Pothole Challenge

Organization: Govt of Goa

Bucket: Software-Mobile App Development

Problem ID: DR112

Team Leader: Pratik Parmar

Team Name: Enigma

College Code:

Solution

"One of the biggest problem is not knowing that there is a problem". During rainy season road gets damaged that leads to accidents, traffic jams and many other problems. Civil Agencies can only repair this roads when they are aware about any damage. Through this hackathon we want to propose an application that will help civil agencies getting information about any pothole on road. Our application will enable public to help civil agencies in getting details of any pothole present on the road. This application will act as an interface between civil agencies and people. We will be using Deep learning, Computer Vision and, Accelerometer and Gyroscope for detecting pothole.

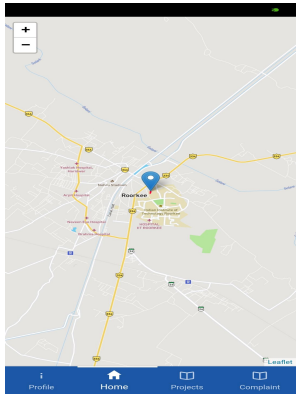
This application will require very little user interaction. Users will be able check status of any pothole registered by them and will be able to send feedback when pothole is repaired.

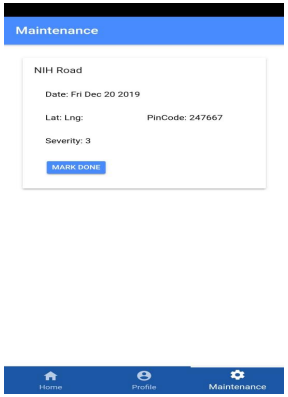
Description of Idea

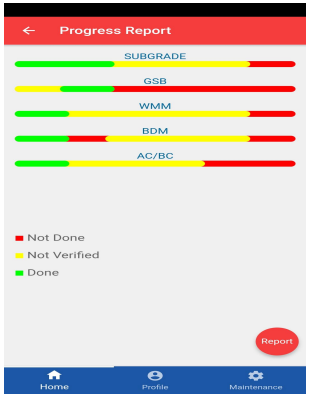
- A hybrid app that will work on both Browser and as a Mobile Application. This application will have two different types of users i.e.Civil Agencies and People.
- User can captures images of Potholes in the app. Application will detect the location of pothole and store it on database.
- While Driving or riding, user needs to open the application. Application will use Accelerometer and Gyroscope in determining pothole. When a vehicle run over a pothole, it experiences a sudden jerk which changes reading of accelerometer and gyroscope sharply. We will leverage this sharp change in detecting pothole. To eliminate false positives, we will create a dataset and use deep learning to get some confidence value.
- Our application will also use computer vision to identify potholes. User can fix mobile on vehicle in such a way that it covers view of road. When camera identifies a pothole, application will fetch that location and store it on database.
- Configuring Google Assistant to accept some voice command and store location at that moment. Later application will upload this location on database. This will enable user to pinpoint location of pothole while driving.
- A small device with a push button that can be tied on steer wheel or bike handle will be created that can send a signal to the application when the button is pressed, indicating that there is a pothole in this location.
- Server will use K-Means algorithms to form cluster of recorded location of potholes and those with high confidence value will be published to the civil agency.
- Application will use google map to show the location of pothole to civil agencies.
- People will be able to see status of maintenance work on pothole.
- Every user is given rating. For every correct reporting of a road bump or potholes, perks will be given to users in form of vouchers or cashback.

Other Features

- Use of Geolocation and Reverse Geo-encoder API so User only need to enable GPS on his phone.
- Progress monitoring of maintenance work.
- View map with special sign indicating road bumps and potholes.
- Use of Deep learning in filtering data obtained from users.







Technology Stack

We will be using HTML, CSS, Javascript, Ionic Framework, Firebase, Google Maps API, Facebook and Google Auth API, Google Assistant, Node.js Tensorflow, Tensorflow.js and Machine Learning models (For detection of pothole).

Benefits

- Minimum human inputs are required and perks will be given so public participation will be high.
- Our application will automate the process of identify location of potholes to a very high extent and thus potholes can be repaired quickly.
- Mishaps happening due to potholes will reduce.