iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 6 **Issue:** III **Month of publication:** March 2018

DOI: http://doi.org/10.22214/ijraset.2018.3299

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue III, March 2018- Available at www.ijraset.com

A Low-Cost Android-Based Monitoring and Tracking System Using GPS

Mr. Arindom Ain[1], Mr. Jeetumoni Barman[2], Rajkamal Borah[3], Iftikar Rekib[4]
[1,2,3,4] *Girijananda Chowdhury Institute of Management and Technology*

Abstract*: *With the rapid growth in the Internet of things, human lives are becoming easier. In this paper, we will present a low-cost monitoring and tracking system based on Android that employs an embedded GPS module to find the location of any android based device and gives a range of control features. The system composed of many location transmitting device and can be monitored using one or more location monitoring device. The real-time location of those transmitting device can be viewed in google map in the monitoring android device

Keywords*: *Android, GPS, GPRS, Sender Application, Receiver Application, Remote Server

I. INTRODUCTION

Nowadays location tracking is one of the crucial factors that plays an important role in many aspects of our day-to-day life. Such as tracking of a school bus, online booking of a vehicle based on nearest location, tracking of a person's location and etc. With the evolution of GPS technology, tracking any location from anywhere is becoming easier. But the implementation requires costly setup and complex hardware to fulfil the needs. So a real-time android device monitoring system may be designed to serve as a tracking system using a GPS (Global positioning system) and GPRS (General packet radio service) technology. A low-cost Android-based device generally has a GPRS and GPS module embedded in it. So we have considered an android based device as key hardware for the system. This paper focus to develop a system that helps to monitor and locate the current location of any android based device. The main advantages of using this application are that user can get location information of the exact point of the location transmitting device at anytime from anywhere. The system is purely software based on android application. So it can be used on any device with Android platform. Most of the regions are Internet enabled and smart phones are coming with a cheaper cost, so we assume our project is technically and financially feasible. The proposed system uses GPS enabled Android device as GPS component both for location transmitting and location receiving. The system includes a GPRS module for location fetching and message transmission, and a remote server to sync updated location in real-time.

II. RELATED WORK

Many research has been devoted to the development of tracking and monitoring system using GPS. In [1] it is proposed to provide the location of a vehicle using a microcontroller supported by GPS and GSM module. Okatan et al. [2] also proposed a system that can track a vehicle based on microcontroller where the location and speed of a vehicle are monitored and can be reported. In [3] they proposed a web-based end user application to monitor the vehicle. Many other researchers proposed a various method in vehicle tracking, such as using passive sensors [4], using wireless sensors technology [5] and cloud computing [6].

III. OBJECTIVES

The main objective of the proposed system is to develop a low cost, portable and real-time tracking as well as a monitoring system. The application developed to be used anywhere at any time using an android device with Internet facility. The application would provide a scope to track and monitor vehicle with an Android device with the application installed. It could be used in a school bus or any kind of other transport. It provides an effective way to track and monitor any person anywhere with the application running on their Android device. Moreover, a real-time tracking and monitoring of school or college transport could be achieved. It could provide a way to help in crime investigation.

IV. PROPOSED SYSTEM DESIGN

The system proposed mainly includes four components viz. sender application (SA), receiver application (RA), a remote server (RS) and remote database (RD). The SA is installed in the device of the location sender. This application fetches real-time latitude and longitude data from satellite about the current location on a regular interval through GPS antenna and the values are being transmitted to the RS through the Internet. Once the latitude and longitude values are uploaded to the server the user is ready to be

©IJRASET (UGC Approved Journal): All Rights are Reserved

monitored and tracked. The path of the movement of the transmitting device can also be traced. The RA is installed in the device of the location tracker. This application fetches the location data that has been uploaded by the SA from the RS and plots a marker on the google map based on the latest latitude and longitude data. The marker location on the map is updated every time the RA fetches different values from the server. The block diagram of the proposed system is given in Figure 1

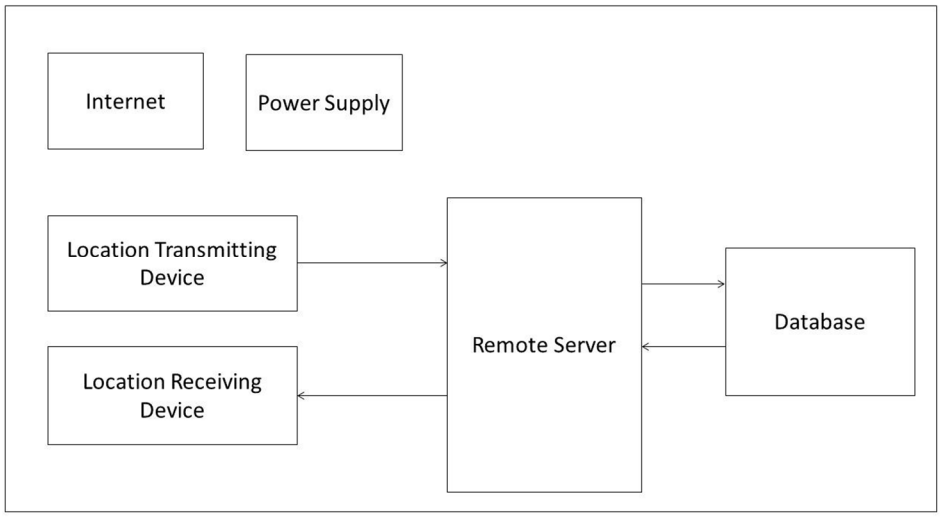


Fig. 1. Block diagram of the proposed system

V. MAIN COMPONENTS USED IN THE SYSTEM

The proposed system mainly consists of four major components

A. Global Positioning System (GPS)

The GPS system uses GPS satellite to provide geolocation and time information to a GPS receiver [7]. It provides corresponding latitude and longitude values to the GPS device. This system is commonly used in military, civil, and also by public users to provide extensive positioning capabilities. GPS can be integrated into most of the handy devices like mobile phones, etc. In the proposed system the GPS enabled Android device is used as the tracking device.

B. Sender Application

The sender application is installed on the sender devices. It uses the internal GPS and GPRS of the device to fetch the real-time location information from GPS satellite and transfer the latitude and longitude data to the remote server. The location data is fetched and updated to the remote server after every 10 seconds. This application provides the flexibility to the user to start sending its current location information and stop when it is not necessary. The block diagram of the sender application is given in Figure 2.

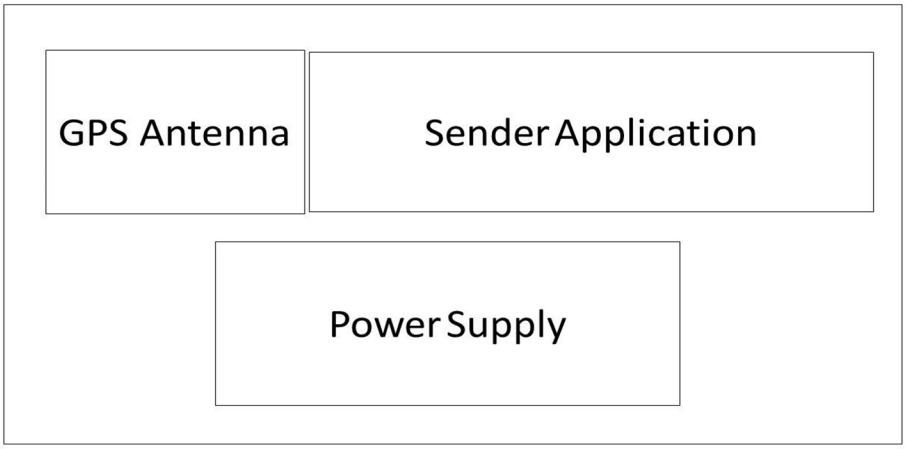


Fig. 2. Block diagram of the Location Sender

©IJRASET (UGC Approved Journal): All Rights are Reserved

C. Remote Server

Remote server receives the location information transmitted by the sender application. The server uses a database to store and manage the location data received. It also stores information of sender and receiver. The block diagram of the remote server is given in Figure 3

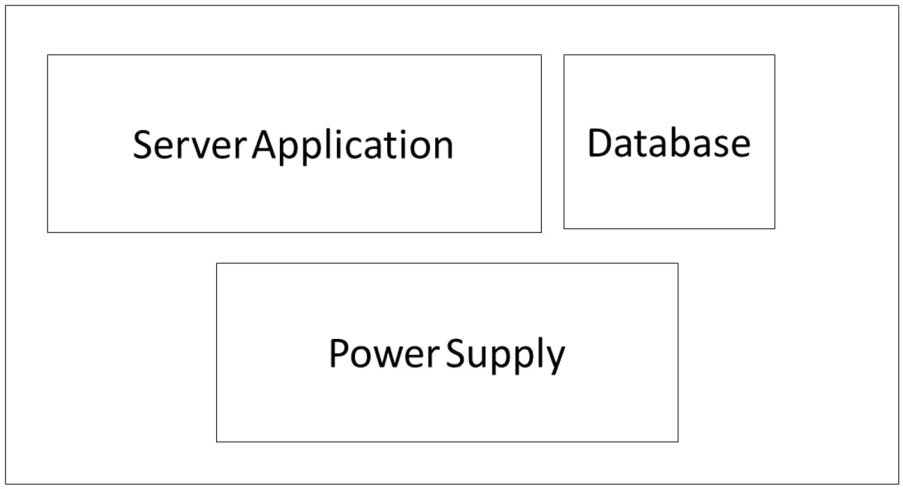


Fig. 3. Block diagram of the Remote Server

D. Receiver Application

The receiver application is installed in the device of location viewer. This application fetches the location information of the sender devices from the remote server in real-time. It uses the latitude and longitude values of the devices to plot corresponding markers on the location in google map. The markers are updated after 10 second. The Block diagram of receiver application is shown the following figure 4

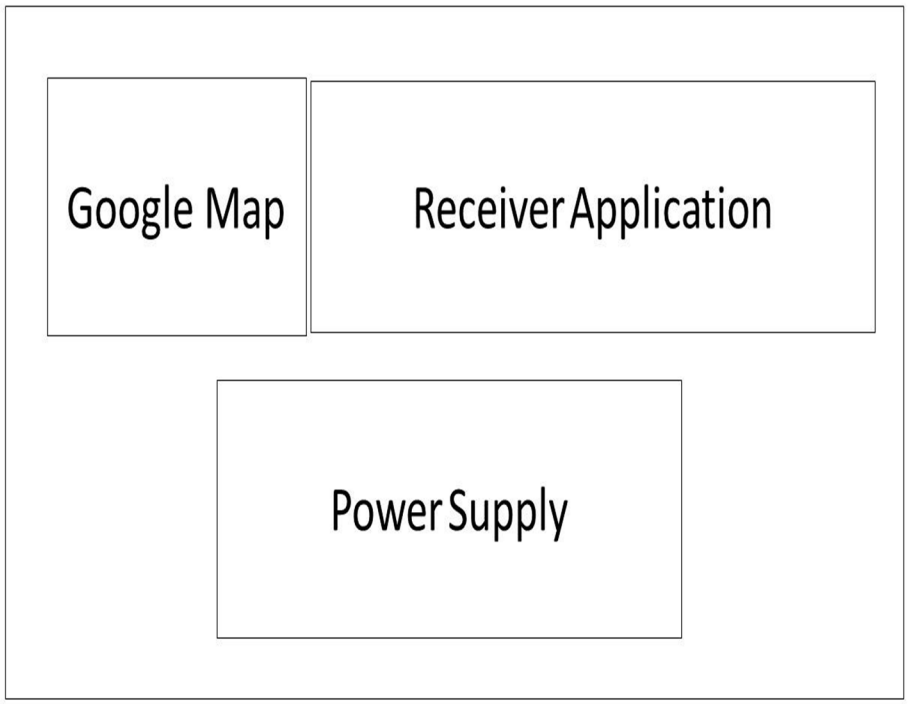


Fig. 4. Block diagram of the Location Receiver

©IJRASET (UGC Approved Journal): All Rights are Reserved

VI. TOOLS AND TECHNOLOGY USED

A. Android Studio

Android Studio is an Integrated Development Environment (IDE) for developing an application for Android platform. It is available under the Apache License [8] with no cost. We have developed the sender and the receiver applications in the android studio.

B. Android Operating System

Android is a Linux-based Operating System. It is used in multiple devices like smart phones. It is open source. It supports many features in a single box, such as GPS for real-time location, GPRS for Internet connectivity and etc. The proposed system uses the built-in GPS for real-time tracking and GPRS to provide Internet connectivity to the installed applications.

VII. JAVA PROGRAMMING LANGUAGE (JDK 1.7 OR HIGHER)

Java is the official language for Android development. Android API's are primarily designed in Java. Java is released by Sun Microsystems in 1995 [9]. All Java enabled platform requires a virtual machine (VM) implementation. The VM interpret the intermediate code (byte code) and convert them to corresponding machine code, which is executed on the processor. The VM in Android is Dalvik [10]. The Android SDK (software development kit) is a set of tools which can be used to develop software applications. The SDK contains standard Java libraries like math libraries, networking libraries and etc., through which we could develop different Android applications [11].

VIII. RESULT AND ANALYSIS

We have successfully implemented our system and we got effective results. We tested our system in real-time moving android based object and successfully monitored and tracked. The experiments are tested on a device with minimum API 19 to target API 23. The system was installed on two different android based devices. One served as location transmitting device and another as real-time location monitoring device. It is observed that when the transmitting device moved from one location to another location, the marker also changed its location in the monitoring device referring to the exact location of the location transmitting device.

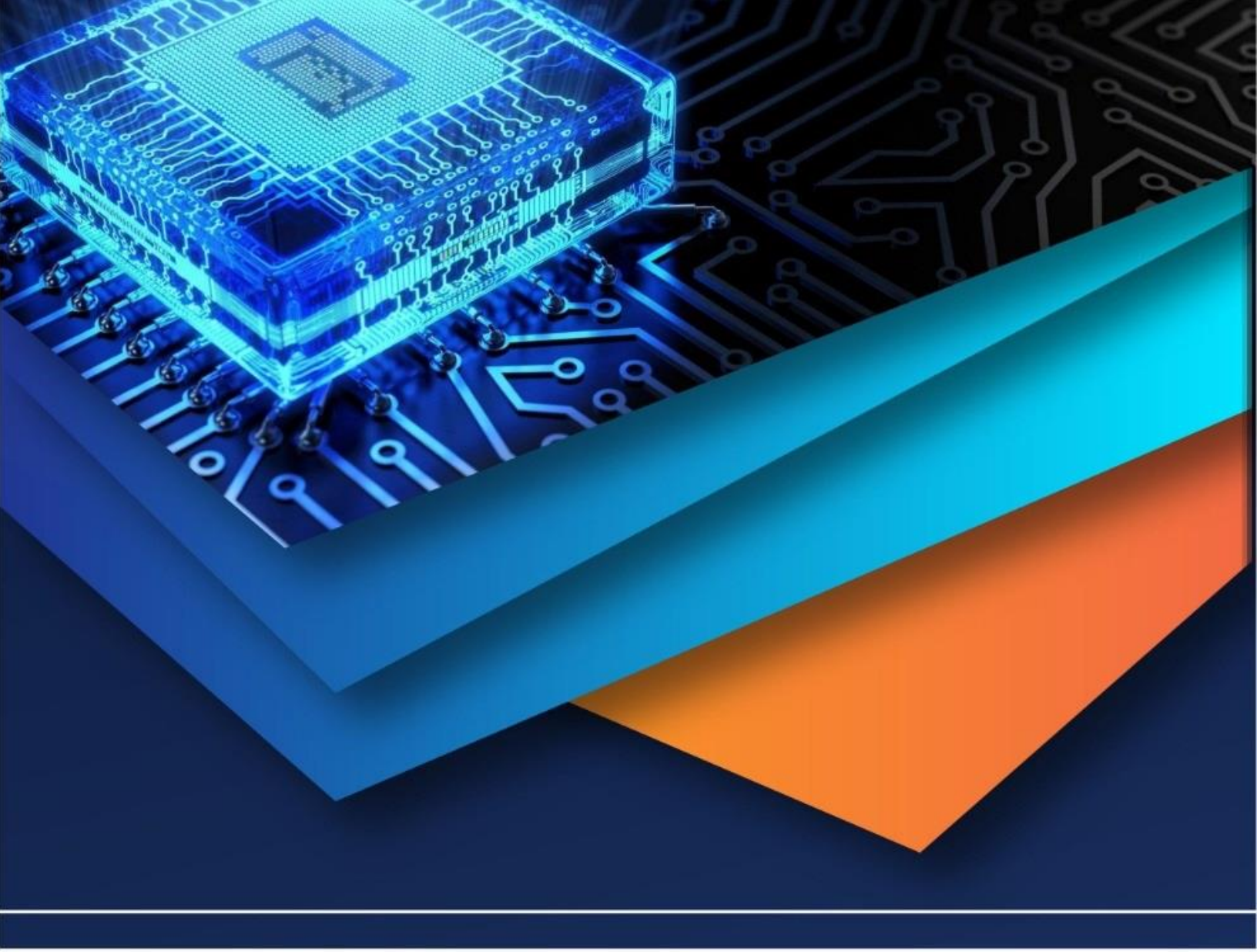
IX. CONCLUSION

The system developed is based on Android based device. Location transmission and location receiving can be done by Android device in real-time. It can be used for monitoring and tracking a vehicle, or a person. It can be used in car, bus, motorcycle tracking. The system fails in limited Internet connectivity. We can add new features as and when required. Reusability is possible in this application. There is flexibility in all the modules.

REFERENCES

[1] Rai, S., and Paul, A., 2015. "Transport tracking system using gps and gsm module". Transport, 4(11).
[2] Okatan, A., Salih, A., Akpolat, C., and Celik, K., 2003. "Micro-controller based vehicle tracing system via use of gps and gsm". In Recent Advances in Space Technologies, 2003. RAST '03. International Conference on. Proceedings of, pp. 605–609.
[3] Almomani, I. M., Alkhalil, N. Y., Ahmad, E. M., and Jodeh, R. M., 2011. "Ubiquitous gps vehicle tracking and management system". In Applied Electrical Engineering and Computing Technologies (AEECT), 2011 IEEE Jordan Conference on, IEEE, pp. 1–6.
[4] Choudhari, P., 2012. "Development of vehicle tracking system using passive sensors". In Communication, Information & Computing Technology (ICCICT), 2012 International Conference on, IEEE, pp. 1–5.
[5] Aravind, K., Chakravarty, T., Chandra, M. G., and Balamuralidhar, P., 2009. "On the architecture of vehicle tracking system using wireless sensor devices". In Ultra Modern Telecommunications & Workshops, 2009. ICUMT'09. International Conference on, IEEE, pp. 1– 5.
[6] Alexe, A., and Ezhilarasie, R., 2011. "Cloud computing based vehicle tracking information systems". IJCST, 2(1), pp. 49–52.
[7] Wikipedia. Available at: https://en.wikipedia.org/wiki/global positioning system [online: Accessed 6-march-2018].
[8] Wikipedia. Available at: https://en.wikipedia.org/wiki/android studio [online: Accessed 6-march-2018].
[9] SINICKIDECEMBER, Available at: https://www.androidauthority.com/develop-android-apps-languages-learn-391008/ [online: Accessed 6-march-2018].
[10] Ma, L., Gu, L., and Wang, J., 2014. "Research and development of mobile application for android platform". International journal of multimedia and ubiquitous engineering, 9(4), pp. 187–198.
[11] Shane Conder, L. D. Available at: https://code.tutsplus.com/tutorials/learn-java-for-android-development-introduction-to-java--mobile-2604 [online: Accessed 6-march-2018].

©IJRASET (UGC Approved Journal): All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)