Review One: Drowsiness Sensing System & Pothole Identification Technique For Monitoring Roads

Prof. Sanket S.Pawar[1] Miss. Sanyogita Paimode[2], Miss. Divya Raut[3], Miss. Shraddha Shirole[4], Mrs. Sandhya Sawalkar[5,] Dr. Dhanke Jyoti[6]
Bharati Vidyapeeth's College of Engineering, Lavale, Pune

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Abstract:

One of the major problems in developing countries is monitoring the road and traffic condition. Potholes on the road can affect the large proportion of society either directly or indirectly. Getting the pothole fixed, informing the authorities and asking them to take action is very time consuming. Implementing a system that involves citizens in the process of detecting pothole is what is being envisioned. many image processing techniques were proposed to inspect pavement defect for improving accuracy and efficiency for the onsite inspection by the humans but it gives you unacceptable stability. Therefore, an application of convolutional neural network is used for pothole detection using digital images in this study. This paper concludes earlier pothole detection methods that have been developed and suggest a cost-effective solution to detect the potholes on the roads and provides timely alerts to drivers to avoid critical problem that causes numerous car accidents annually is driver fatigue. Due to incapacity of driver to halt or minimize the impact accidents caused by driver's sleepiness are much more inclined to result in fatalities or severe accidents. this paper focuses on accident detection and avoidance system which detect accidents and alerts the driver by buzzer. It calculates the eye open ratio by using eye blinking algorithm.

Keywords:

Convolutional Neural Network, Image processing, pothole detection, drowsiness detection

Introduction:

Road accidents occur due to multiple causes such as over speeding, use of mobile phones, drunken driving, vehicular condition, poor light condition, fault of driver, overtaking. In the context of population, India is ranked second with fast growing economy and it is known to have wide network of roads. Roads are prime means of transportation in India today. They carry almost 90 percent of country's passenger traffic and 65 percent of its freight [1]. however most of the roads in India are small and crowded with poor surface quality and road maintenance needs are not sufficiently met. Although technology has been widely used in many industries, it has not been widely adopted by industries, in the field of road infrastructure and repairs. By using right technology, it has potential to greatly improve the efficiency and effectiveness of pothole repair work, improving safety of roads. However, many municipalities are still using the old-age methods of cement to fix potholes.

According, to study it can be seen that sleepiness is a major cause for accidents, especially automated accidents. WHO statistics show that 1.2 million people worldwide die every year due to road crashes, accidents, 50 million people are injured and more than 4000 people die daily from road traffic injuries [2]. Activities such as driving a car, handling heavy machinery, monitoring a nuclear plant are activities that require visual reaction times; these can be affected by drowsiness. According to Peru's statistics indicate that in 2007 there were 3510 details due to traffic accidents and 49,857 injuries, most of them due to tiredness of the drivers [3].

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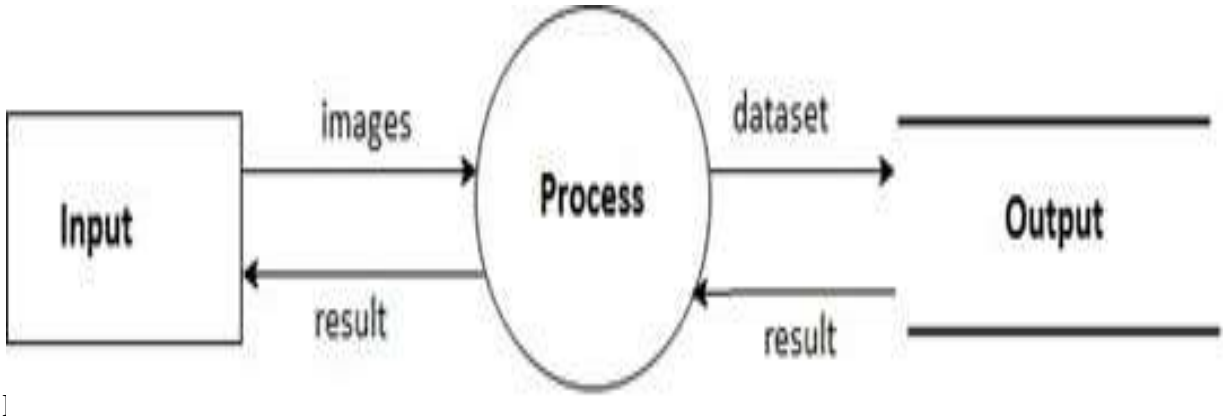

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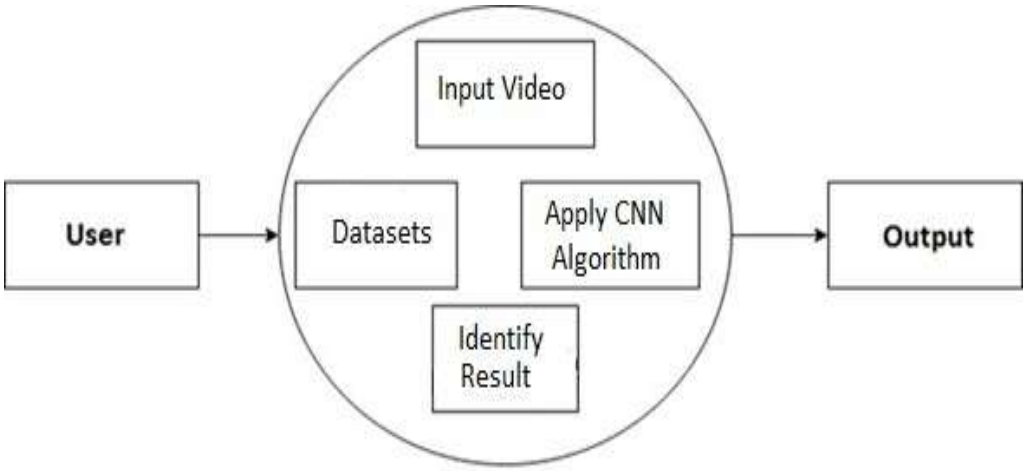


Convolutional Neural Network

This Algorithm is very much popular and it is most widely used algorithm in image recognition problems. Few examples are:

Face Recognition: To recognize faces using convolutional neural network and you can design face recognition based attendance system or you can have even criminal identification using facial recognition system.

Emotion Recognition: so you can recognize emotions based on dataset available with you and again you can use CNN algorithm to recognize emotions. now based on emotions you can detect the depression of particular person and you can avoid suicides and other consequences.

CNN image classification takes an input image, process it and classify under certain categories. This mainly works on images. Types of images such as black and white (binary images), grey level (8 bit), color (24 bit/RGB) can be suitable for convolutional neural network but as it is deep learning algorithm even it is much advanced than the traditional machine learning algorithm.

IMAGE PROCESSING

Image processing is process of transforming an image into a digital form and executing certain operations to extract some meaningful information from it. This system treats all images as 2D signals by applying certain pre-set signal processing methods. It is an essential pre-processing systems in numerous applications such as face recognition, object detection and image compression. Such pre-processing can improve the performance of a model. Exploiting Images for example, Adding or removing objects to images is another application, particularly in the entertainment industry.

Image processing can be used for improving quality, remove undesired objects or creating new images. Image processing is broad and complex field with many different algorithms and techniques that can be used to gain different results

Types of Image processing:

Visualization- Find objects that are not visible in the image.

Recognition- Distinguish or detect objects in the image.

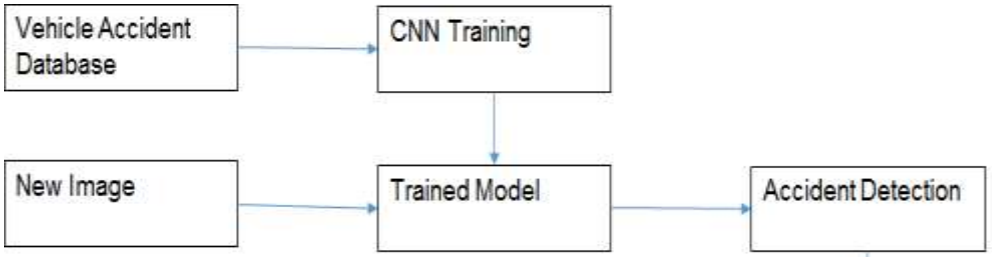
Sharpening and restoration- Create an enhanced image from the original image.

Pattern Recognition- Measure the various patterns around the objects in the image.

Retrieval - Browse and search images from a large database of digital images that are similar to the original image.

POTHOLE DETECTION

Pothole detection is main part of any automated driving system. previous works defined pothole as oval shaped area in the road surface that has different texture than road surface. The main Objective of this system is to identify potholes through deep learning approach. This system is used to automate task of detecting potholes and helps to understand whether the pothole is ahead or not. This system uses the object detection algorithm to detect the potholes and alerts by the buzzer.



System Architecture:

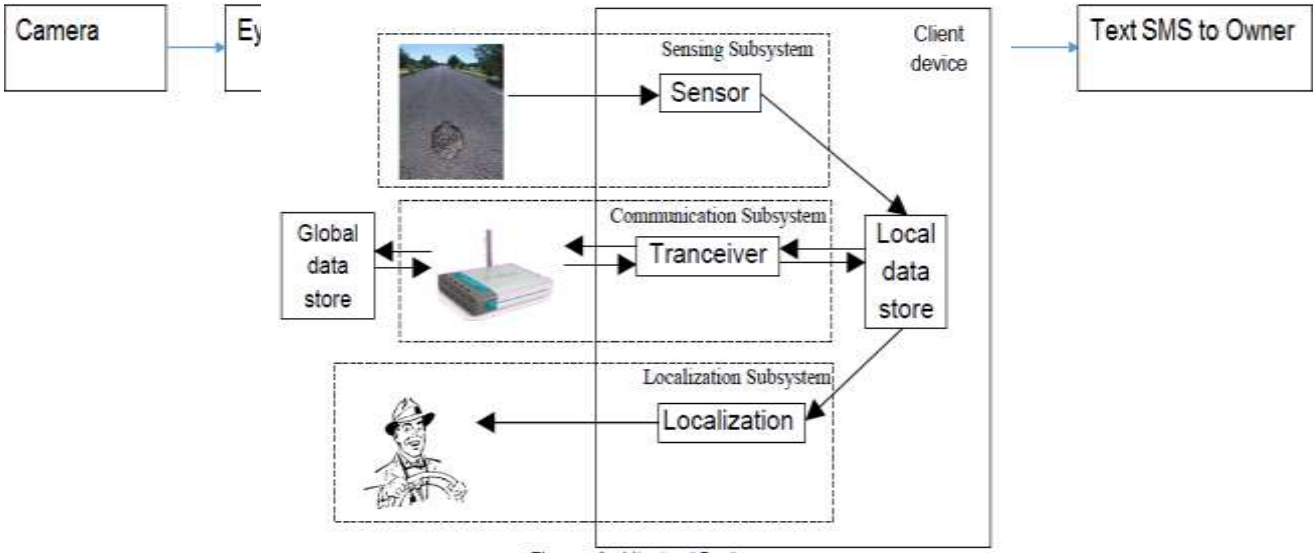


Figure : Architectural Design

DROWSINESS DETECTION

Nowadays the driver safety in the car is one of the most wanted System to avoid accidents. For enhancing the safety. We are detecting the eye blink of the driver and estimating the driver status. In this system we are detecting the eye status of the driver to detect the whether the driver drowsy or not so to avoid situation like accidents. Firstly, camera as sensor captures the eye of the driver then it calculates eye aspect ratio using the eye blink detection algorithm and it results that if eye of the driver remains closed continuously and if the threshold value is below 0.35 then the driver is alerted by the buzzer sound and also sends the message of the driver status to respected owner via SMS.

Conclusion:

We studied a machine-learning algorithm for prediction of road quality. A unified model and convolutional neural network for object detection is implemented. The deep learning model is trained with pothole images to modify and predict potholes and drowsiness detection. A deformable parts model or CNN model can be trained with images to predict potholes but comparatively CNN eye blinking performs better in predicting potholes and produces promising results in time, speed and accuracy when compared. better training data could

improve the performance model. This model can be packed with flasks as an API and integrated with a mobile application to report potholes to the government which will reduce the communication gap between the government and its citizens. This model can also be used in real-time to predict pothole which implemented in autonomous vehicles so that it can prevent or execute a strategy to reduce discomfort to the passengers. The road sense application is an attempt to provide its users with better knowledge about the routes of their transportation. With further work in this field. It is possible for this project to play a proactive part in improving road conditions. Overall in this paper, we propose to upgrade the road type detection algorithm through detecting other road anomalies and trying other machine learning classifiers.

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