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POTHOLE DETECTION AND IT'S AVOIDANCE

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Abstract- Pothole detection is one of the most important tasks for road maintenance. Computer vision approaches are generally based on either 2D road image analysis or 3D road surface modeling. However, these two categories are always used independently. Furthermore, the pothole detection accuracy is still far from satisfactory. The proposed pothole detection and avoid any system focuses not only on the detection of potholes but also assist the driver to avoid potholes; by giving directions towards left or right to avoid the pothole. Moreover, it will also have an automatic control over the speed of vehicle which will reduce the speed of the vehicle as the car approaches towards the pothole. All the data will be collected in the local database/cloud. The data will be further used for various types of analysis such as the road that has a greater number of potholes, tracking the lifeline of the road and prioritize the road reconstruction

Keywords: *IR,CNN, Artificial Intelligence, Machine Learning*

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I INTRODUCTION

Traffic congestion has been increasing world-wide as a result of increased motorization, urbanization, population growth and changes in population density. Congestion reduces utilization of the transportation infrastructure and increases travel time, air pollution, fuel consumption and most significantly, traffic accidents. While different factors contribute to the leading cause of around 95% percent of all accidents. The driver behavior can be improved by either alerting him about the probable collision or controlling the vehicle itself.

At present, the commercially available traffic detecting equipment's include loop detectors, pressure sensors, infrared, radar, ultrasound-based sensors and video cameras. are cheap to manufacture, their installation and repair are very expensive because they involve digging and re-surfacing of the road,

which is labor intensive, time consuming and causes disruption to the traffic. The pressure-based traffic sensors have the same problem. Infrared , radar and ultrasound sensors, on the other hand, are more expensive to make. The use of these active devices in urban areas may have safety and other regulatory implications. The effectiveness of This type of sensors can also be affected by bad weather. Also, the images have to be processed further to obtain useful data from them. Road conditions is a key part for safe and comfortable driving and also for maintaining traffic efficiency in one's day to day life. It is desirable to have a mechanism by which people can know about the road conditions on the routes on which they wish to travel, in real time.

Also understanding conditions of road surface is also very important for road maintenance and asset management.

The proposed system will provide, vehicle assistance to driver, in case if potholes are detected. Assistance includes giving

directions to the driver, to move left or right in order to avoid potholes. System will consist of camera and an IR sensor. Camera will be used to detect speed-breaker .

Problem Definition

It consists of an IR based sensing module and a python based user interface, It is to be designed and implemented for vehicles. Road conditions are a key part for the driving safety, comfort and efficiency of traffic in people's day-to-day lives.

Scope Statement

It is to be designed and implemented for vehicles. Road conditions are a key part for the driving safety comfort and efficiency of traffic in people's day-to-day lives. It is desirable to have a mechanism by which people can know about the road conditions in the routes on which they wish to travel, in real time. Also understanding conditions of road surface is also very important for road maintenance and asset management.

II ANALYSIS AND DESIGN

IDEA Matrix

An IDEA matrix is a concept that evaluate various effects that the idea has. This tells us almost everything about the project

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I	D	E	A
INCREASE: Awareness in public accident.	**DRIVE:** Records to local database.	**EDUCATE:** User needs knowledge about vehicle and about the proposed system.	**ACCELERATE:** In this system we extend Road detection management system and we save the location of the pothole on the database which will help us in future analysis.
IMPROVE: Road journey experience as our journey will be hassle free.	**DELIVER:** Detects potholes and Speed breakers.	**EVALUATE:** Area wise detection of road anomalies.	**ASSOCIATE:** Vehicle assistance and optimum automatic speed reduction.
IGNORE: Traffic condition of the road.	**DECREASE:** The possibility of accidents and threat to life of passenger and driver.	**ELIMINATE:** The possibility of vehicle stopping on road due to road anomalies.	**AVOID:** Road anomalies and traffic congestion.

Table 1 IDEA Matrix

Mathematical Model

Let S be the Whole system which consists:

S= {IP, Pro, OP}.

Where,

    A. IP is the input of the system.

    B. Pro is the procedure applied to the system to process the given input.

    C. OP is the output of the system.

A. Input:

IP = {u, F,}.

Where,

    1. You be the user.

    2. F be set of files used for sending

B. Process

1. In this project Detection of bad road conditions such as potholes, bump, steep shoulders and objects on the road.

2. Real time road conditions in the routes on which they wish to travel.

C. Output:

Vehicles position on GPS with information including latitude and longitude data.

System Architecture-1

In this coordination there is a IR based sensing component and IR based user interface. Vehicles position on GPS with statistics including latitude and longitude data.
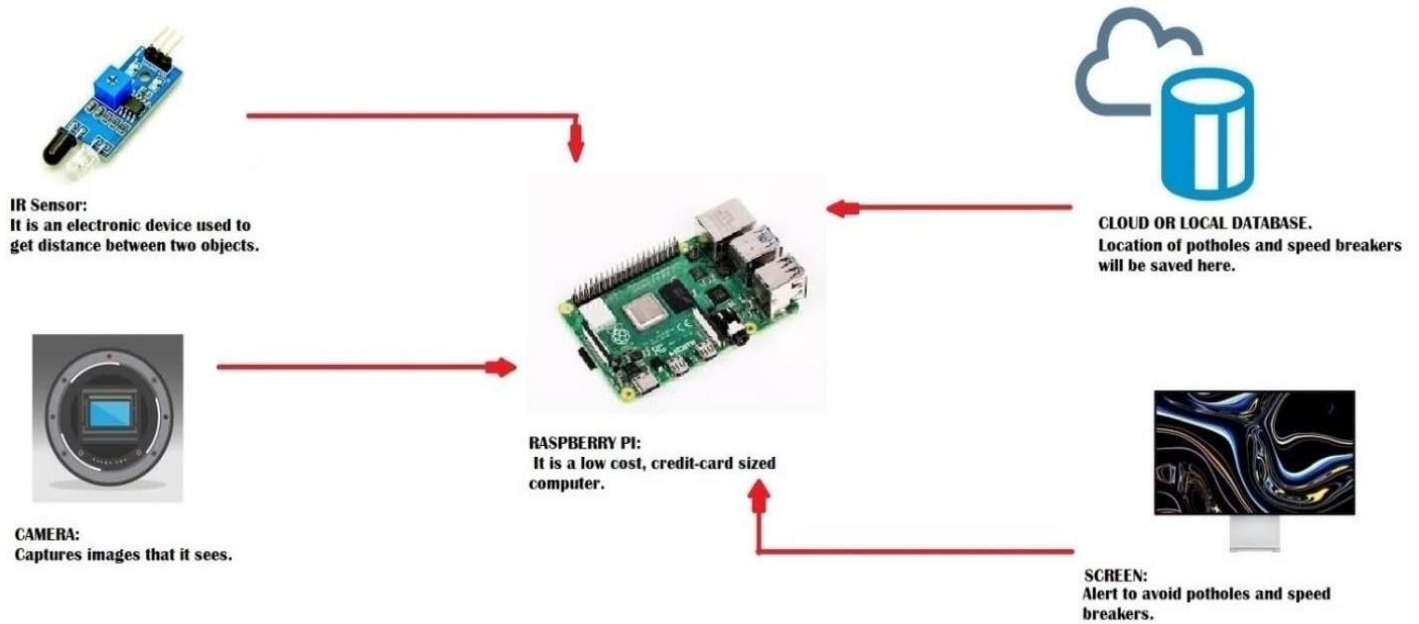
Fig 1 System Architecture-1

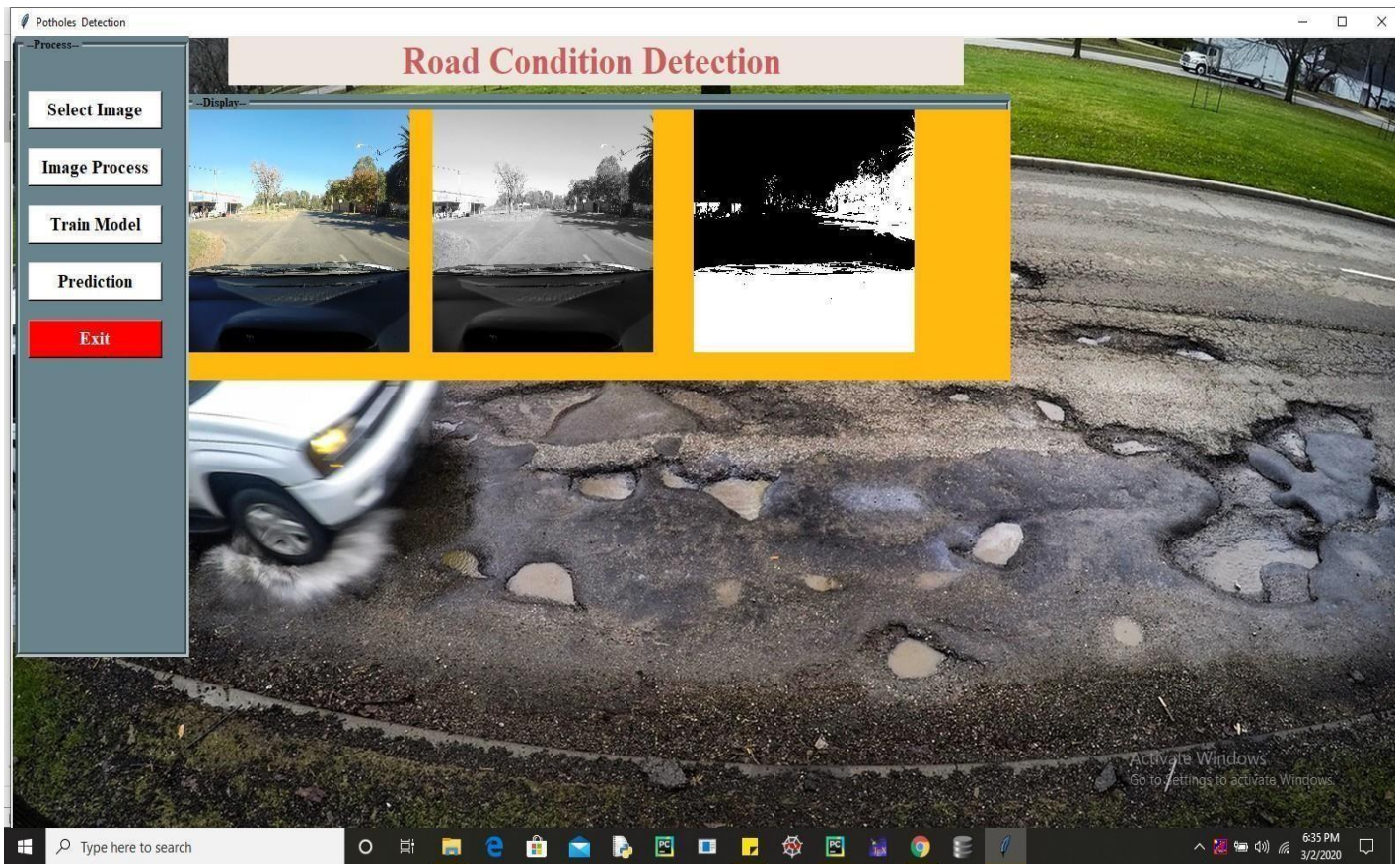## III RESULTS & DISCUSSION

Main GUI snapshots
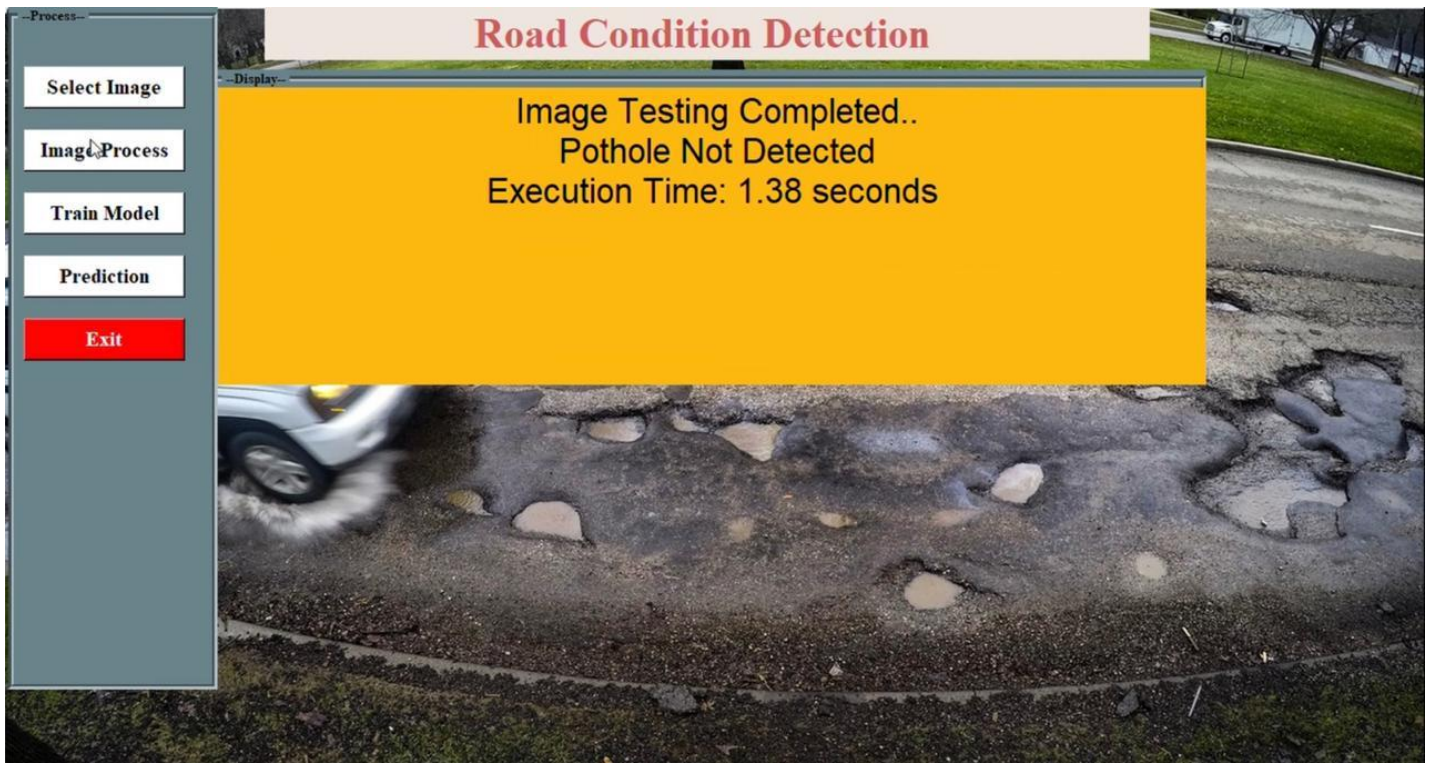
Preprocessing

Fig2 GUI-1
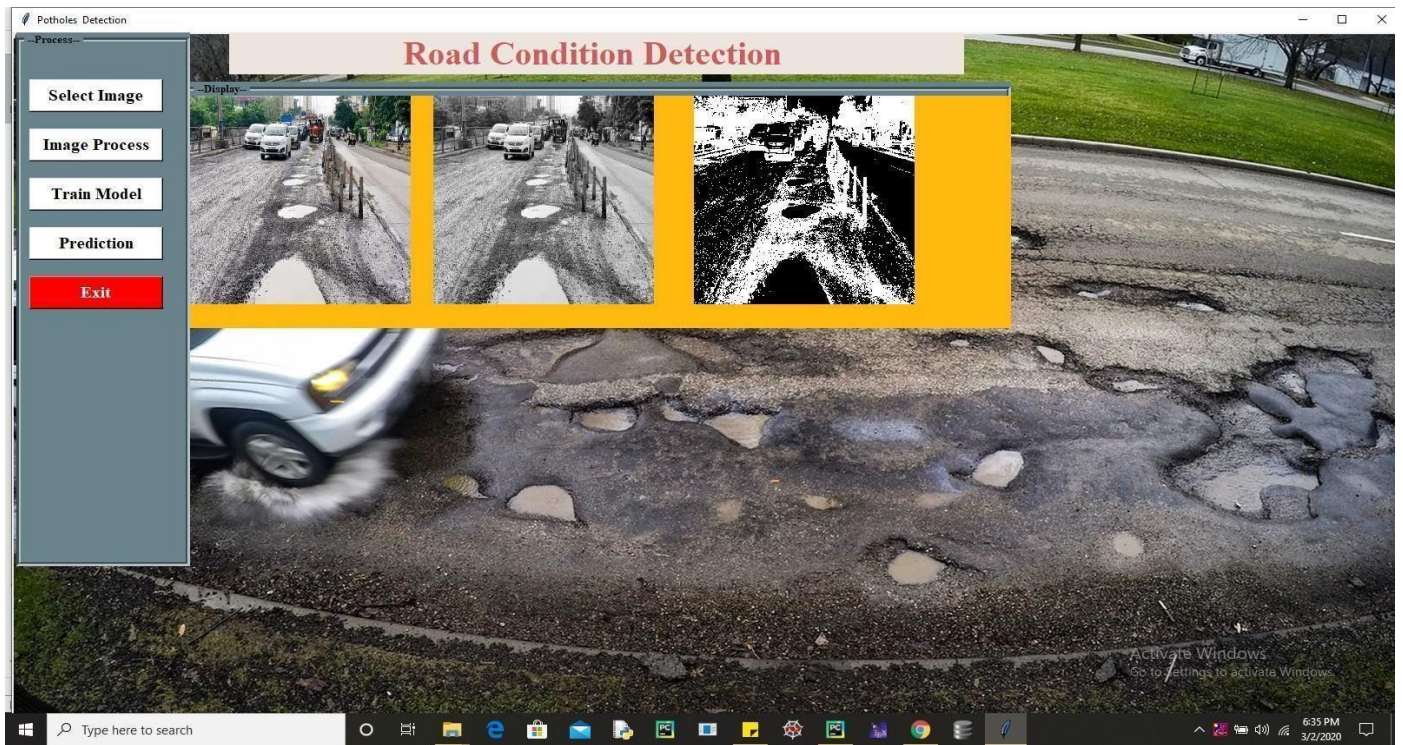
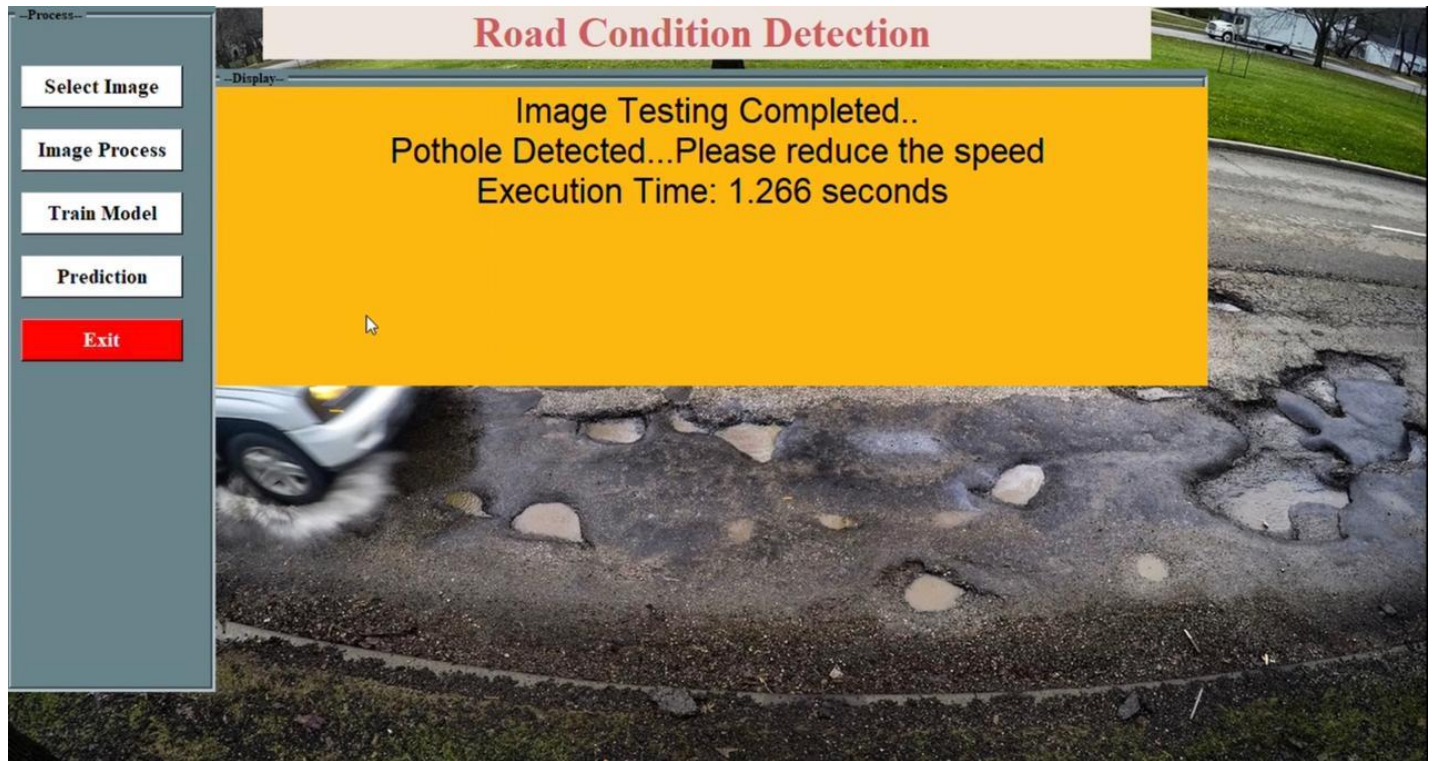*Fig 3 GUI-2*

Outcome

Fig. 4 GUI-3

Fig2 GUI-4

Results

In our system camera captures the object and verify in the system. then it will find the object and detect the object by its name.

In tracking, an object can be defined as anything that is of interest. For example, vehicles on a road, cricket match ball. Any object which is present in the nearby environment that maybe important to track in a specific domain. The appearance and shapes can be represented by object. First we will describe the representation of object shape. Representation of objects is very important in object detection and tracking. There are various ways used to represent objects.

Deep convolutional neural networks have recently achieved state-of-the-art performance on a number of image recognition benchmarks, including the Ima-geNet. The winning model on the localization sub-task was a network that predicts a single bounding box and a confidences core for each object category in the image.

Such a model captures the whole-image context around the objects. In this work, we propose a saliency-inspired neural network model for detection, which predicts a set of class-agnostic bounding boxes along with a single score for each box, corresponding to its likelihood of containing any object of interest.

When we want computers to understand complex scenes. Image captioning is one such task. In these tasks, we have to train a model to predict the category of a given image is to first annotate each image in a training set with a label from a predefined set of categories

IV CONCLUSION

According to the real time road conditions evaluation, the abnormal road condition can be detected and saved in traffic center. The drives of the vehicles can be obtain near by road information from the other vehicles via active warning signals or Google Maps to manage their driving behaviors for improving driving safety, comfort and efficiency.

V FUTURE WORK

In future if the road conditions can be improved and then there will be comfort for the people. The system can be made useful as a part of smart city campaign. Also, applying machine learning techniques in classifying data can help the system to adapt to changing factors like nature of the road and vehicle type the users use. And the data collected can be sent to the government officials and help them in choosing the right person for the job to do a rightful job.

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