ROAD TYPE DETECTION

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Introduction:

In previous research, road detection for pavement like asphalt is major, but road detection for various road surface is minor. As road detection for pavement, the methods to detect the white line on the road with Snake which extracts the contour of the objects are proposed by J. C. McCall and M. M. Trivedi,"Video Based Lane Estimation and Tracking for Driver Assistance: Survey, System, and Evaluation", Y. Wang, E. K. Teoh and D. Shen, "Lane detection and tracking using B-Snake".

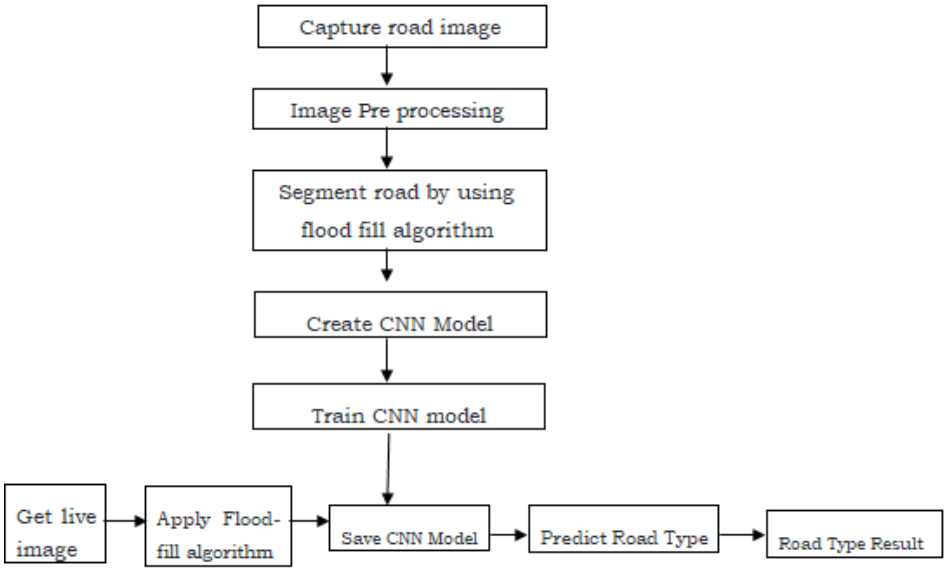
Another method can detect the rough road region without depending on the color of road. The road detection with Watershed which is region partition method by using grey scale image S. Beucher and M. Bilodeau, "Road Segmentation and Obstacle Detection by a Fast Watershed Transformation"

In this project we propose the road detection method corresponded to multi road types with Flood Fill. Flood Fill is one of the image processing methods to partition the region of input image based on RGB color model. Road detection is useful for automatic robots because the robots work on various road surface in outdoor environment. The proposed method has two features. Firstly, the method can cancel the influence of shadow on road by using HSV color model. Secondly, the method can recognize multi road types by CNN algorithm. By using the proposed method, the robot can select the suitable controller for road surface or the safety route. We implement the proposed method in vehicle navigation and the availability is verified by the experimental results.

Objectives:

1. Recognition of road surface.
2. Identify multi road types.
3. Differentiate between road and other objects present in the image.
4. High accuracy Information.
5. Simulate the process.

Methodology:



In this project, there are mainly two parts

1. Road detection
2. Identifying road type

The first objective can be completed by using image processing tools such as flood-fill algorithm. By using this algorithm, we can differentiate between road and other objects present in the image. In this first part, our main objective is to detect Road. Once this road has been detected, then a part of the road will be given as an input to identify Road type for the CNN algorithm.

The second objective is to identify road types. For this, we will be using the CNN algorithm to classify a given Road into three types

1. Muddy Road
2. Cement Road
3. Damar Road

In this CNN algorithm, there are mainly two things to be done

1. Training CNN model
2. Deploying CNN model to identify Road type

Training CNN Model:
In this process, there are mainly 4 steps to be done.

1. Collect the data set (this data set includes different road type images)
2. Pre-processing data set
3. Splitting the data sets (Train dataset and test dataset)
4. Train CNN model

Deploying CNN model:

Once the road has been detected by using a flood fill algorithm, we will use a part of that road to identify the type of road. To identify the type of road will be using the saved CNN model which has the ability to identify a given road image. This CNN model identifies the road basically three categories Muddy Road, Cement Road, Damar Road.

Result:

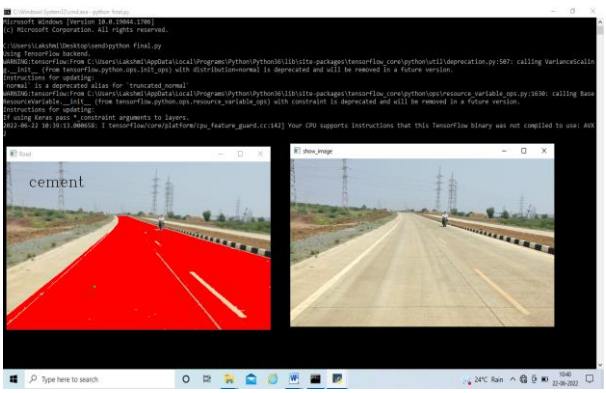


Fig1: Cement Road

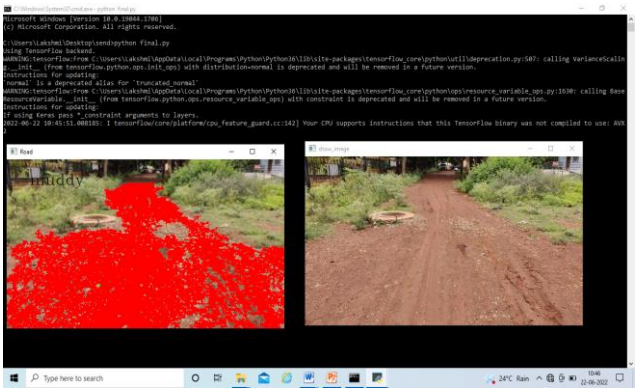


Fig 2: Muddy Road

Scope for future work:

A few researchers developed image-based approaches for road surface inspection using the state-of-the-art deep learning methods. In particular, some works focus on detecting only the existence of the damage regardless of its type. Other works focus on classifying the road damages into a few types. The focus of this study the detection of different types of roads using Deep Learning algorithms. This introduces the classification of road damages, reviews the image-based object detection algorithms, and presents our solution.

By using the proposed method, the robot can select the suitable controller for road surface or the safety route. We implement the proposed method in vehicle navigation and the availability is verified by the experimental results.