IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

SMART STUDENT TRACKING SYSTEM

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Abstract: The possibility of missing children is becoming increasingly common. So to decrease this issue, we are introducing a paper on Kid Global positioning framework Utilizing Arduino Uno and Google Guide. This framework is utilized for following the data of the lost kid utilizing Google Guide alongside the position and area of that youngster through GPS. When a child is on his or her way to school or the outside world, the "tracking system device" is simply stored in the child's bag. In the event that the child is lost or missed, the child's parents can simply send a message with the subject line "TRACK" to the operating device that is housed in the child's bag. The parents will be able to access the lost child's location in real time by receiving the child's precise position along with its longitude and latitude, which will then be copied into the Google map.

Keywords-- IoT, GPS Tracking, Sensor Temperature, Heart Beat, Location Update

I. INTRODUCTION

The child tracking system that is currently in widespread use all over the world provides parents with the assurance that their children are protected from suspicious behavior. We will discuss the implementation feature and demonstrate the system requirement for tracking the child in this paper. If a low-accuracy GPS is used in this system, a high-accuracy GPS is required to implement it. The system might display an error at that child location. This system sends a message with the name TRACK to the device, and the GPS on that device sends the longitude and latitude of the child's location to the GSM module. The GSM module then receives the information about the child's location's longitude and latitude, and this message will be sent to the user for tracking the lost child. This paper proposes a low-cost, high-accuracy, and user-friendly system that makes use of Google Maps. The Arduino is a small microcontroller that is used to control the entire system. Google guide can work on the precision of GPS. This paper presents research that describes the Child Tracking System using Google Maps. The high accuracy of the Google map demonstrates the improvements.

Hardware and software make up the open-source Arduino platform for electronics prototypes. By connecting Arduino to the Internet and either sending data to the Internet or responding to data on the Internet, or both, a connection can be made between the real world and the virtual world. The sensors can be used to detect almost anything, including sound, temperature, and light. How the program is put into action determines how Arduino reacts. When it comes to making our own projects, the programmable board Arduino is very popular and simple to use.

Arduino projects can be used independently or via USB to connect to a computer. The GPS module and GSM receiver are controlled and interfaced by the Arduino microcontroller. Arduino is able to display and monitor sensor data in order to sense the environment and receive input from a variety of sensors. The Arduino IDE software includes the Serial Monitor. Its function is to enable both the sending and receiving of messages from the Arduino and from a computer via USB.

II. RELATED WORK

Due to various objectives, there are numerous GSM techniques. Some methods are used to follow things, while others are used to find people or animals [1]. The GSM framework is extremely crucial for work the framework with high proficiency. Some researchers use the global system GSM services to track people, things, and animals [2]. Additionally, a

strategy for dealing with cases involving missing children between the ages of 14 and 17 has been developed by some authors. Because some children have been kidnapped, some authors use a GSM system to control and monitor them [3]. Besides, some of creators are planned another strategy to recognize the area of vehicles. The framework is produced by utilizing Arduino, GPS, and GSM. Vehicles can be tracked by sending their geographic coordinates [4, 5]. SeokJu Lee, Girma Tewolde, Jaerock Kwon are planned and executed a framework that tracks the development of related vehicles at any spot and time [6]. The gadget planned inside the vehicle works utilizing the Worldwide Situating Framework (GPS) and the Worldwide Framework for Versatile Correspondences/General Bundle Radio Assistance (GSM/GPRS) innovation [7]. By integrating GPS devices on the bus and sending the coordinates to the user via SMS, RFID, or the GPRS service provided by GSM networks, the authors addressed the issue of citizens not knowing when buses are arriving and taking longer to wait for them [3-5]. After enabling GPS on the tracking device, this information is sent to the central control unit, or it is sent directly at bus stops using RF receivers [6]. Saw Nang Paing, May Zin Oo, Mazliza Othman, and Nobuo Funabiki designed a system that uses an Arduino-connected GPS module to detect car theft. The system monitors cars, locates them, and sends an SMS message on GSM with the vehicle's current location to the owner [6].

The child was tracked in the 2016 research paper, but the system is complicated because it uses an ARM controller. In addition, a smart phone-based paper GPS and GSM child tracking system was introduced in 2013. However, the child does not need to be present. Now, we are developing a cost-effective GPS and GSM-based Arduino-based child tracking system. There are different explores in working on the precision of GPS point . We can now simply use the Google Map to locate the child. Jens Eilstrup Rasmussen created the web mapping service known as Google Map. In addition to a dedicated parking assistance feature, it provides turn-by-turn navigation. It is primarily accessible on mobile devices.

III. PROJECT METHODOLOGY

A personal computer or cellular phone, a Microcontroller Arduino Mobile or GSM modem, a GPS antenna, and a GPS receiver make up the components of this system. The transmitting and receiving sides of this system will be the system's two main components. We use one of the Arduino boards, the Arduino pro mini, for this project. Arduino is an easy-to-use open-source electronics platform built on hardware and software. The Atmel ATmega processor is the foundation for Arduino, a microcontroller interface as well as a programming language and environment for implementing logic on the chip. We use the Arduino mini because we want the project to be as small as possible and because the Arduino IDE makes it easy to program. It is a product used to program the Arduino loads up by composing the determine code and download it to the load up and it put away in streak memory on the load up and it holds until the client changes the sketch so it should be modified just a single time. The framework program is composed by utilizing Arduino IDE that permits the Arduino to speak with the GSM and GPS and acknowledge information from GPS and send it on knead utilizing GSM. The figure below shows the methodology flow chart:

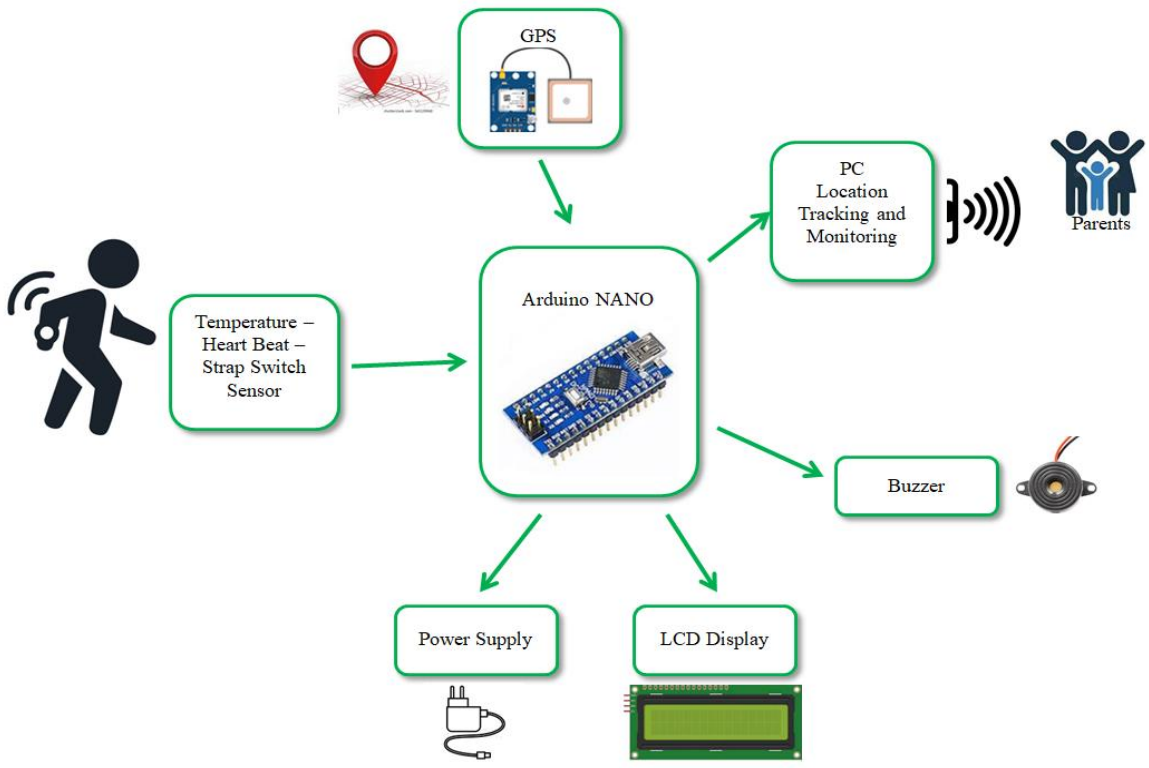


Fig. 1. Proposed Methodology

The on-going plan is an implanted application framework. Arduino is a GPS and GSM module-based tracking system. Using the Global System for Mobile Communication (GSM) and the Global Positioning System (GPS), this system is utilized for tracking and positioning any location. The process of determining the vehicle's location using its latitude and longitude is known as vehicle tracking. The allocation value is GPS coordinates. Accident Detection Alert System and Soldier Tracking System are two other applications for this vehicle tracking system. A GPS system is made up of a group of satellites and sophisticated receiver tools. GPS antenna and the U-blox NEO6M module make up the GPS module. It has UART, USB, SPI, and DDC interfaces. One serial communication UART interface is configurable in NEO-6 modules. This system's most important component is a GPS receiver. The coordinates for each second, along with the date and time, are received by this component from the satellite. The microcontroller processes the GPS receiver to obtain its latitude and longitude values. The microcontroller processes this information and sends the data to the cell phone. It gives the exact data about area. A program has been fostered that it is utilized to find the specific place of the vehicle and furthermore obvious explored track of the moving vehicle on Google map.

IV. Experimental Setup and Results

A. GPS Module

NEO-6M GPS Module with EEPROM and Antenna, thecompact receivers offer a wide range of adaptable connectivity options in addition to excellent integration capabilities. A satellite navigation system known as GPS (Global Positioning System) is used to determine an object's location on Earth. It gives data, for example, the area facilitates (scope, longitude, elevation, date, time, speed, etc. The navigation system uses the NMEA (National Marine Electronics Association) protocol for data. These satellite data are gathered by the GPS receiver. In our review we utilize U-Blox Neo-6M module (Fig. 2).

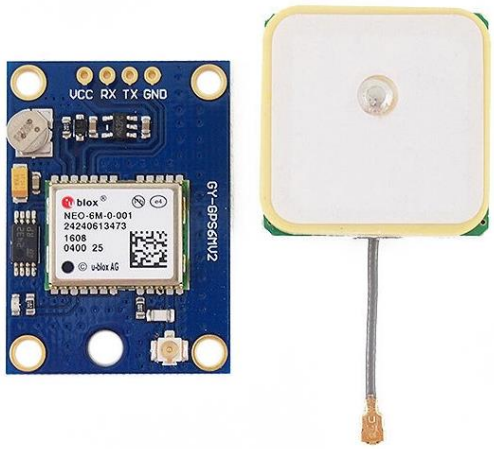


Fig. 2. GPS Neo 6m

B. The Arduino NANO

It is a compact, precise control panel made for breadboards and applications requiring a lot of space. The new ATmega328 package included in revision 05 enables the placement of all components on the board's top. Additionally, it has an internal reset button. Revision 05 uses the same pin arrangement as revision 4. The equipment framework comprises of an Information unit, Control unit, Result unit, and Power supply Arduino is a microcontroller board utilized as the cerebrum to control individual global positioning framework. It connects the GPS and GSM/GPRS modules via input and output channels. They are controlled by a software program written in C, compiled, and saved in the flash memory of the microcontroller. Arduino can detect the environmental factors by getting input signal from different sensors and can influence its current circumstance through actuators. The GPS Module is the sensor in our case.

Fig. 3. Arduino NANO

C. Dynamic Webpages

This makes it possible to provide all services in a variety of fields, like the Person Tracking System. It uses a web server and a free web hosting service. Using this SQL command, a sample PHP-scripted website is connected to a MySQL database table to store location coordinates:

```
INSERT INTO locations
(latitude,longitude,gps_date,gps_time)
VALUES
($_GET[lt],$_GET[lg],$_GET[gps_date],$_GET[gps_
time]);
```

A primary key with an auto-increment attribute, the "id" field can be used to distinguish between rows. When the person's location is entered, this is the sequence number that is automatically assigned. TCP/IP connections are used for HTTP communication. The GET approach looks like this:

```
GET /send.php? lt=24.80129&lg=46.69985&
gps_date=021118&gps_time=103201 HTTP/1.1
```

The supervisor visits the webpage whenever he needs to know where a person is located. The person's path is displayed at various time laps using the Google Maps API.

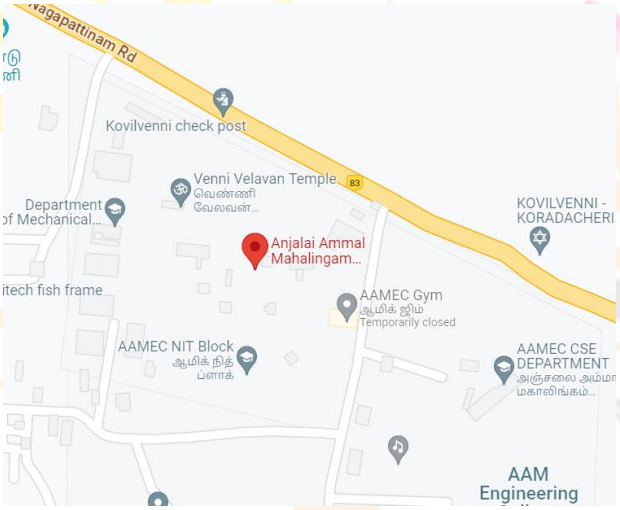


Fig. 4. Google Map

D. Temperature sensor

The typical internal heat level of an individual changes relying upon orientation, on-going movement, food and liquid utilization, season of day, and, in ladies, the phase of the period. A healthy adult's normal body temperature can range from 97.8 degrees Fahrenheit (36.5 degrees Celsius) to 99 degrees Fahrenheit (37.2 degrees Celsius).

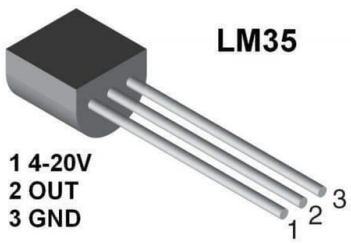


Fig. 5. LM35 Temperature Sensor

E. Heart beat sensor

A person who is at least 18 years old can have a resting heart rate anywhere from 60 to 100 beats per minute. Typically, your rate is lower the healthier or fitter you are. A competitive athlete's resting heart rate may be as low as 40 bpm. As per the Public Wellbeing Administration, UK, coming up next are ideal ordinary heartbeat rates very still, in bpm

(pulsates each moment): Newborn baby • Infants between the ages of 1 and 12 months—80 to 140 • Toddlers and young children between the ages of 2 and 6—80 to 120 • Children between the ages of 7 and 12—75 to 110 • Adults between the ages of 18 and older—60 to 100 • Adult athletes—40 to 60

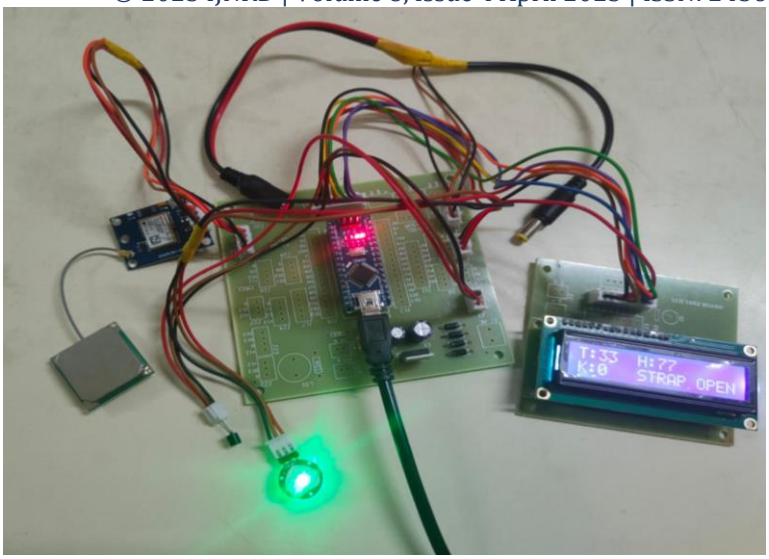
Fig. 6 Heart Beat Sensor

The micro controller is the project's core. The project is broken up into various blocks. The clamp-type sensor detects the heartbeat. The micro voltage at which the clip-type sensor generates its signal is extremely low. Up to 1.2 mV is the sensor's maximum differential signal at the R wave. As a result, the signal ought to be sent to the instrumentation amplifier for accurate amplification and higher S/N levels. The circuit's resistance determines the amplifier's appropriate gain.

F. Results

The development of a remote patient monitoring system that is dependable, effective, and simple to implement is the primary goal of this project. This system has the potential to be an essential component in the provision of essential health services to the elderly and remote population. Utilizing wireless transmission technology, this project enables the transmission of system body parameters that are sensed from a remote patient to the server PC.

GPS (Global Positioning System) and GSM (Global System for Mobile Communications) are the tools used for the tracking system in this project. Three schools were chosen to test the application on first-grade students, to determine the number of students who leave the school for a variety of reasons and to directly identify their new locations. The application of this system has demonstrated positive results in determining the precise number of children leaving the designated area for them and sending the direct notification to the child's family or school administration. Where the application was carried out in School A for the months (September, October, and November). With respect to School B, the application was executed in (December, January, and February) and it was carried out in School C in the months (Walk, April, and May). We have kept a steady decline in the quantity of understudies leaving their schools because of multiple factors. This demonstrates that the application was successful in addressing the issue of students leaving their schools for a variety of reasons.



V. CONCLUSION AND PERSPECTIVES

In this paper, we propose a person tracking system based on IoT, GPS, and Arduino technologies; one of the most widely used systems for real-time person tracking and monitoring. The system has a significant advantage because it enables on-demand monitoring of a person through a straightforward Internet connection. We are currently designing the system and testing each module separately with PYTHON for web programming and basic C programs. Our goal is to put all of the pieces together and try real experiments. The system can be made better by allowing people who are being tracked to set alerts for dangerous situations. Simply pressing a button will activate this notification. We can use and send other healthy person information, such as heart rate, temperature, and tension, collected by sensors, in addition to GPS coordinates, to increase safety. Finally, this concept is applicable to a wide range of other fields and applications.

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