

MES COLLEGE OF ENGINEERING, KUTTIPPURAM
DEPARTMENT OF COMPUTER APPLICATIONS
20MCA246 – MAIN PROJECT

PRO FORMA FOR THE APPROVAL OF THE FOURTH SEMESTER MAIN PROJECT

(Note: All entries of the pro forma for approval should be filled up with appropriate and complete information. Incomplete Pro forma of approval in any respect will be rejected.)

Main Project Proposal No : _____
(Filled by the Department)

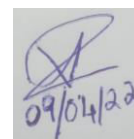
Academic Year : 2021- 22
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1. Title of the Project : ROAD TRAFFIC PREDICTION FOR INTELLIGENT TRANSPORTATION SYSTEM
2. Name of the Guide : Dr.GEEVAR C ZACHARIAS
3. Student Details (in BLOCK LETTERS)

Name

Register Number

Signature



VARSHA C

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Date: 16/04/2022

Approval Status : Approved / Not Approved

Signature of
Committee Members }

Comments of the Guide

Dated Signature

Initial Submission :

First Review :

Second Review :

Comments of the Project Coordinator

Dated Signature

Initial Submission:

First Review

Second Review

Final Comments :

Dated Signature of HOD

TRAFFIC PREDICTION FOR INTELLIGENT TRANSPORTATION SYSTEM

VARSHA C

Introduction:

In our life, road structure is an essential component. As monitoring the road surface, we could notice where is a problem on the road and prevent the accident. A human-based road damage monitoring system could be the first answer but not a perfect solution because it is affected by a different condition such as weather, speed of the vehicle, the complexity of the road, and the difference of criteria from the individual inspection. Deep learning-based technology is a good key to unlock the object detection tasks in our real world. By using deep neural networks, we could break a problem that is dangerous and very time-consuming but has to be done every day like detecting the road state. This paper describes the solution using YOLO to detect the various types of road damage in the IEEE Big Data Cup Challenge 2020. This also aims to develop a tool for predicting accurate and timely traffic flow Information and an accident detection mechanism. Traffic Environment involves everything that can affect the traffic flowing on the road, whether it's traffic signals, accidents, rallies, even repairing of roads that can cause a jam. If we have prior information which is very near approximate about all the above and many more daily life situations which can affect traffic then, a driver or rider can make an informed decision. Also, it helps in the future of autonomous vehicles. In the current decades, traffic data have been generating exponentially, and we have moved towards the big data concepts for transportation. Available prediction methods for traffic flow use some traffic prediction models and are still unsatisfactory to handle real-world applications. This fact inspired us to work on the traffic flow forecast problem build on the traffic data and models. It is cumbersome to forecast the traffic flow accurately because the data available for the transportation system is insanely huge. In this work, we planned to use machine learning and deep learning algorithms to analyse the transportation system with much-reduced complexity. Also, Image Processing algorithms are involved in traffic sign recognition, which eventually helps for the right training of autonomous vehicles. The accident detection mechanism aims to detect the accident occurs while travelling and inform it to the neighbours. So that neighbours can easily get the information and take necessary actions.

Objectives:

- The main advantage of Intelligent Transportation System is to provide a smooth and safe movement of road transportation.
- It's also helpful in the perspective of environment friendliness to reduce carbon emission.
- It provides many opportunities for automotive or automobile industries to enhance the safety and security of their travelers.
- These methods provide a good effect for traffic damage prediction, traffic congestion, accident detection and can establish a rapid and effective forecasting model. Most of these methods are the prediction and analysis of traffic flow parameters.

Problem Definition:

Existing system

Deep learning-based technology is a good key to unlock the object detection tasks in our real world. By using deep neural networks, we could break a problem that is dangerous and very time-consuming but has to be done every day like detecting the road state. We could find out the road damage as monitoring the road surface. A human-based road damage monitoring system could be the first answer but not a perfect solution because it is affected by a different condition such as weather, speed of the vehicle, the complexity of the road, and the difference of criteria from the individual inspection.

Proposed system

Road damage detection is a crucial problem, and many kinds of researches have developed to break it in this challenge. As one of the deep-learning way, we used a YOLO-based solution to detect road damage. We eliminated the bounding boxes of useless classes in the dataset, every image is checked whether it has an object or not. We trained our models by splitting them into training dataset and validation dataset such as 5Foldcrossvalidation, used various data augmentation options, for example, hue, saturation, value for HSV, image translation, image scale, mosaic, etc, therefore the input images are augmented to train the model. We used ensemble models that are trained with a dataset to predict the road damage.

Here we also implement traffic congestion detection. The evolution of the computer technologies is playing an important role in the development and planning of the smart transportation system for the public domain. The smart transportation management monitors and manages the traffic in real time. We propose an approach for smart traffic monitoring and control system. The proposed system aims to provide least congestion routes for the emergency services.

The accelerometers in mobile phones detect presence of accident based on the ratio we set. User can view accident notification through the application.

Basic functionalities:

Modules

1.Admin

- Login
- View users details
- Add notification
- View feedback
- Track user
- Add and manage routes
- Accident detection

2.User

- Register
- Login
- View profile
- Road quality alert
- feedback
- View route
- Search route and find traffic congestion on google map .

- Search alternate paths.
- View accident notification

Object Detection Using Deep Learning

Nowadays, deep learning has an important role in image classification. It extracts the feature maps from an input image using a neural network with hidden layers, and several deep learning networks based on Convolutional Neural Networks (CNNs), such as AlexNet , VGGNet , ResNet , etc, achieved a successful performance in the ImageNet Large Scale Visual Recognition Challenge (ILSVRC). A main point is that object detection could be a combination of classification and localization, thus many approaches have developed to solve object detection tasks using deep learning-based technology. The detection model is trained with the image dataset which contains the bounding-boxes and the labels to detect an object. From the perspective of region proposal-based methods, they propose a region that may include the object, classify the object, refine and get rid of overlapped bounding boxes, and score them based on other objects in the input image. And there are representative region-based models such as R-CNN , Fast R-CNN , and Faster R-CNN , and they also called by two-stage object detectors.

YOLO

YOLO has a single neural network architecture, predicts a set of bounding boxes and class probabilities at a sitting for every test image. First of all, it divides the full image by several a grid with a specific size, and anchor boxes are generated in every grid of input image by predefined scale and size. Each anchor box predicts the objectness score, box center offset x, box center offset y, box width, box height, and class scores at one time in contrast to a two-stage detector. Thus, YOLO is an extremely fast end-to-end algorithm to detect the objects, and it is called a one-stage object detector. Also, the performance of YOLO has improved over the development of deep learning technology, so there are updated versions for improving the light-weight, inference speed, and accuracy.

DECISION TREE ALGORITHM

Here decision tree algorithm used for traffic prediction. A decision tree is a tree-like model that acts as a decision support tool, visually displaying decisions and their potential outcomes, consequences, and costs. From there, the “branches” can easily be evaluated and compared in order to select the best courses of action. To identify classification and regression we have used a Decision Tree Algorithm (DT).The goal of this method is to predict the value of the target variables. Decision tree learning represents a function that takes as input a vector of attributes value and return a ”Decision ” a single output value.

HARDWARE AND SOFTWARE REQUIREMENTS:

This specifies the hardware and the support software required to carry out the development.

HARDWARE REQUIREMENTS:

The selection of hardware is very important in the existence and proper working of any software. Then selection hardware, the size and capacity requirements are also important.

- Processor :64 bit

- RAM: Min 3 GB
- Hard Disk: 10 GB

SOFTWARE REQUIREMENTS:

One of the most difficult task is selecting software for the system, once the system requirements is found out then we have to determine whether a particular software package fits for those system requirements. The application requirement:

- OPERATING SYSTEM: WINDOWS 10
 - FRONT END: HTML, CSS, JAVASCRIPT
 - BACK END: Mysql
 - SOFTWARES USED: JetBrains Pycharm, Android Studio
 - TECHNOLOGY USED: PYTHON, JAVA
 - FRAME WORK USED: Flask
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