

IOT BASED KIDS MOVEMENT TRACKING SYSTEM

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ABSTRACT

A child tracking system is a mobile application that can monitor and keep track of the location of a child. The purpose of the project is to devise a method that will enable parents to maintain surveillance over their children even when they are unable to see them directly. When the parent is at work, however, they may use a straightforward app to track and monitor their child's location even while they are away from home thanks to a system that tracks children. An investigation into some of the tracking systems that are already in place has been carried out in order to collect information and identify problems. The Rational Unified Process (RUP) model is used as the applicable methodology for this project. For the purpose of determining the user requirements and needs associated with the system, a data gathering method known as a questionnaire and an interview were both undertaken. The analysis of the results was based on the responses from the users. The vast majority of users (parents) is in agreement and is looking forward to the system being put into place. The mobile application use the GPS and SMS services found in Android mobile phones. It allows the parent to get their child's whereabouts on a real time map. The system has two sides: a parent side and a child side. A parent's device main duty is to send a request to the child's device to get the location of the child. However, the primary function of the child's device is to respond with the GPS location to the parent's dash board upon request.

Keyword : Iot GPS Kids Tracking

I. INTRODUCTION

In today's world, over 80% of the world population, including children around the age of eight or seven, owns smart phones. This is due to many reasons. One of them is the remarkable features and capabilities that new smart phones offer especially Android based smart phones. With that many features, the need for resourceful applications rises. In our opinion, GPS offers outstanding capabilities in locating position and this can be used to develop resourceful application that helps in locating missing or lost children. Studies conducted by Cyber Travel Tips showed that in Malaysia, missing children are basically classified into two categories. The first category involves fleeing from one's house as well as disappearance. The second category is kidnapping or abduction. Statistics show that a total of 5,996 children under the age of 18 have vanished from their homes since 2004. Fortunately, 4092 kids were either discovered by the police or came home. The remaining 1,904 kids are still missing, though. Boys and girls between the ages of 14 and 17 make up those kids.

Additionally, parents are often worried about the safety of their kids when planning family vacations. This anxiety may make it difficult for the parent to enjoy their family vacation. Even worse, parents may lose track of their kids and worry about kidnapping or worse. As a result, this project is intended for use by parents and aims to assist in identifying lost or missing children. It makes use of the fact that many modern kids have smartphones, which is useful in situations like these. In this work, GSM, or more especially SMS, one of a smart phone's essential services, is coupled with GPS in a single system. Parents can use a parent-side application to ask a child side for its location, and the child side will be able to extract the location from the request reply and display it on a map. The child's side application, on the other hand, collects the necessary data from the smart phone that will be utilised to find the smart phone. The parent's smartphone, which is already registered on the programme, receives data like GPS coordinates and time. Utilizing Short Message Service, the parent and child applications communicate with one another (SMS). SMS provides special functionality for the system. It will make it possible for the system to function without an internet connection, enabling the use of the programme on smart devices.

The modern child is more likely to be influenced by what their peers think, and they are more likely to be defrauded or kidnapped by anyone they come into contact with. In Malaysia, the number of people detained on suspicion of committing crimes is rising steadily. Among all crimes, kidnapping is regarded as the most horrible. While it does pose a serious threat to the victim's life, it also produces unending emotional distress and keeps everyone else in the family awake at night. One of the objectives of criminals who kidnap

children is to make money by using the children they steal to make pornographic videos that feature the victims and are sold.

1) To reduce the frequency of kidnappings of children by putting a tracking system in place.

The majority of parents work, thus due to the time commitments required, it is impossible for them to be by their children's sides all the time. This child tracking device allows parents to know exactly where their children are at all times.

2) To submit a proposal for tracking technologies for the child monitoring system.

using a global positioning system (GPS) as a tracking method to pinpoint the children's precise location (longitude and latitude). Thanks to technology, parents can keep an eye on their kids wherever they go.

3) Establish a mechanism for tracking where children are at all times.

Having the ability to When parents are gone from the house, they should keep an eye on their kids' whereabouts and movements while they are outdoors.

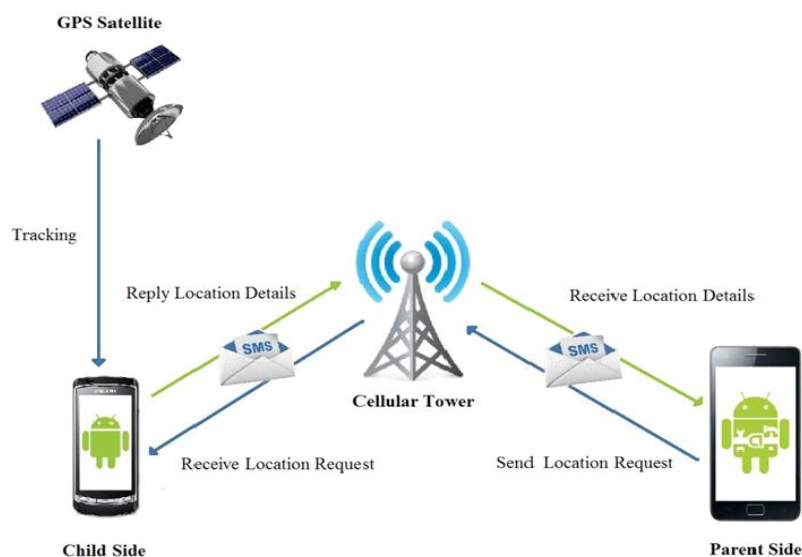


Figure 1: Architecture of Proposed system

II. LITERATURE SURVEY

The review of literature for child safety and location tracking devices are discussed below.

Al-Suwaidi and Zemerl [1] work states that the problem was solved by proposing an application “Locating Friends and Family Using Mobile Phones with Global Positioning System(GPS). The system's architecture is built on a client-server model. The client phone logs in to the server and registers itself. The server then keeps a database of the coordinate position changes that the client transmits to it on a regular basis. Any client who wants to find out where another client is located must sign up and login to the server first. This software was created to make it easier to find friends and family. J2ME was used to develop the mobile app. In terms of the server, it employs PHP and MySQL Database to ensure that it won't be overburdened. This suggested method would provide every client equal access to the system and command privileges, which would make it difficult to utilise in a child monitoring application. The authority to direct and govern should belong to the parent. This technique has the drawback of requiring internet connectivity on both the client and server sides in order for the system to function.

Almomani [2] states that a “Ubiquitous GPS Vehicle Tracking and Management System” is proposed. By providing two different types of end user apps, a web application and a mobile application, this system architecture is created to provide optimum accessibility for the user whenever and wherever they need it. The system's architecture is client-server based. On the server side, it has a database to store user information and data as well as GPRS, web, and SMS servers. The client, on the other hand, is a box that houses a GSM modem and a GPS tracker. After registering and logging onto the web server, users who use the web or mobile application to obtain location will send an SMS request to the client device's GSM modem. The client device then answers over GPRS, which is then received by the SMS server after being forwarded from the GPRS server. Finally, the SMS server sends the web server's response. The goal of this initiative is to assist fleet managers in keeping an eye on their drivers' habits while also helping parents keep an eye on their young drivers.

Chandra, Jain and Qadeer [3] used a simple web server approach along with SMS to solve the problem. For mobile phones having GPS receptors and Java support, it was implemented. The position of a client can be shared via sending an internet-based message to the web server's database or by directly sending an SMS message to other clients. The locations are visible to customers on Google maps. This application's purpose is to make it possible for the user to share their location with those who are using the same service as them or even friends.

Anderson, Lustig, Brunette, Borriello and Kolko [4] proposed solution for” transportation information system” using only GPS and SMS. A gadget (a box) with a GSM modem and a GPS unit on the client side. The information and locations connected to a basic GSM phone for SMS functionality are stored in a database server on the back end. A user can send an SMS to the server's GSM phone to request the location of a client, and the server will then send the user the most recent location information it has obtained from the client. The fact that the system works without requiring internet connectivity on both ends is one of its distinctive features.

Chandra, Jain and Qadeer [5], The GSM module will respond with specific information about the children based on the message information the parent sent to it. On the Google map, the location is visible. When a specific child is in a life-threatening scenario, the device button needs to be touched so that it can take a picture and send it, together with the user information, to the registered cellphone numbers. It won't take long to save the child's life.

Anderson [6], from the perspective of children To track speed and location, technologies like GPS, GPRS, and GSM are employed. The technology is permanently installed on buses, cars, and other vehicles, allowing GPS trackers to determine if a vehicle is travelling on a regular route or not and to determine its speed. Modern day internet connections between people largely depend on digital technologies. Parents are given an android-based tracking system for their kids. The network that connects several parts using a single device and is connected to a server is known as the internet. With the help of a GSM location tracker, parents can monitor their kids in real time.

Almomani [7] the microcontroller used is ARM-7 LPC2148. Cases of missing children are steadily rising in the real world. Child care is a significant problem. Different approaches are presented to develop effective solutions. To solve it, numerous methods and procedures have been put in place. [5] presented a two-node global positioning system (GPS)-based approach to address the issue of child care. One of these two nodes is a child node that has a GPS receiver and a Bluetooth module. A Bluetooth-capable mobile makes up the parent node. Through a Bluetooth connection, the distance between the child and parent can be determined while the location of the child is being tracked by GPS technology and displayed on a map in the mobile device. Children under the age of six not verbally communicate their difficulties to their parents, which is why a wearable gadget was invented in [6]. This gadget collects data on the child's physical activity and heart rate and transmits it in real time to the parents.

SeungHee Lee [8], Using (hard) electrical parts, a wearable sensor badge is made that can detect ambulatory actions and provide context. Using the most recent technology, a wearable sensor jacket is created from (soft) cloth. Stretch sensors are positioned to detect movements of the body and upper limbs. When worn as clothes, the sensors provide the necessary data.



Figure 2: Arduino IDE

Bradley J. Rhodes [9], A wearable Internet of Things gadget was created to protect and defend women and young girls. In abnormal international situations, changes are made to the body's core temperature and galvanic skin resistance. This served as the input data, and when it exceeds the threshold value, an alert signal is generated. This piece explores the relationship between skin resistance, body temperature, and stress. These criteria were applied, and the person's activity was examined. The equipment [9] did an examination of body temperature and skin resistance. Using a triple axis accelerometer, body position is calculated. Following the acquisition of raw data, activity recognition is carried out using a customised machine learning algorithm. Sensor data is sent to a cloud platform to create real-time data. After that, MATLAB is used to evaluate the data. A variety of sensors are built inside the jacket to track body activity. Wi-Fi and an audio playback module are the two modules in paper [10]. Through a Wi-Fi module, the parents can receive the baby's information. The audio playback module plays the audio that has been recorded. There are several sensors, including accelerometers, cryostats, thermometers, gas sensors, flame sensors, and PIR sensors. The embedded system's microcontroller accelerometer senses the infant's angular location and movement. There are many innovative ways to find missing or lost children, as the literature

research undertaken has shown. Internet access on both the client's side and the server is necessary for some of the techniques listed above. In rare situations, there may be no internet access on either the parent's or child's side, thus the server is not convenient.

III. TECHNOLOGY OVERVIEW

The technology feasibility to the proposed system could be summarized as below.

Web server: The Apache web server, which provides service at the dedicated port 8080, is used for this role because it has the capacity to run concurrently and respond to client requests immediately. Because Linux is a multiuser operating system, Apache web server performs best on Linux. The PHP scripts run effectively on this server.

Messaging: In the suggested system, commands known as AT (Attention Commands) are used to communicate with the modem. Each command is an alphanumeric code with a specified meaning, and commands may also accept parameters.

Server Scripting: In the proposed system, server-side scripting is done using the JSP language, which supports both procedural and object-oriented approaches. JSP is a flexible language because it supports a variety of data types and a for-each loop with a key-value concept that makes it easy to navigate through arrays of various types.

Sensors: Are the electronic gadgets which sense the dirt dampness substance and ship off the base station.

ESP32 KIT: This unit gets the data structure sensors and converts the simple information to computerized; this information gets prepared utilizing C language and transferred to the worker utilizing Wi-Fi arranged organization.

Breadboard: This gadget assists with interfacing different parts and structure circuit without patching, it has a matrix of interconnected attachments with which we can associate different segments needed for a project.

Wi-Fi organization: Data gathered from sensors should be transferred to a distant worker; it is finished utilizing a Wi-Fi organization, it is needed to specify the side and secret key in the code to build up correspondence.

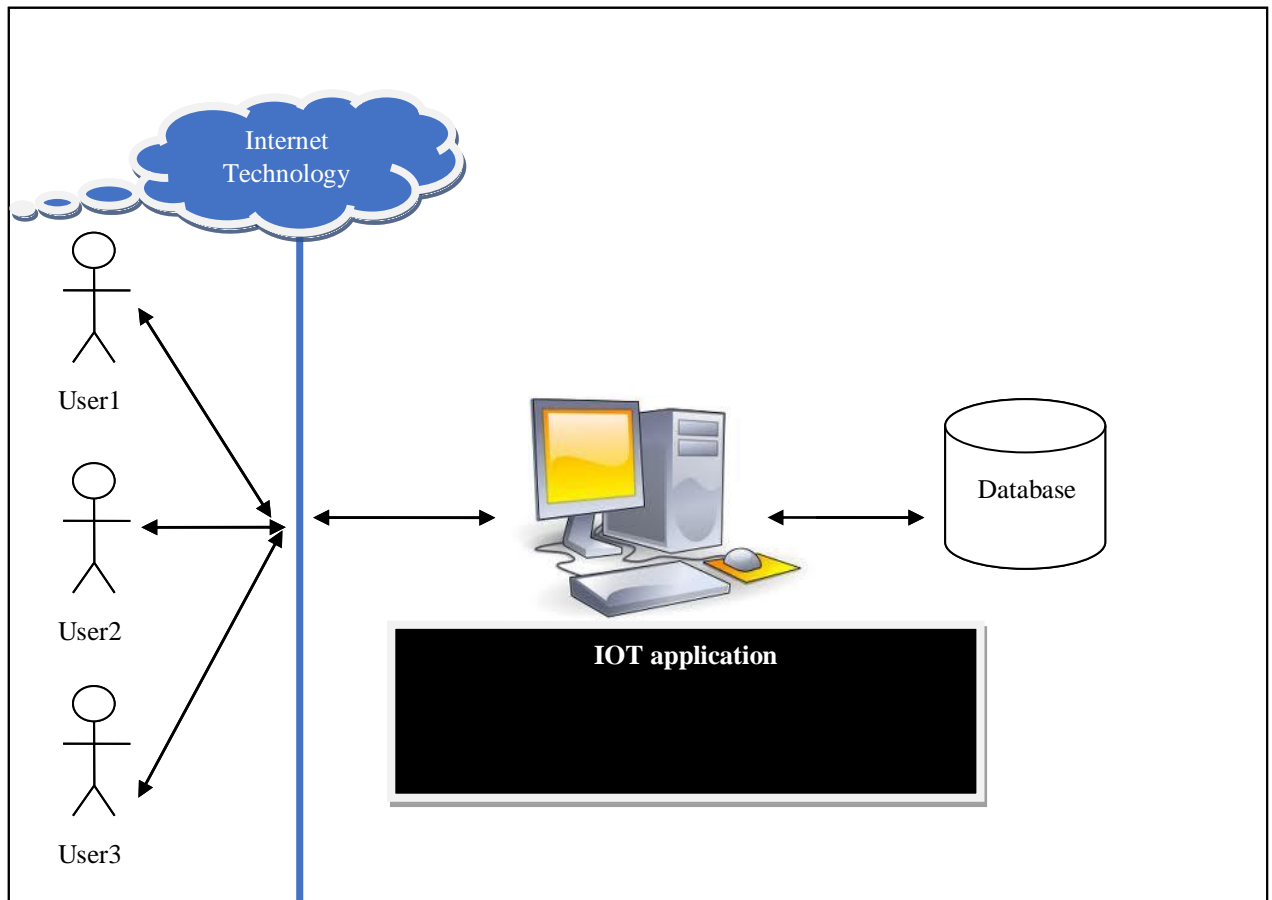


Figure 3: Architecture diagram

IV: Software and Hardware Requirements

Hardware Specification

Processor	-	Pentium III or Higher
RAM	-	2GB or Higher
Hard disk	-	500 GB
ESP32 board, GPS module		
Bread board		
Jumper wires		

Software Specification

Front end	-	Bootstrap Framework
Programming Language	-	C,PHP
Operating System	-	Windows 7 or Any Compatible
Editor	-	Notepad++
IDE	-	Arduino

V: METHODOLOGY

The algorithm for the proposed method is given below.

Step 1 – START

Step 2 – Declare the input out pins

Step 3 – Read information from GPS module and upload to customer server or blynk app

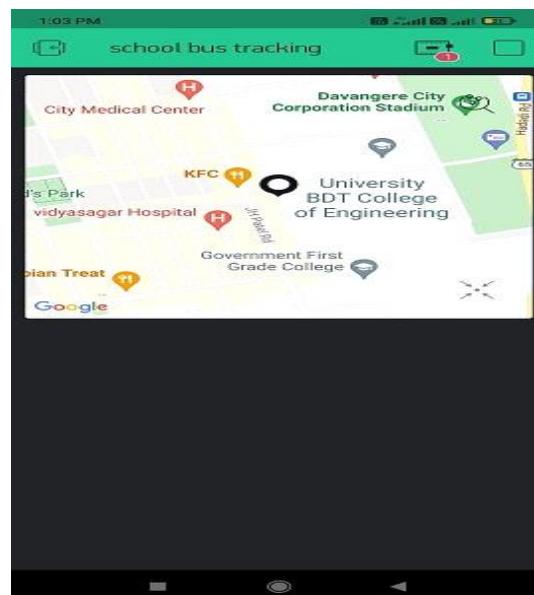


Figure 4: Above screen shows the Location of the kid being tracked using Blynk app, which receives signals from GPS module

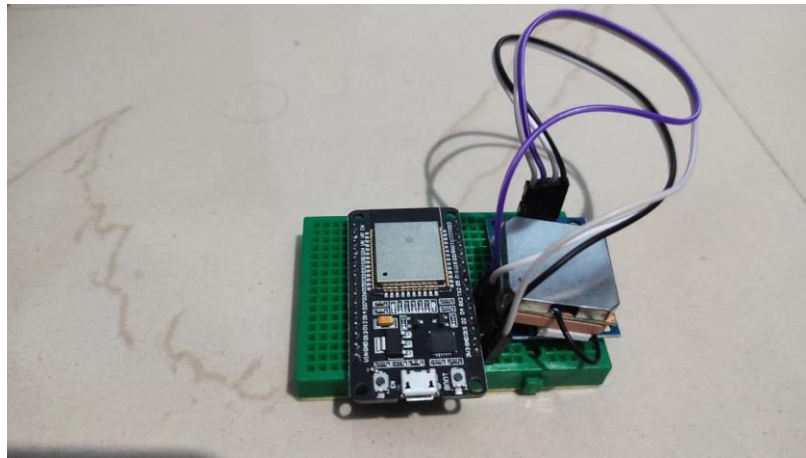


Figure 5: Above screen shows the prototype being used to implement the project

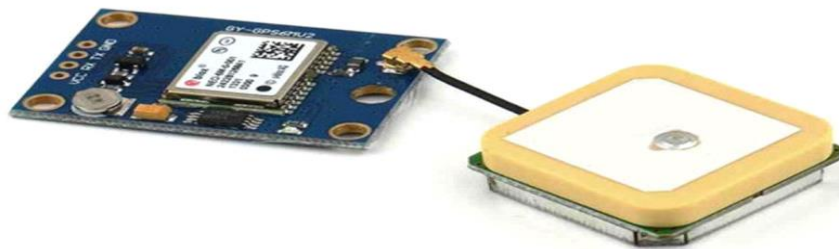


Figure 6: GPS module

Test cases

TC#	Input	Expected Output	Observed Output	Status
TC 01	Getting account of Blynk	Server must allow user to install blynk	Allows	Pass
TC 02	Adding widgets to Blynk	System must allow to configure	Allows	Pass

		widgets		
TC 03	Granting location permission to widget	Smart phone must allow location fetching info via GPS	Allows	Pass
TC 04	Getting current location via GPS	GPS must connect to satellite and fetch current location	GPS fetches location info	Pass
TC 05	Populating live info and updating kids location	GPS fetches current location and updates to map widget	Location gets updated	Pass

Table: Test case for login process

CONCLUSION

Parents especially who live in urban area, needed to work day and night to sustain the family which causes them cannot know where their child is going during the working hour. Because many parents, particularly those who reside in urban areas, are required to work day and night in order to provide for their families, they are often unable to know what their children are doing while they are at work. Nevertheless, parents are now able to monitor and keep tabs on their children using nothing more than a straightforward software that tracks children. Since the majority of parents have jobs, it is impossible for them to constantly be by their children's sides because of the time constraints involved. Parents are able to determine exactly where their children are at any given time thanks to this child tracking technology. It is necessary to have a child tracking system in place so that incidences of kidnapping can be avoided. However, with the child tracking app, parent can track and monitor their child with just a simple app. The parent is not possible to always stay beside of children as most of the parents needs to go for work. By having this child tracking system, parents

can track the location of their children. In order to avoid the kidnapping cases, the child tracking system is needed.

FUTURE ENHANCEMENT

1. Along with location info other bio parameters could be fetched
2. System could be connected with child help line
3. Advanced GPS could be used to get more accurate info

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