IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 3, May 2024

Smart Application to Avoid RoadAccidents Caused by Speed Breakers

Aparna K S[1], Muskan[2], Nadira Ishrath[3], Naveed Sufiyan[4], Mohammed Muzzammil[5]
Assistant Professor, Department of CSE[1]
Students, Departmentof Computer Science[2,3,4,5]
Rao Bahadur Y Mahabaleswarappa Engineering College, Bellary, Karnataka, India
Visvesvaraya Technological University, Belgavi, Karnataka, India
aparna.vastrad@gmail.com and nsufiyan26@gmail.com

Abstract: *The intelligent application presented in this study aims to stop speed breakers from causing accidents on the road. The application employs on board sensors and GPS technologies to identify speed violators and notify drivers. The software detects speed breakers and alerts drivers in real time by combining sensor data analysis and machine learning methods. Our application aims to enhance road safety by notifying drivers about speed breakers. Therefore, reducing the possibility of accidents and making the road safer for everyone.*

Keywords: Smartphone application, Early warning systems, speed breakers

I. INTRODUCTION

In the modern world, speed breakers on roadways might result in extremely dangerous incidents. Although speed breakers are designed to reduce traffic and make roads safer, they can also be the cause of accidents when poorly constructed or designated. Applications for smartphones have devised creative methods to address this issue. These applications notify drivers of impending speed limit violations using advanced technologies like sensors, camera and GPS location. These apps assist drivers in modifying their driving to stay safe and prevent accidents by providing them with information about impending bumps. To further improve safety, these applications combine features like animal, pothole and object identification in addition to speed bumps detection. These programs can identify items blocking the way, identify pothole, and identify animals crossing the road by combining sensor data with camera footage. Drivers can take necessary action by precisely identifying these hazards with the use of GPS location tracking.

In order to ensure safe driving and prevent accidents, it is critical to assess the quality of the road, particularly in poor visibility situations as rain or nightfall when speed limit signs might not be visible. In residential and school zone, where speed breakers are frequently constructed to regulate vehicle speed and protect pedestrians, early warning systems and real-time speed limit detection can assist prevent accidents caused by speeding. Road safety is improved when speed bumps are level with the surface of the road, enabling cars to pass safely at specified speed limits. Initiatives to increase road safety can effectively avoid accidents and save lives by utilizing technology and community involvement.

II. LITERATURE SURVEY

Various existing systems and approaches for detecting speed breakers and bumpy roads. It mentions that most existing systems use additional hardware to detect speed breakers, which can be expensive. One approach discussed is the use of a smartphone's accelerometer and magnetometer sensors to monitor traffic and detect road bumps. The system relies on GPS to locate the direction of motion of vehicles. In the paper [1], Pothole detection system using 2D LiDAR and camera, to improve the pothole detection accuracy, the combination of heterogeneous sensor system is used. By using 2D LiDAR, the distance and angle information of road are obtained. The pothole detection algorithm includes noise reduction pre-processing, clustering, line segment extraction, and gradient of pothole data function. Vision based approach is exploited to detect road anomalies in [2] Computer vision-based detection and localization of potholes in

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 3, May 2024

asphalt pavement images, it addresses the detection and localization of one of the key pavement distresses, the potholes using computer vision. Survey shows that some study uses Stereo vision [3] to detect pothole, it proposes a stereo vision system which detects potholesduring driving. The objective is to benefit drivers to react to potholes in advance. This system contains two USB cameras takingphoto simultaneously. [4] Paper presents a vibration-based approach for automatic detection of potholes and speed breakers along with their co- ordinates. In this approach, a database is maintained for each road, which is made available to the public with the help of global database or through a portal in a [5], paper propose a low complexity method for detection and tracking of potholes in video sequences taken by a camera placed inside a moving car. The region of interest for the detection of the potholes is selected as the image area where the road is observed with the highest resolution. One of the ways to reduce road accident is to identify the humps and potholes present in the path. In [6] paper, an internet of things-based road monitoring system (IOT-RMS) is proposed to identify the potholes and humps in the road. The pathway which is affected by the pothole is greatly influenced by the scattering signal of the ultrasonic sensor [7] Investigate the performance in detecting potholes with an image classification method based on the deep convolutionalneural network models.

III. METHODOLOGY

The system proposed in this paper, the car is capable of reaching the given destination safely and intelligently thus avoiding the risk of human errors. Many existing algorithms like lane detection, obstacle detection are combined together to provide the necessary control to the Vehicle.
The following steps describes detail methodology implemented in the model:

1. Speed Breaker Detection:

To obtain the images used, a camera was mounted inside the vehicle on the front windscreen. The reason for this is that it more accurately reflects the scenario of developing a device that can be fitted to a vehicle for commercial use. An image library was created by driving around and creating an image library that includes 48913 images. To sidestep any issues that normally occur when taking photos from a moving vehicle such as blurring of the image, a GoPro camera was used. The GoPro camera was set to a 0.5 second time lapse mode and using this setting it was possible to achieve stable images for speeds up to 60km.

Animal Detection

To obtain (correct) predictions from deep neural networks you first need to pre-process your data. In the context of deep learning and image classification. Animal detection is classified into further steps.
Capturing Phase: To detect motion, we first have to capture live images of the area to be monitored and kept under surveillance. This is done by using camera compare the live images being provided by the web cam with each other so that we can detect changes in these frames and hence predict the occurrence of some motion.
Comparing Phase: Comparing the current frames captured with previous frames to detect motion: for checking whether any motion is present in the live images, we compare the live images being provided by the web cam with each other so that we can detect changes in these frames and hence predict the occurrence of some motion.
Pre-Processing: Pre–Processing Is heavily dependent on feature extraction method and input image type.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 3, May 2024

Image Segmentation: In order to identify and analyze the target in the image, we need to isolate them from the image. The image segmentation refers to the image is divided into regions, each with characteristics and to extract thetarget of interest in the process.

Pot Holes Detection: In preliminary work it was found that irrelevant information in a frame, such as foliage,can lead to false positives. Therefore, it was decided to first extract the entire road surface automatically in the software and scan only the extracted area for potholes.

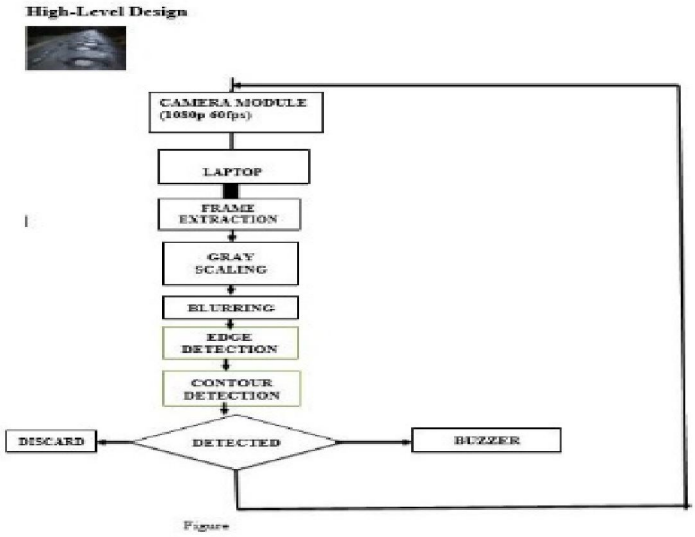

Figure 1 : Pot Holes Detection

Traffic Signal Detection

Traffic signs have two major features: Shape (square, circle, triangle, etc.) and Color (red, yellow, blue, green). Detecting shapes in an urban environment is very challenging and unreliable due to complications in image acquired. The image is captured by the camera. Each image thus captured is then processed. Initially, before color segmentation some pre-processing on the image captured by the camera is required. Some example image containing traffic sign is shown in figure. For image preprocessing, first step is to analyze the intensity of color components, and if it is in the limited range, it is necessary to apply stretching to the dynamic range of intensities of color components which is nothing but image normalization.

Figure 2: Image pre processing

Noise Removal: This step is required basically to remove false candidates that have been wrongly detected as regions of interest.In order to remove the number of detected regions (possible traffic signs), we apply morphological function which help smoothen the image and remove artifacts.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 3, May 2024

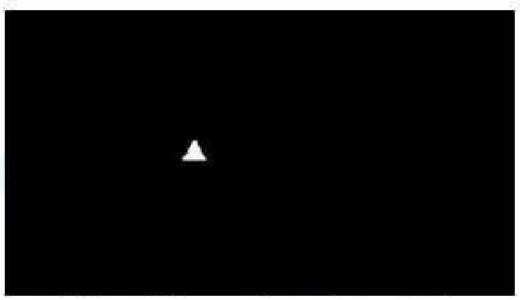

Figure 3: After Noise Removal

Lane Detection

The camera captures the image of the road continuously through Open CV in RGB form. Then it converts the image from RGB form to HSV by image processing technique. It is then dilated for image enhancement of the concentrated region.

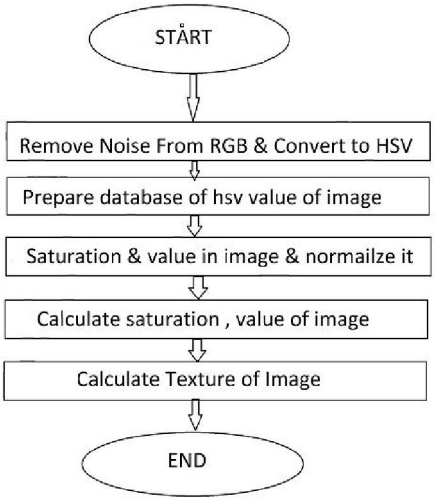

Figure 4: Lane detection

IV. RESULTS

Fig 1: Animal Detection

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 3, May 2024

Fig 2: Pothole Detection

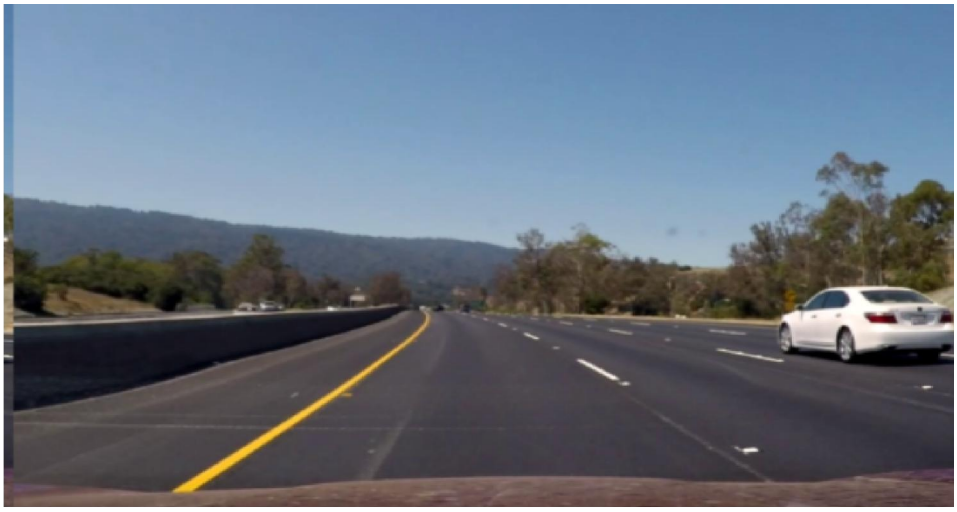

Fig 3: Lane Detection

Figure 4: Traffic Signal detection

V. CONCLUSION

Our smart application addresses the problem by giving drivers real-time alerts, our clever application tackles the issue of speed breakers causing accidents on the road. In addition to providing advantages like increased efficiency, cost savings, and environmental impact, the application lowers accidents and increases road safety. By applying machine

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 3, May 2024

learning methods, this project can be further enhanced by adding a user feedback mechanism to improve the project. The data analytics, mobile application development, and GPS navigation are some of the methods employed.

REFERENCES

[1]. Dighi S, "Symbiosis student killed in mishap," Daily News and Analysis, 03, 2012.
[2]. Over 11,000 people killed by potholes, speed breakers last year, Accessed from http://timesofindia.indiatimes.com/india/Over-11000-people-killed-by-potholes-speed-breakers-last
[3]. Bhoraskar R, et al., "Wolverine: Traffic and Road Condition Estimation using Smartphone Sensors," Communication Systems and Networks (COMSNETS), 2012 Fourth International Conference, IEEE, 2012, pp. 1- 6.
[4]. Hull B, et al., "CarTel: A Distributed Mobile Sensor Computing System," In Proceedings of the 4th international conference on Embedded networked sensor systems, ACM, 2006, pp. 125-13.
[5]. Mohan P, et al., "Nericell: Rich Monitoring of Road and Traffic Conditions using Mobile Smartphones," In Proceedings of the 6th ACM conference on Embedded network sensor systems, ACM.