Aurdino Based Real Time Depth and Jerk Sensing Mechanism in Moving Vehicle Using GPS Technology

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Abstract- *Road roughness is one of the most important and primary indicator of the utility of roads. As roads are key part of the general population in their lives, thus checking the road conditions has expected a lot of consideration. So the clients can maintain a strategic distance from or be careful of the terrible road ahead by utilizing road surface condition data. Road condition can be characterized by the anomaly, which might be as surface roughness, pothole, breaks, and consumption. To measure road surface pothole condition, we have made a device capable of detecting the intensity of the bump caused by the pothole. Then that particular potholes location is plotted on Google Map along with its intensity.*

Keywords- GPS Technology, Atmega328 processor, 8-bit Atmel Microcontroller.

I. INTRODUCTION

In the past few years, a lot of research has been carried out on various automated methods for detecting uneven pavements, for that there are various sensing methods from which to methods standout, Vision based and vibration based. Vibration based methods are known to be resources heavy, requiring sophisticated algorithm whereas Vibration based sensing system requires very less resources, and less power Hence vibration based system becomes more feasible but Which sensing methodology to be used depends on the expected output, image based methods use camera technology, camera captures the images in real time. These images are applied to image processing algorithms like edge detection. This requires lot of processing time and power. This method has one advantage over the other is, it can sense a pothole without experiencing it i.e. Characterization of pothole can be done on the basis of size of the pothole. In contrast to Vibration based method which employs accelerometer; this is a device that measures total specific external force on the sensor.. An accelerometer falling freely in the vacuum will show zero reading. The design of the accelerometer is often very simple. The simplest design can be a mass hanging by a thread and some sensor to measure its deflection for original.The device is popularly used to measure vibration or inclination. We in our pothole detection system we will be using accelerometer MMA7361 which is +3V processed designated continuous query processor on distant nodes. The system uses GPS for detecting the movements of vehicles. Cartel includes, Carnet, a networking stack that uses connection (e.g. Wi-Fi, Bluetooth) to transfer information between portal and remote nodes.

A. Block Diagram-

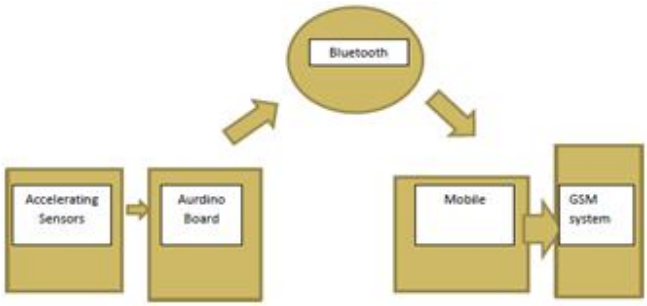

Fig. (i) Block Diagram

B. Hardware Architecture

1. Aurdino Board

Fig 1.2: Aurdino Board

Aurdino is an open source project that created microcontroller based kits for building digital devices and interactive objects that can sense and control physical devices. The project is based on microcontroller board designs, produced by several vendors, using various microcontrollers. These system provides sets of digital and analog input/output pins that can interface to various expansion boards and other circuits. The boards feature serial communication interfaces, including Universal Serial Bus(USB) on some models, for loading programs from the microcontrollers , the Aurdino project provides an integrated development environment based on programming language named processing, which also supports the languages C and C++.

2. Bluetooth module(RN-42)

Fig 1.3: Bluetooth module

The RN-42 is perfect for short range, battery power applications. The RN-42 uses only 26 micro ampere in sleep mode while still being discoverable and connectable. Multiple user configurable power modes allow the user to dial in the lowest power profile for a given application. The RN-42 is even FCC and Bluetooth SIG certified making it a complete embedded Bluetooth solution.

3. Accelerometer(MMA7361)

Fig 1.4: Accelerometer

The MMA7361L is a low power, low profile capacitive micro machined Accelerometer featuring single conditioning, a 1-pole low pass filter, temperature compensation, self test, 0g – detect which detects linear free fall and g –select which allows for the selection between two sensitivities. Zero g offset and sensitivity are factory set and require no external devices. The MMA7361L includes a sleep mode that makes it ideal for hand held battery powered electronics.

C. Software Architecture

An android Application is built in Android Studio which have Google map integrated into it the GUI application contains buttons a login page so each user can be authenticated, the map inside the GUI application gets instantiated when pothole sensor sense its first pothole, the latency rate is very low because GPS is set to High Accuracy mode which by itself set upper bound on error, so the time taken by Sensor to sense pothole and Application to show in Map is very low which makes potholes detection location pinpoint.

II. FLOWCHART OF ANDROID APPLICATION

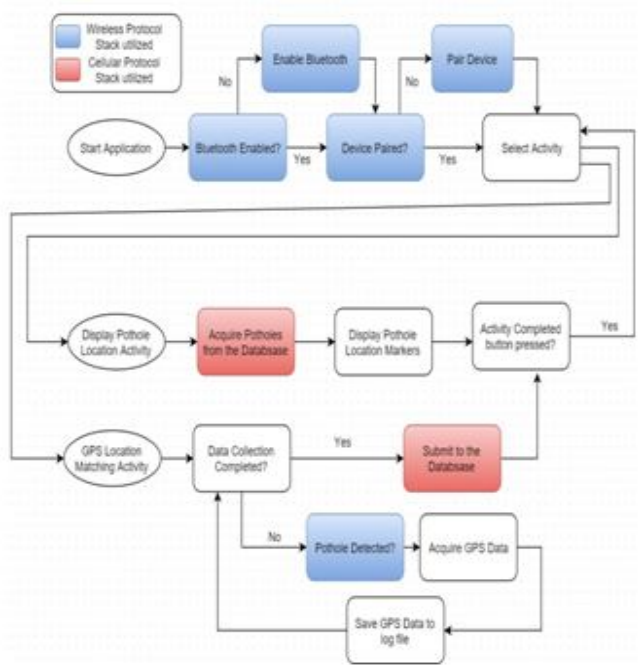

Fig 1.5: Flowchart for Android App

III. APLLICATIONS

- Applications utilizing the machine learning implementation should have permissions matching those of the sensors used.
- The raw sensor data should be evaluated in real time.
- User should be asked if collected data should be reported to appropriate authorities.
- Native communication tasks of the device should not be hampered.
- Data collected by components should be made accessible to other applications, as well as components.
- The algorithm designed should avoid resource-intensive techniques to determine result.

IV. FUTURE SCOPE

In our project road monitoring and jerk sensing system we implement this system to avoid a jerk. In this system we set a three LED's on the system, in three colours Red, blue and Green and it indicates the following tasks,

1) If the green LED glows then it will indicate that the Road condition is good to Drive the vehicle.
2) If the Yellow LED glows then it indicate that the condition of Road is poor please go slow.
3) If the Red LED glows then it tell us the Road condition is very bad to drive and it is dangerous to our Health.

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