Path Texture Classification

Problem Statement

The aim is to help Visually Impaired (VI) people in identifying the kind of path texture of surrounding area while walking. Not only VI but sighted person also needs to be careful while walking or running. This solution will help the VI by providing safe mobility in outdoor environment.

Background

A variety of assistants are already designed to provide ease in navigation of VI. But still, several organizations have long been working to make them economical, user-friendly, and suitable for them. Either the solutions is too heavy which cannot be carried everywhere or the solution is too costly which makes it unaffordable for normal use. The effort is being done in order to make it useful and affordable for VI.

Methodology

Step 1: Data Preparation

This will involve using the existing data from IIT Delhi's website and scraping the other few from free source

Step 2: Developing a model for Currency Detection from the dataset

In this step, a deep learning model is developed for path detection and texture classification using the dataset

Step 3: Training and experimentation on datasets

Taring and testing is performed using this model on the custom datasets to do the prediction accurately

Step 4: Deployment and analysis on real life scenario

The trained and tested object detection model will be deployed in a real-life scenario for further analysis.
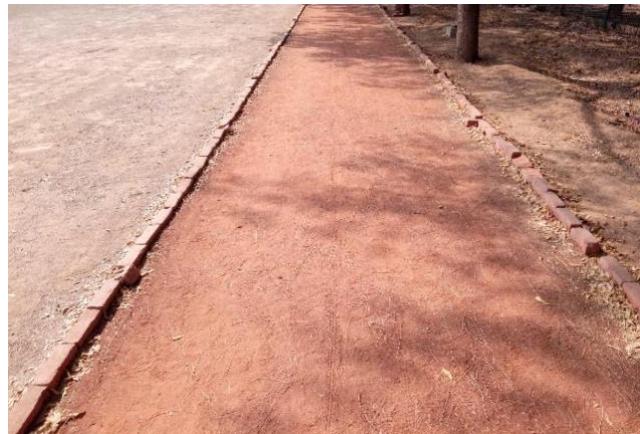
Experimental Design

Dataset

The dataset contains sequential photos of tracks, footpath, playground, roads and muddy areas. The dataset is classified into three classes namely Concrete, Grassy, and Muddy. A set of 538 pictures is used in the training sets and 165 images in a test set.

(a) Concrete

(b) Grassy

(c) Muddy

Evaluation Measures

Evaluation is measured in terms of SENSTIVITY, SPECIFICITY, ACCURACY, F1 Score on the dataset.

Software and Hardware Requirements

Python based Computer Vision and Deep Learning libraries will be exploited for the development and experimentation of the project. Tools such as Anaconda Python, and libraries such as OpenCV, Tensorflow, and Keras will be utilized for

this process. Training will be conducted on NVIDIA GPUs for training the object detection model on custom dataset.