

# International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 8, Issue 5, May 2019

## Pothole Detection System

Pranay Kailas Patil, Amit Kumar Sharma, Sanvid R Remane, Saurabh Chaudhari, N.M.More

B. E Students, Department of Computer Engineering, JSPM NTC, Pune, India

Professor, Department of Computer Engineering, JSPM NTC, Pune, India

**ABSTRACT:** One of the increasing problems roads face are worsened road conditions. Many reasons like rains, oil spills, road accidents or wear and tear, make the roads difficult to drive on. Unexpected hurdles on road may cause more accidents. Also because of bad road conditions, fuel consumption of the vehicle increases, causing wastage of precious fuel. All these reasons urge that it is important to get information of such bad road conditions, collect this information and distribute it to a Government body. It also becomes important to report accidents and accurate location of vehicles for life saving and property security purposes.

**KEYWORDS:** Real time tracking, accident detection, reporting, traffic, safety, anti-theft, potholes, security, vehicle accident.

### I. INTRODUCTION

There are various challenges involved in this. First of all there should be a way to get information about road conditions. Then the location of the pothole must be identified. Lastly the information must be conveyed in a manner which can be understood and used by Government body. We in this project try to design and build such a system. In this system the wireless access point collects the information about potholes in its vicinity and distributes this information to BMC using wireless broadcast. This same system is applied for accident detection too! Detection of an accident and sending the real time location to nearest helping body can save lives. Anti-theft in cars can help saving million of dollars.

### II. LITERATURE SURVEY

Automated Pothole Detection :-One of the sensor boards that we used for collecting environmental data also has an accelerometer that can measure both the vertical and the horizontal acceleration. We realized that this accelerometer can be used to detect the road surface condition. For example, when a bus goes over a pothole there would be a significant change in the vertical component of the acceleration (and also in the horizontal component due to braking etc.)[6] They were developing a road surface condition monitoring system that used acceleration sensors mounted on public transport buses to monitor the road surface condition with only a few sensors. These bus mounted sensors gathered vertical and horizontal acceleration data on its route together with the GPS coordinates of the data collection points. Continuous Road Damage Detection Using Regular Service Vehicles We outlined an affordable system that continuously monitors the road network for surface damage like potholes and cracks. The system consisted of a structured light sensor mounted on vehicles that travelled the roads on regular basis. It made use of sensors and equipment already present on the vehicle, like GPS on transit buses. The data was collected from many vehicles, aggregated and analysed at a central location and the assessment results were displayed interactively to facilitate road maintenance operations. Thus, they described in detail the key sensor, the data it collects and the algorithm to detect cracks and potholes.

(An Emerging Trend In Communication System) According to this project when a vehicle meets with an accident immediately Vibration sensor will detect the signal or if a car rolls over, and Micro electro mechanical system (MEMS) sensor will detect the signal and sends it to ARM controller[8]. An automatic alarm device for

## International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 8, Issue 5, May 2019

vehicle accidents was introduced in this paper. This design was a system which could detect accidents in significantly less time and would send the basic information to first aid centre within a few seconds covering geographical coordinates, the time and angle in which a vehicle accident had occurred.

### III. PROPOSED ARCHITECTURE

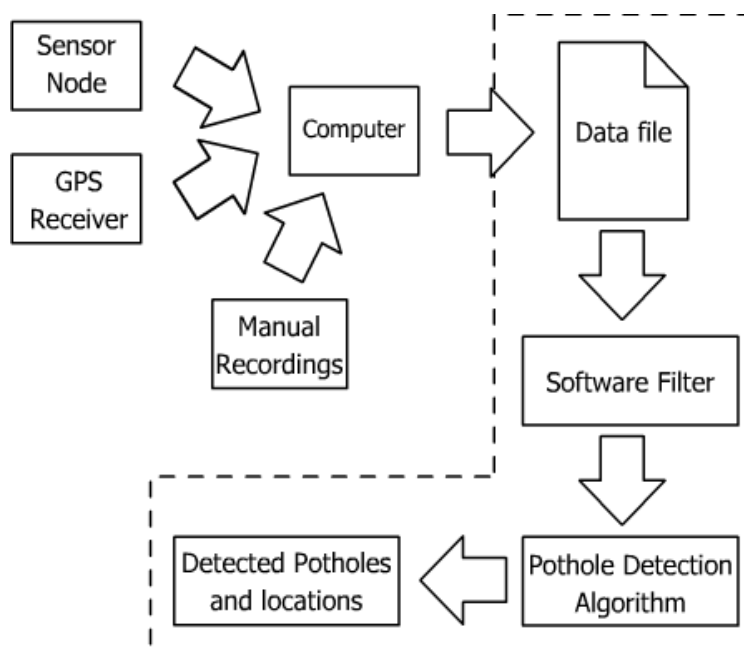


Fig 01 Proposed Architecture

1. **Android** :Android is a powerful Operating System supporting a large number of applications in Smart Phones. These applications make life more comfortable and advanced for the users.
2. Android applications are composed of one or more application components (activities, services, content providers, and broadcast receivers)
3. Each component performs a different role in the overall application behavior, and each one can be activated individually (even by other applications)
4. **JAVA**: Java is the language that underpins all Android development.
5. XML: XML was created as a standard way to encode data for internet-based applications.
6. Android SDK :SDK stands for Software Development Kit, which, though it may conjure up images of a briefcase full of spy tools, is actually just a fancy name for a set of pre-packaged code. The Android SDKs are modules of Java code that give developers access to device functions Android SDK is a library called Gradle.
7. MySQL: To store data locally is through Android's built-in support for using SQL to interact with a MySQL database.
8. API's: As an Android developer, you'll likely want to interact with many other services. For example, you may want to allow your users to access a calendar from a third party service, or google map.

# International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 8, Issue 5, May 2019

## Software requirements

1. Java Development Kit (JDK) 7 or later version
2. Android SDK
3. Android Studio
4. Embedded C language

## Hardware requirements

1. 2 GB RAM minimum, 4 GB RAM recommended
2. 400 MB hard disk space
3. At least 1 GB for Android SDK, emulator system images, and caches
4. 1280 x 800 minimum screen resolution
5. PIC Microcontroller
6. IC Microcontroller
7. ZIGBEE Module
8. Ultrasonic Sensor
9. Power Supply

## IV. IMPLEMENTATION

Microcontroller, GPS, GSM are the fundamental components of the proposed project. They are used for all three purposes i.e. Pothole detection and reporting, accident tracking and reporting and anti theft. The project kit will be mounted below the vehicle.

### 4.1 Pothole Detection And Reporting

The components that take part in detection and reporting are IR transmitters, microcontroller, GSM, GPS. The two IR transmitters operate at 38 KHz frequency. We are using two IR transmitters in order to detect two types of potholes. One pothole has less depth and is not dangerous. The other pothole is the dangerous one and which requires immediate repairing as the depth of this pothole is large. The IR transmitters are calibrated on the basis of ground clearance of the vehicle. The calibration is done with the help of potentiometers which can vary the height to which IR's can detect. Thus after a certain threshold depth, the IR transmitters will get triggered and it will perform the following functions. As soon as any one of the IR gets triggered, the microcontroller will be notified that the IR has sensed a pothole.

The microcontroller will immediately make the GPS to take coordinates of that particular location and this information of the location will be the current location of the pothole. This location data will be stored inside the memory of the microcontroller. The microcontroller then uses the GSM kit to send an SMS to predetermined number say, a government body responsible for road maintenance. The SMS body consists of the exact location of that detected pothole.

Thus, in this way, detection and reporting of the potholes is done in real time. Through software programming, the database of such potholes detected in various parts of the city can be kept so that the government body can address these potholes and repair them at a later stage. This will also enforce them to take actions as the database will be managed by some higher authority that will enforce these actions.

### 4.2 Accident Tracking and Reporting

For detecting an accident, we are using a bump sensor as an accident sensor. Whenever the bump sensor gets triggered, it performs the following functions.

1. As soon as the bump sensor gets triggered, it will send the microcontroller the information that it has sensed an accident.
2. The microcontroller will immediately make the GPS to take coordinates of that particular location and this information of the location will be the location of the place where the accident took place. This location data will be stored inside the memory of the microcontroller.

## International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 8, Issue 5, May 2019

3.The microcontroller then uses the GSM kit to send an SMS to predetermined number say, a hospital. The SMS body consists of the exact accident location. Thus, in this way, accidents can be detected and immediately reported to a hospital. This way, many lives that are lost due to delay in time can be saved as there is no need of other people that witnessed the accident to call an ambulance.

### V. FUTURE SCOPE

Our project is implemented by keeping future in mind. As of today, such a system which can do all three things i.e Pothole Detection and Reporting, Accident Detection and Reporting and anti theft system is not available. We dream about a future where this project would be implemented in each and every vehicle. Further, it could be given Wi-Fi or Bluetooth connectivity to create a network of vehicles. This network would intelligently notify other vehicles present inside it about road conditions and traffic analysis. Also, our aim is to make security systems affordable as currently only high-end vehicles boast this technology.

### VI. CONCLUSION

Our system is efficiently designed to fulfil two main criteria; First one being detecting potholes on the road and second is to form a software interface with the system which can store the data on a cloud source which is accessible to all. This will help others travelling on the road. The cost-effective system that we have proposed will prevent accidents to a great extent. Our proposed solution makes use of a better and more efficient technology to detect potholes and warn the driver about them so that he is aware a prior. Compared the already existing technology, this system would be time efficient and would consumer lesser power. As there would be database comprising of the location of the potholes, it will notify the government authorities and in turn necessary action can be taken. As we can extend the project by integrating it with GPS systems and real time satellite feed, it will help the commuters have a prior idea of the potholes on the path and make them conscious of their route enabling a safe travel.

### REFERENCES

- 1:-<http://timesofindia.indiatimes.com/india/Bad-roads-killed-over-10k-people-in-2015-3416-deaths-due-topotholes/articleshow/53482615.cms>
- 2:-<http://www.gpsinindia.com/>, The largest repository of Global Positioning System (GPS) knowledge in India.
- 3:- <https://www.google.co.in/maps/@12.8844208,77.5891755,15z?hl=en>
- 4:- Real-time Embedded Components and Systems, Book by John W. Pratt and Sam Siewert.
- 5:- De Zoysa, Kasun, ChamathKeppitiyagama, Gihan P. Seneviratne, and W. W. A. T. Shihan. "A public transport system based sensor network for road surface condition monitoring." In Proceedings of the 2007 workshop on Networked systems for developing regions, p. 9.ACM, 2007.
- 6:- Eriksson, Jakob, Lewis Girod, Bret Hull, Ryan Newton, Samuel Madden, and HariBalakrishnan. "The pothole patrol: using a mobile sensor network for road surface monitoring." In Proceedings of the 6th international conference on Mobile systems, applications, and services, pp. 29-39.ACM, 2008.
- 7:- sensor network for road surface monitoring." In Proceedings of the 6th international conference on Mobile systems, applications, and services, pp. 29-39.ACM, 2008.
- 8:- Mohan, Prashanth, Venkata N. Padmanabhan, and RamachandranRamjee. "Nericell: using mobile smartphones for rich monitoring of road and traffic conditions." In Proceedings of the 6th ACM conference on Embedded network sensor systems, pp. 357-358. ACM, 2008.