CERTIFICATE

This is to certify that Mr. Ayush Chiddarwar, Manthan Watile, Prajwal Chaudhari, Ms. Pranjal Sharma, Diksha Mohod. From (institute) Government Polytechnic Yavatmal having Enrollment No. 1801350073, 1901350240, 1901350236, 1801350029, 1801350018 has completed **Project planning Report** having title **"Android Application for Pothole Detection System"** in group consisting of five Candidates under the guidance of the Faculty guide.

Name & Signature of Guide   _____

Name & Signature of HOD   _____

ACKNOWLEDGEMENT

This project is done as a semester project, as a part course titled "**Android Application for Pothole Detection System**" We are really thankful to our course the **Principal DR. D.N. Shigade** and the **HOD DR. M.V. Sarode** Computer Engineering, Government Polytechnic, Yavatmal for his valuable guidance and assistance, without which the accomplishment of the task would have never been possible We thank to **Prof. G.K. Yadav** for giving this opportunity to explore into the real world and realize the interrelation without which a Project can never progress. In our present project we have chosen the topic- "**Android Application for Pothole Detection System**". We are also thankful to parents, friend and all staff of Computer Engineering department, for providing us relevant information and necessary clarification, and great support.

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ABSTRACT:

The topic of our project is Android Application for Pothole Detection System. In this project we are going to create a system which can be used to collect the data of Potholes, Road Condition along with Co-ordinates. The purpose of the project is to collect the data about the Potholes and Speed Breaker along with their co-ordinates, Road Condition etc. By using this project, it will be easy to study the road conditions along with the standards of Travelling and Transportation. Keeping all the records on online database so there will be no need of physical paper / register. In this project when the user Starts its journey this application starts to collect the data from Accelerometer/Gryoscope along with the co-ordinates and stores in the Database. Application monitors for change in acceleration. When such a change is recorded, the application collects the data for longitude and latitude. This Application then adds the time, geographical co-ordinates and the severity of the pothole to the event log. The application is based on the Android's built-in Accelerometer. The benefit of this project is that it provides Local Authority with the Location and the severity of the potholes, which they can repair and ultimately will result in safer and a more enjoyable driving experience.

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Chapter 1

INTRODUCTION

Potholes are cracks and cavities on roads caused by change in the temperature. Over long periods of time roads weaken under the weight of heavy vehicles. This causes small cracks. Poor Maintenance and negligence causes the cracks to expand. Continued pressure on the cracks lead to potholes. 1) As India continues to suffer from worsening weather conditions each year 2) the issue of potholes remains an important issue. However Local Authorities are falling behind in repairing damage to the roads. Daily 1214 accidents takes place in India and poor road conditions significantly play an important role in these numbers. Our project aims to create an Android Application that automatically records potholes and logs their exact location using Latitude and Longitude. This will hopefully significantly increase the numbers of potholes reported creating a safer and enjoyable journeys.

Objectives

The objectives of this project were to create an Application

- That can identify a change in acceleration .

- That can obtain the most accurate location data possible.

- That is able to transmit data to an external destination (server).

- That has a good user interface- easy to use, clear instructions.

Issues for consideration

- One of the major difficulties would be differentiating between potholes and non-potholes. For example a bump on the road might also be recorded if a driver goes over speed bumps also the vehicle suspension can also directly affect the data recorded by the application as there is the chances of vehicle having soft and responsive suspension.

- Another difficulty will be getting the exact location of the event while the vehicle is moving at speed.

Chapter 2

LITERATURE SURVEY

Existing applications

As part of my initial research we decided to investigate applications that offer the same or similar services for android and other platforms. Our aim is to see how these applications work and to see how they can be improved. To date we have identified some Android Apps that offer the same service – Pothole Finder, RoadDetector etc. We also looked at photo driven applications and pothole reporting websites.

Photo driven applications - There are several applications (some developed by local authorities) that offer pothole reporting systems that require the user to take a photograph and upload it with the location data as opposed to a detection system. These can be used for a number of reports (potholes, graffiti, broken lights etc)

https://play.google.com/store/apps/details?id=com.sbordolo.potholefinder – " Pothole Finder " a similar kind of app which uses Google Map to locate potholes.

https://play.google.com/store/apps/details?id=com.rodec.roaddetector – " RoadDetector " is a example of the Application developed by the local authority.

http://www.androidzoom.com/android_applications/tools   /pothole-agent_isud.html -" Pothole Agent " A similar kind of Concept used to locate the pothole problem.

www.androidzoom.com/android_applications/pro   ductivity/fixmystreet_xpp.html - " Fix My Street " a similar kind of app designed to tackle the potholes problem.

In addition to phone applications, there are several websites that allow users to report potholes.

www.ripoff.ie

Other similar websites include:

- Pothole Watch (http://www.potholewatch.com)

- Watch That Hole (http://www.watchthathole.com)

. I would not recommend this as there was no explanation of what each button did or how to use the application. The user interface was poor and offers little instruction to the user. We were able to figure out most of the functionally by trial and error but we do not believe the average user would have the patience or technical knowledge to be able to do so. One of the flaws identified was that the GPS is not automatically turned on when launching the app. The user needs to go to the phone's settings to turn it on.

Overall impressions

Neither of the applications we investigated were satisfactory from the perspective of the end user, Applications should be user friendly and easy to figure out. We intend to create an application that addresses these issues.

Chapter 3

PROPOSED METHODOLOGY AND IMPLICATION:

3.1 Problem Definition:

Potholes are cracks and cavities on roads caused by freezing. Over long periods of time roads weaken under the weight of heavy vehicles. This causes small cracks to form. Water from rain or melted snow or ice gets into the cracks and freeze. This causes the cracks to expand. The issue of potholes remains an important issue. However Local Authorities are falling behind in repairing damage to the roads. According to the website Potholes.ie, latest figures by several state governments, potholes across the country claimed 3,597 lives in 2017, a more than 50 pc rise in the toll last year. In 2016, potholes claimed six lives every day in India. These are just the numbers of reported deaths and the numbers could be higher as dozens of pothole-related deaths go unaccounted. Crash reporting protocols vary from state to state in India. Our project aims to create an Android Application that automatically records potholes with the help of accelerometer sensor and logs their exact location using longitude & latitude.

One of the major difficulties would be differentiating between potholes and non-potholes. For example a bump on the road might also be recorded if a driver goes over speed bumps, cat eyes or other objects lying on the road. Another difficulty will be getting the exact location of the event whilst the car is moving at speed. Battery drainage is one of the key issues. The Accelerometer and longitude-latitude will drain the battery over time, especially during an extended journey. For such journeys a car charger is recommended.

3.2 Action Plan:

Sr. No	Details Of Activity	Plan Start Date	Plan Finish Date	Name Of Responsible Team Members
1.	We search for the project topic.	8/04/21 (2 hours)	15/04/2021 (2 hours)	Ayush Chiddarwar, Pranjal Sharma, Diksha Mohod, Manthan Watile, Prajwal Chaudhari.
2.	Identify the problem and its need/Solution.	15/04/2021 (2 hours)	22/04/2021 (2 hours)	Ayush Chiddarwar, Pranjal Sharma, Diksha Mohod, Manthan Watile, Prajwal Chaudhari.
3.	Collect more information related to the project and cleared concept about the implementation of different modules in the project.	22/04/2021 (2 hours)	03/05/2021 (2 hours)	Ayush Chiddarwar, Pranjal Sharma, Diksha Mohod, Manthan Watile, Prajwal Chaudhari.
4.	Learned concept related to project in android language.	03/05/2021 (2 hours)	10/05/2021 (2 hours)	Ayush Chiddarwar, Pranjal Sharma, Diksha Mohod, Manthan Watile, Prajwal Chaudhari.
5.	Add proposed modules in report.	10/05/2021 (2 hours)	17/05/2021 (2 hours)	Ayush Chiddarwar, Pranjal Sharma, Diksha Mohod, Manthan Watile, Prajwal Chaudhari.
6.	Some difficulties occur in project development therefore, Discussed with guide.	17/05/2021 (2 hours)	24/05/2021 (2 hours)	Ayush Chiddarwar, Pranjal Sharma, Diksha Mohod, Manthan Watile, Prajwal Chaudhari.
7.	We gathered further information which will be required for making our project report.	24/05/2021 (2 hours)	31/05/2021 (2 hours)	Ayush Chiddarwar, Pranjal Sharma, Diksha Mohod, Manthan Watile, Prajwal Chaudhari.
8.	We Present the project in File and Submit it.	07/06/2021 (2 hours)	14/06/2021 (2 hours)	Ayush Chiddarwar, Pranjal Sharma, Diksha Mohod, Manthan Watile, Prajwal Chaudhari.

3.3 Proposed Data:

Rapid data collection of pothole information at low cost over a wide area is crucial for developing an efficient pothole-maintenance strategy. In other words, a specifically designed system that can collect pothole information at high speeds over a wide area is needed. Existing manual methods, along with vibration-based and laser-scanning methods are available.

The goal of our research is to develop a pothole detector using common devices that are used by many drivers over a wide area. Moreover, the devices should provide high detection accuracy at low cost. We surveyed various devices, and we concluded that an accelerometer-based mobile application is the most suitable device for our requirement. To detect potholes it is mandatory that our proposed pothole detection algorithm is installed on an android device. As a result, we can collect huge amounts of pothole data at high speeds over a wide area.
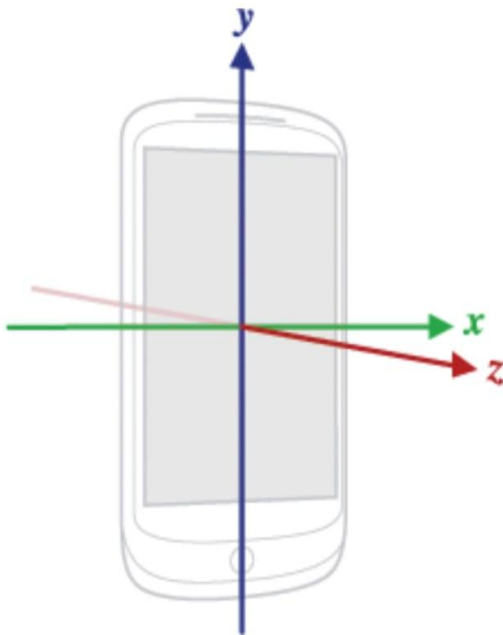
Moreover, more and more sensors which include G-sensors, electronic compass, gyroscope, longitude & latitude, microphone, and cameras are equipped in mobile device (e.g., smartphone and i-Pad). Several applications use these sensors in mobile devices and combine mobile sensing techniques to solve problems such as social network, healthcare, environment monitoring, and traffic information. Therefore, using the mobile device based on mobile sensing techniques to detect potholes is suitable and convenient. One of the issues we have identified is the difficulty of getting an accurate location while travelling at average driving speeds. One possible solution is to record the journey from start to finish by regularly calling the location coordinates.

3.4 Proposed Application:

When the user starts their journey, they launch the application on their phone and set it to record. The application launches the accelerometer and Latitude and longitude in the phone. The application monitors for changes in acceleration. When such a change is recorded, the application calls the Latitude and longitude and asks for the coordinates of the pothole. The application then adds the time, the geographic coordinates and the severity of the pothole to the event log. When the user finishes their journey they press stop and are presented with the event log. They can then choose which events to report to the local authorities. When finished the user clicks report and the data is sent to a database. The benefit of this project is that it provides Local Authorities with the location and the severity of potholes, which they can repair and ultimately will result in safer and a more enjoyable driving experience.

3.5 Proposed Scope:

We intend to keep working on this application beyond the FYP.

Our plan is

- Fix all existing bugs
- Develop a database and connect it to server.
- Introduce a tabbed design, graph and location display and a form for deciding what events to report. Long term we would like to make a version of this application for other platforms. This would involve learning objective for the iPhone/IOS .
- Further this application can be developed to measure the Comfortness and smoothness of Aircraft landing and takeoff.
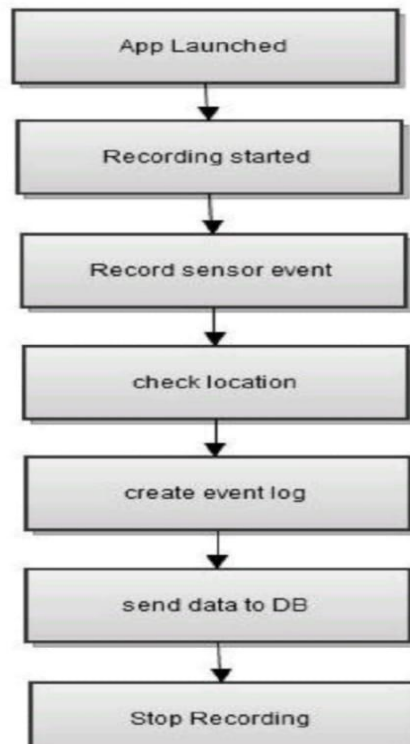
3.6 Limitations

IOS users may not be able to use this application, Access to google maps may need some permission and can raise some user security alerts. Not able to differentiate between pothole and speed breaker. May not able to catch small pothole

3.7 Summary:

In this report, we propose a novel pothole-detection system using an accelerometer. The proposed pothole-detection algorithm can be designed and implemented in consideration of the limited computing power of the embedded systems. Multiple issues remain with the proposed pothole-detection. Nevertheless, we confirmed that a pothole-detection system using a typical accelerometer-based device has the potential for use as an automatic and smart pothole-detection system.

Flowchart for Application Functioning :-

Flowchart :-

App Launched

Recording started

Record sensor event

check location

create event log

send data to DB

Stop Recording

Chapter 4

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