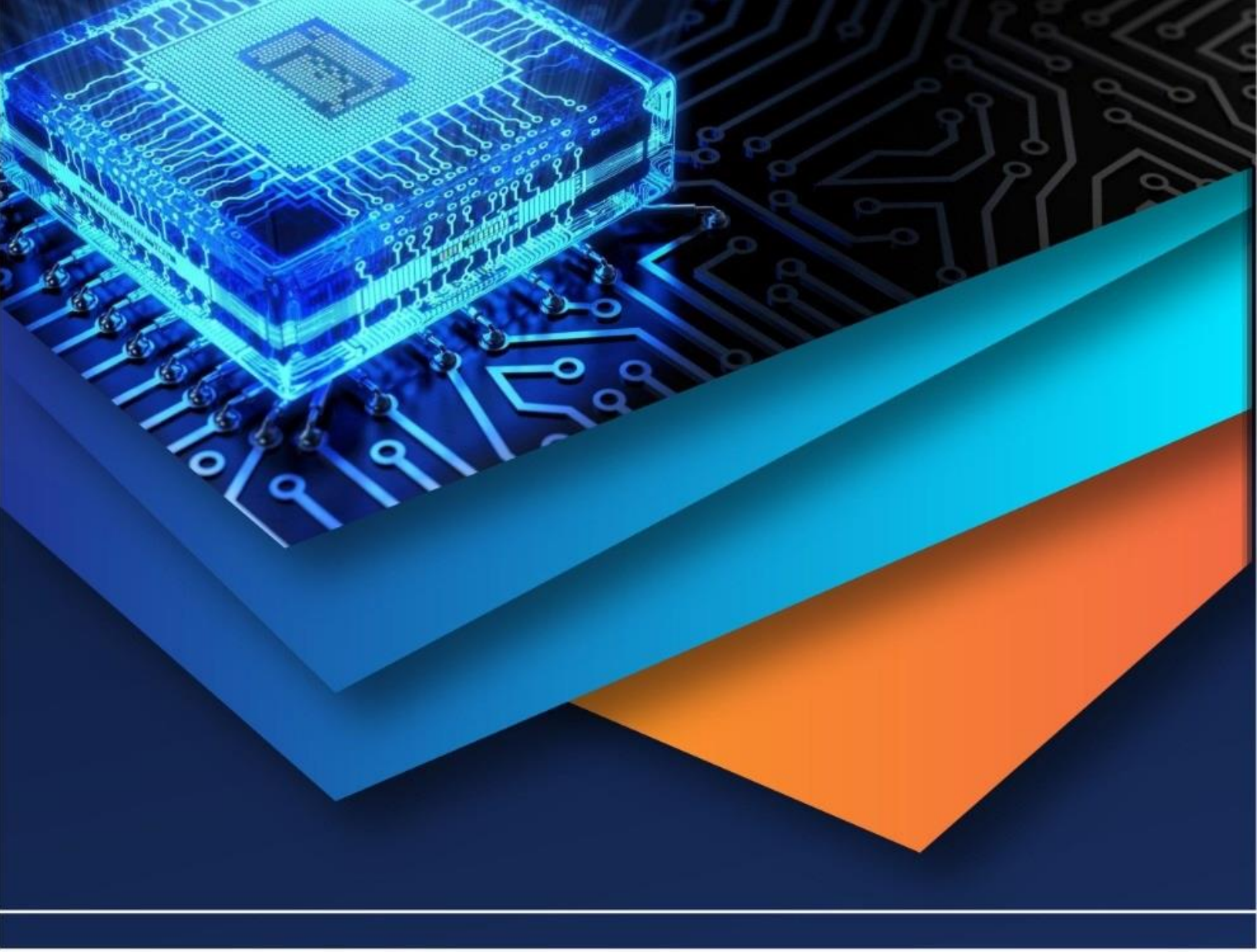
This mechanism aims at coming up with an economical, docile way to prevent such accidents from happening and also facilitates ease of implementation so that it can be used in middle and low income countries without incurring heavy loss.

VI. ACKNOWLEDGEMENT

The authors would like to thank all who were involved directly or indirectly in the data collection, experiment conduction, and analysis stage of the project.

REFERENCES

[1] Christene Maria Sunny, S Nithya.”Forecating of road accidents in Kerala: A case study”, International Conference on data science and Engineering, 2018
[2] Mutangi, K.,”Time Series Analysis of Road Traffic Accidents in Zimbabwe”, International Journal of Statistics and Applications.
[3] Jha, K., Sinha, N., Arkatkar, S.S. and Sarkar, A.K.,” A comparative study on application of time series analysis for traffic forecasting in India: prospects and limitations”.
[4] Rasika Phadnis, Jaya Mishra,”Object detection and pattern tracking using Tensorflow”, Second International Conference on InventiveCommunication and Computational Technologies,2018
[5] Brajesh and Dr. Chander Shekhar “Accidental mortality in India: Statistical models for forecasting”, International Journal of Humanities and Social Science Invention.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY