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Child safety and tracking system (CSATS)

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Abstract

This paper describes a child tracking system that incorporates an ESPCAM32, GPS location, and image capture functionality. It enables parents to keep an eye on their children in real time. A lost child's information is tracked using Latitude and Longitude, as well as the child's frontal image and location via GPS, using this system. The way this process operates is by keeping the "tracking system device" in the bag or locating on the physical characteristics of that particular child, whether they are at school or out in public, and sending a message titled "/START" to the specific operating device via the telegram application that is kept inside that child's bag. In this way, the parents are given the precise location of their child, along with pictures and the longitude and latitude of that location. These details are then copied into the Google map, making it simple for the parents to access the location of their lost child.

Keywords: Arduino, Child, GPS, GSM, Track, location.

1. Introduction

Today, smart phones are the user's basic need; these smart phones provide a plethora of features that make our lives simpler and easier. This paper is about the safety of children. Child safety is a major concern around the world today, as child crime is on the rise. In this paper, we discussed how a smart phone provides safety and monitoring for parents, allowing them to easily track their children based on their needs. High precision GPS (Global positioning system) is used to implement such a system.

This system is used to track a lost child's information using Latitude and Longitude, as well as the child's front image and GPS location. This process works by keeping the "tracking system device" in the bag or locating on the physical aspects of that specific child, who is going to school or outside the world, and sending a message named "/START" to the specific operating device via the telegram app that is kept inside that child's bag. In this manner, the parents receive the exact location of their child, as well as images and the longitude and latitude of that location, which are then copied into the Google map and the location of that lost child can be easily accessed.

2. Related Work

Kaushik Gupta et al [1] developed a system that allows parents to track their children when they are out of sight. This is accomplished through the use of a hidden WFPS-enabled device worn by the child and connected to the parents' smartphone via a mobile network. This Child Monitoring system allows you to monitor or track your child's activities from anywhere in the world. This system's notable features include geo-fencing, a discrete panic button, a long battery life, and real-time tracking.

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An application that helps send SOS messages for the elderly was created by Netravati et al [2]. This application sends all the data from the child's phone to the server and from the server to the parent's phone when the SOS button is manually pressed. The parent portion of this app allows parents to view all of their children's activities, while the child portion only allows children to view a website while information is being fetched in the background secretly.

Poonkuzhlai, P et al [3] described the development and implementation of a mobile IOT-based health and safety monitoring system for kids that uses a sensor-embedded health monitoring device for protection and emergency services. This system is used to continuously monitor the child's parameters as well as their location for safety purposes.

N. Manjunatha et al [4] created a device that can be tracked using GPS locations, as well as a panic button on the device that alerts the parent via GSM module, calling for help. To control and constantly monitor the device, the parental android app was developed. The parental phone, which can receive and make calls as well as send and receive SMS on the smart device via GSM module, is always connected to the device. Wireless technology is also integrated into the device, making it possible to bind it to an area within monitoring range. If the device leaves the monitoring range, an alert will be sent to the binding device, allowing you to keep a virtual eye on the child. health monitoring system for mobile devices The parental app allows for tracking of parameters like temperature and heart rate/pulse rate checks. The gadget also monitors whether it is plugged in or not using a contact switch and notifies the parent if it is unplugged.

M Nandini et al [5] created a system using a The temperature, heartbeat, touch, GPS, GSM, and digital camera modules were all interfaced with the LinkIt ONE board, which was programmed in embedded C. The system automatically sends an SMS alert to the parent or carer and an MMS containing an image taken by the serial camera when the child needs help right away.

Senthamilarasi et al [6] used a Front-end user interfaces include a web application and a mobile app, a cloud and database for storing and retrieving data, and a monitoring device.

Dhanalakshmi. M et al [7] created the system Child Tracking Device, which makes it simple for parents to monitor the whereabouts of their kids. This gadget uses SMS-based engineering. In order to find out the latitude and longitude of their child's location, parents do not need to send any special codes to the device. By pressing the key, they can receive the SMS. There are two ways for a child to alert their parents and neighbours if they feel unsafe. The buzzer is turned on and an SMS alert is sent to the parents' or guardians' phone.

Atul Ahire et al [8] described an Android application that has features for tracking children, including GPS tracking of their exact location. GSM will be used for network services as well as internet access. Arduino will also be used as a microcontroller in the child's module to sense and control objects.

A.Saranya et al [9] created a wireless network-based Automatic Child Monitoring (ACM) system. The software hand function and the danger zone function are both implemented by ACM. By utilising GPS sensors, acceleration sensors, and mobile GIS (Geographic Information System), the software hand function can keep an eye on the child's routine activities, and the safety zone function can instantly alert parents to the child's location.

A. Gupta et al [10] proposed a model for child safety using smart phones that allows parents to track their children's locations and allows children to send a quick message and their current location via Short Message services in case of an emergency. Testing on the Android platform validates the proposed system.

3. Proposed System

Figure 1 depicts a use-case diagram of the system, which shows the connection between the child and the parent/guardians. At first, the device will be with the child. Which reads the child's location. The used telegram application connects the child and parent, whereas GPS will only connect to the child's device. The image and L&L of the child's location will be continuously received until we send the message /STOP from the Telegram application.

Figure 2 shows a level -1 block diagram of how the ESP32-CAM and GPS are connected to the phone. Installing the Telegram app on the phone will enable us to connect the ESP32-CAM and GPS using a code. The parent telegram application can receive the GPS coordinates and the image taken by the ESP32-CAM.

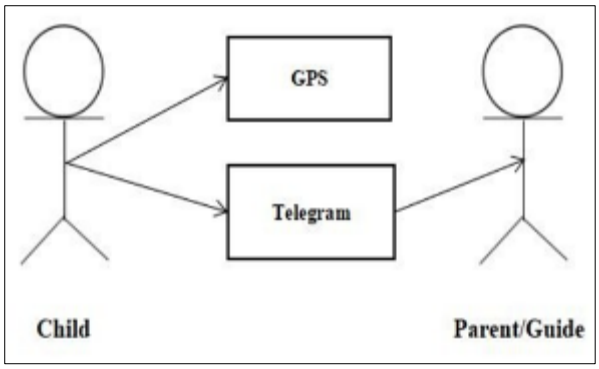

Figure 1 Use- case Diagram of system shows connection between child and parent/guardians

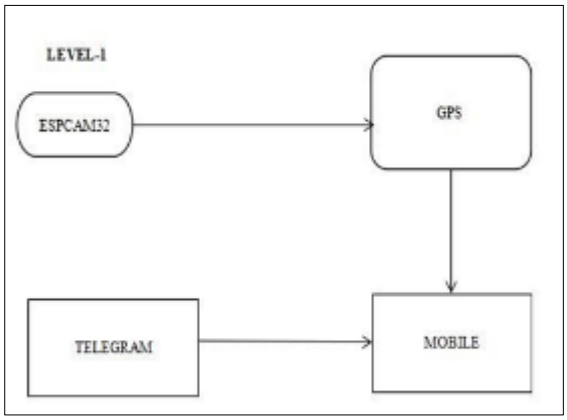

Figure 2 Connection between ESP 32 cam to GPS and ESP 32 cam to Telegram app

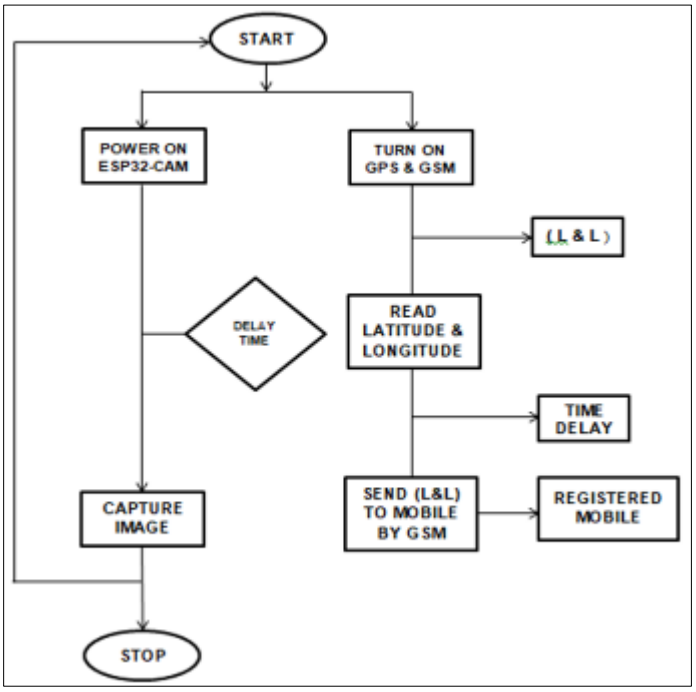

Figure 3 Flow Diagram of the Proposed System

The flow chart of the proposed system is shown in Figure 3. In this system, we send the telegram application's message /START to the device.

GPS and ESPCAM32 are enabled. After some time, the device's GPS reads and sends the longitude and latitude of the child's location to the mobile phone via the GSM module. The GSM module receives information about that Child's longitude and latitude; this message is then sent to the registered mobile in order to track that Child's location. At the same time, the image captured by the ESPCAM32 will be sent to a parent's registered Telegram app.

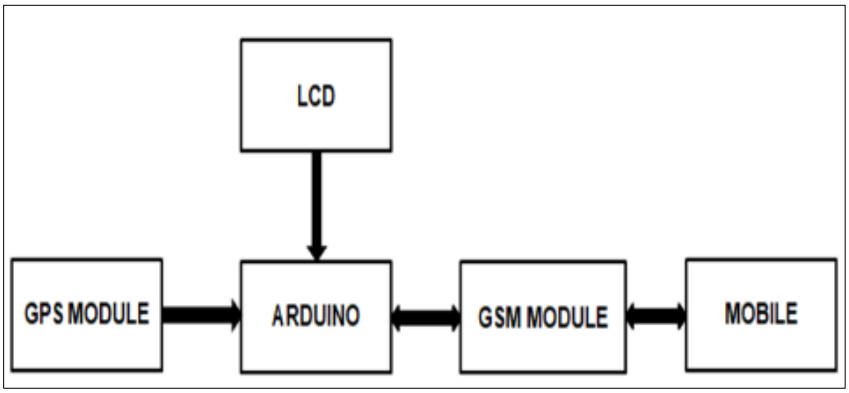

Figure 4 Block Diagram of the Proposed System

The above block diagram depicts the operation of the CSATS device, which is shown in fig 4. In the block diagram, the arduino or espcam-32 is linked to the GPS and GSM modules. It is also linked to the espcam-32's LCD, which serves as a display for the location's latitude and longitude(L&L). A mobile block connected to these blocks is also used for a Telegram application that receives the position (L&L) and photographs taken by the espcam32.

4. Results and discussion

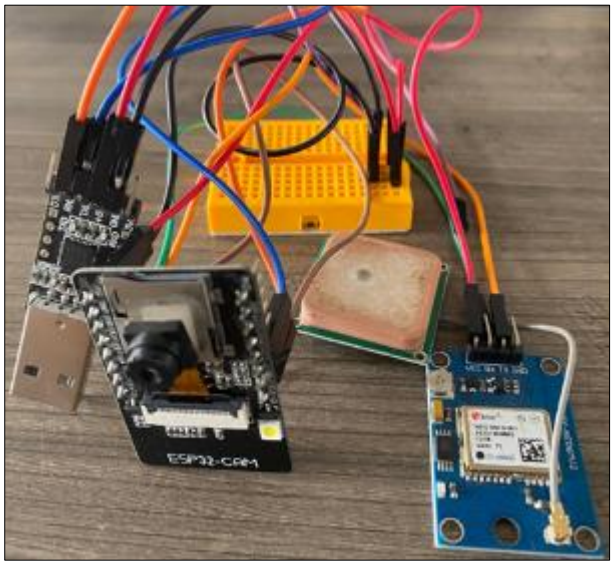

Figure 5 Working Module

The project model is depicted in the figure above. This project model is made up of breadboard connections, jumper wires, an espcam-32, a GPS and GSM module, and USB TTL. The Espcam-32 is a fully functional microcontroller with a camera built in. GPS and GSM modules both have processors and antennas that receive data directly from satellites over a specific RF frequency. To connect mobile devices, an electronic chip or circuit known as a GSM module is used. USB TTL: A number of USB to serial converter cables are available to connect USB and serial UART interfaces. Jumper wires and bread boards are used to connect hardware components.

5. Conclusion

Based on the information that is currently available, GPS and GSM-based child safety and tracking systems can provide a significant level of protection and safety for children. These devices use GPS and GSM technology to track the location of the child and alert the parent or guardian if the child leaves a predetermined area or is in danger. The ability to locate their child at any time provides parents and guardians with peace of mind, which is one of these systems' main benefits. These devices can help prevent kidnappings and other dangerous situations by immediately alerting parents or authorities if a child is in danger.

It is important to remember that the use of GPS and GSM modules in child safety and tracking systems has limitations. Because they rely on network coverage, these technologies may not work well in areas with low signal strength. In other cases, such as when the child is inside or in areas with poor GPS coverage, they may be unable to provide real-time tracking data. Despite these disadvantages, child safety and tracking systems that use GPS and GSM modules may be useful tools for ensuring children's safety and security. The incorporation of GPS and GSM technologies in these devices can provide additional security for parents and guardians while also assisting in the avoidance of potentially hazardous situations.

Compliance with ethical standards

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Disclosure of conflict of interest

To the best of our knowledge, the named authors have no conflict of interest in any form.

References

[1] Kaushik Gupta, Mahima Sukal and Viral Sonavadia, “Child Monitoring System – Tagsy”, International Research Journal of Modernization in Engineering Technology and Science, Volume:04/Issue:04/April-2022.

[2] Netravati and R. Savita, “Child Monitoring System Using Android Application”, International Journal Of Creative Research Thoughts – IJCRT, Volume 9, Issue 5 May 2021.

[3] Poonkuzhlai, P., R. Aarthi, and Yaazhini VM. "Child monitoring and safety system using WSN and IoT technology." Annals of the Romanian Society for Cell Biology (2021): 10839-10847.

[4] N. Manjunatha , H. M. Jayashree , N. Komal , K. Nayana, “IoT Based Smart Gadget for Child Safety and Tracking”, International Journal of Research in Engineering, Science and Management, Volume-3, Issue-6, June-2020.

[5] M Nandini, Priyanka, S Murugan, K N H Srinivas, T D S Sarveswararao, E Kusuma Kumari. “Smart IOT Device for Child Safety and Tracking”, International Journal of Innovative Technology and Exploring Engineering (IJITEE) ISSN: 2278-3075, Volume-8 Issue-8 June, 2019.

[6] Senthamilarasi, N. & Bharathi, N. & Ezhilarasi, D. & Sangavi, R.B.. (2019). Child Safety Monitoring System Based on IoT. Journal of Physics: Conference Series. 1362. 012012. 10.1088/1742-6596/1362/1/012012.

[7] Dhanalakshmi. M, Hemamalini. S, Divya. M and Sivalingam. T, “Child Tracking Device”, International Journal of Engineering Research & Technology (IJERT), ISSN: 2278-0181, RTICCT - 2018 Conference Proceedings.

[8] Atul Ahire, Pooja Domb, Mithilesh More, Pushkar Pednekar and Anushree Deshmukh, “Child Tracking System Using Arduino & GPS-GSM Kit”, International Journal on Recent and Innovation Trends in Computing and Communication ISSN: 2321-8169, Volume: 6 Issue: 4,April 2018.

[9] A.Saranya, C.Venkatesh, S.Selva kumar, “Design And Implementation Of Automatic Child Monitoring (Acm) System Using Wireless Network”, IJCSMC, Vol. 5, Issue. 4, April 2016, pg.356 – 363.

[10] Gupta and V. Harit, "Child Safety & Tracking Management System by Using GPS, Geo-Fencing & Android Application: An Analysis," 2016 Second International Conference on Computational Intelligence & Communication Technology (CICT), Ghaziabad, India, 2016, pp. 683-686, doi: 10.1109/CICT.2016.141.