Pothole Detection System

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ABSTRACT

"Pothole detection system" which assists the driver or rider in avoiding potholes on the roads by giving prior warnings. In This system it uses accelerometer sensor of android Smartphone for detection of potholes and GPS for plotting the location of potholes on Google maps. While designing the pothole detection algorithm we have assumed some threshold values on Z-axis. The threshold values are set by trial and error method. Potholes detected by the users are displayed on the map and number of potholes is calculated for the path given by the user.

Keywords— *Pothole, Accelerometer sensor, Threshold values*

1 Introduction

Pothole detection system is the present call as there is lot of miserable road accidents taking place due to the bad road conditions. Pothole detection refers to spot the potholes on the road. In our application we make use of accelerometer sensors inbuilt within the Smartphone's of user itself. . The main aim is to develop an application, in order to enable the users to detect the potholes on the road and also have a safe journey. This system is basically for the safety of the people and also for the management of it and to take the desired action if required.

1.1 Existing Systems

Aniket Kulkarni et al. [1] has proposed a paper called Pothole detection system using machine learning on android in which the pothole sensor plug-in monitors the changes in the acceleration in order to detect potholes. For this, the user needs to have an Android Smartphone. The device's built-in accelerometer is used to collect the x, y and z axis accelerations. The pothole detection algorithm is good, in terms of speed and accuracy. This algorithm accepts the training set and displays the pothole scenario in the particular area. Sudam Pawar et al. [2], has proposed a system where the system is divided into three subsystems. Firstly, sensing subsystem which is used to sense the potholes encountered by it. Second is communication subsystem which handles the information transfer between Wi-Fi Access Point and Mobile Node. Third subsystem is the localization subsystem which analyses the data received from Access Points and warns the driver regarding the occurrence of

potholes. Sudarshan Rode [3] has proposed a system which includes: Sensing, Communication, Localization subsystems. These subsystems work independent of each other but have one center point they revolve around; that is data. Sensing system generates the data; Communication collects, co-ordinates and distributes the data; lastly Localization uses the data and generates information for the driver.

1.2   Proposed System

This system we proposed is for public usage. The user will be updated with the upcoming potholes by the marker on the Google maps. The user can also update new potholes while travelling by starting the service provided in the application. The detection of potholes and humps is done with the help of built in accelerometer present in the Smartphone. The values obtained from the accelerometer is given as input to the algorithm which categorizes potholes and humps for different types of vehicles like bicycles, cars and buses, these features make it unique from the existing systems. There is another feature called marker cluster where in number of potholes are clustered together to provide information about the number of potholes around the current location.

2   SYSTEM ARCHITECTURE

The architecture is as shown in figure below. It includes the sensor node, the GPS receiver and the manual recordings which sense all the data and then this whole data is gathered and is stored on the cloud. This data is updated as and when the new pothole is detected.
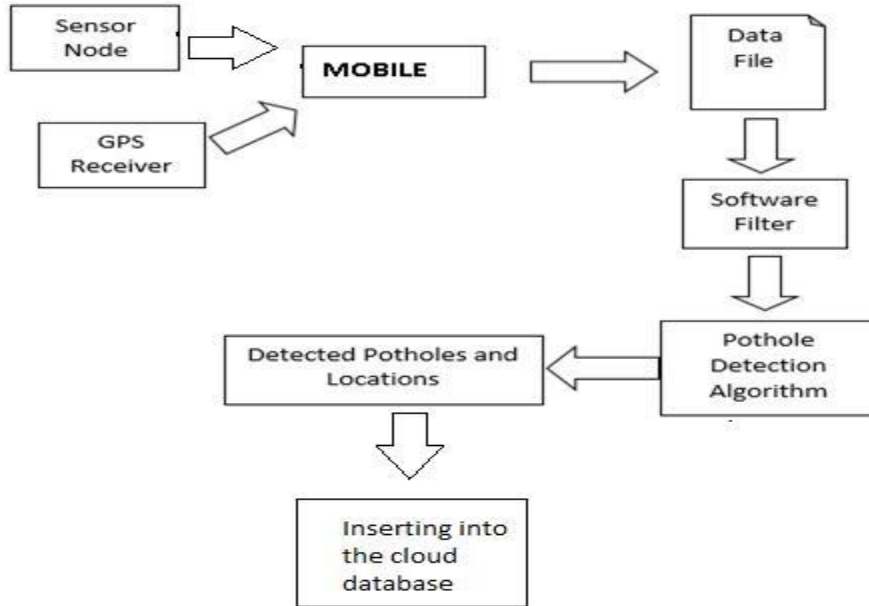

Figure: Architecture of the system

Proceedings of the 3rd National Conference on Image Processing, Computing, Communication, Networking and Data Analytics (NCICCNDA 2018)

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3 CONCLUSION AND FUTURE ENHANCEMENT

In our proposed system, automatic detection of potholes and humps and notifying vehicle drivers to evade potential accidents are the major purposes. The proposed approach is an economic solution for detection of potholes and humps, as it uses inbuilt accelerometer sensors in Smartphone. Our idea to build mobile application is an additional advantage as it provides timely alerts about potholes and humps. The proposed system considers the presence of potholes and humps. However, it does not consider the fact that potholes or humps get repaired by concerned authorities periodically. This system can be further improved to consider the above fact and update server database accordingly.

Also, it is limited to showing the shortest path between the source and destination, but it could be enhanced by including the feature of showing the shortest path with minimum potholes. Another enhancement could be, machine learning techniques can be used to set threshold values for detection of potholes for each and every vehicle separately.

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