

CHILD MONITORING SYSTEM - TAGSY

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ABSTRACT

Everything in today's world is based on technology and we should be able to combat any problem with appropriate IT solutions in context. This project proposes a smart IoT Based device that can help reduce parents' insecurity with regards to their children's whereabouts in real-time. The project aims to create a system that allows the parents to keep a track of their children when they are out of their sight. This is done using a concealed WFPS-enabled device worn by the child which is connected to the parents' smartphone using a mobile network. This Child Monitoring system helps monitor or track the child and their activities from anywhere in the world. This system plays an important role. It tracks whether the children are safe. Some prominent features of this system are Geo-fencing, Discrete Panic Button, Long battery life, Real-Time Tracking.

Keywords: Raspberry Pi, Wi-Fi Positioning System, Internet Of Things, Real Time Tracking.

I. INTRODUCTION

It is observed that more families are now spending time on work and social duties, resulting in a lack of interaction with their children. This causes increased concerns towards their safety and whereabouts which has made keeping a track of their activities quite challenging. Also, crimes against children are increasing rapidly around the world. According to a study, roughly 60,000 children go missing in India every year [1]. There is an assumption that every 10 minutes, a child goes missing. Cities like Mumbai and Delhi have the highest rate when compared to other metro cities. With the lack of availability of affordable child monitoring systems, it is hard to monitor the whereabouts of children. The safety of children is very critical since they cannot protect themselves. A momentary lack of parental supervision should be combated with an appropriate IT solution in context. Therefore, the proposed system must alert the parents when the child walks too far away and/or outside the "circle of safety" in their absence.

The solutions that are available in the market today are not able to address all the issues in one device. There are a few ways that the existing solutions work. First, with the use of a smartphone. This method might seem handy, but providing a young child with a smartphone in hand is not an ideal case, counter to the monetary investment for the phone, and the additional responsibility that the child has to take to handle and take care of the phone. This makes it a less feasible solution. The other way is via smartwatches that a child wears on the wrist. This may seem like an ideal solution, but the problem with this arises when the kidnapper is aware of such a device, and immediately removes the device from the child's wrist and destroys it. With the proposed solution, we make a discreet-looking device that doesn't look like a tracking device but is always with the child. Because of the way it looks, it does not distract the child, and with its small size, it can be easily attached to any part of the child's clothing.

II. PROBLEM STATEMENT

More families are now spending time on work and social duties, hence away from their children. This causes increased concerns towards their safety and whereabouts, and has made keeping a track of their activities quite challenging. Crimes against children are increasing Year on Year. According to a study, roughly 60,000 children go missing in India every year [1]. There is an assumption that every 10 minutes, a child goes missing. Mumbai and Delhi have the highest rate when compared to other metro cities. With the lack of availability of affordable child monitoring systems it is hard to monitor the whereabouts of Children [2]. Safety of children is very critical since children cannot protect themselves. A momentary lack in parental supervision should be combated with an appropriate IT solution in context.

Therefore, it is necessary for the proposed system to alert the parents when the child walks too far away and/or outside the "circle of safety" when they are away.

In case of an emergency, or in a situation of panic, the child must be able to communicate with their parents. This can be done via live transmission of audio from the device with the child, to the parent's device.

If in case the child does go missing or has a fall, the aid of technology can increase efficiency and decrease the time necessary to locate and reach the child.

III. PURPOSE, SCOPE AND APPLICABILITY

Purpose

When a violation of child safety is identified, a certain sensor in the child module will emit a signal, which is the main function of the suggested child tracking system. These sensors and WFPS will send this signal to the microcontroller, which will then send it to the transmitter, which will then send it to the parent module. The decision will be made by the parent module, and the violation handling procedure will begin. The kid tracking system's functionality necessitates hardware between the child and parent models, which comprises a drive circuit for the sensors' activation.

Scope

This project is developed for parents to keep track of their child's whereabouts. Nowadays, children are easily influenced by their friends, and might even get cheated or kidnapped by any stranger. By this system, it is comparatively easier to keep a track of a child's current location [3]. The Web application will deal with the Android platform and is utilized for GPS following between the device and parents phone. The Web application is mindful to keep track of the location of the device.

The edit access for the child profile is given to the parents themselves, along with their account. The Web application will include the route history trace where the parent tracks the route their child traversed during a particular period. The Web application in the device will update the location of the child at an interval of 30 min, 1 hour, and 2 hours. Parents can select the interval time to view the current location of the child. They also can make calls from the Web application to the particular school if any inconvenience happens when the location is not found or tracked. Nowadays, crime rates are increasing day by day, especially kidnapping children. Moreover, it is not possible for parents to always stay beside them due to the rising culture of working parents. In such a case, the proposed system can reduce the number of child missing cases. This system provides a tracking solution for the parent to keep tracking their child's location outdoors by using GPS as it allows them to determine the exact location of the child. It, therefore, helps to minimize this tragedy to reoccur in the future.

Applicability

Parenting is a difficult profession, with responsibilities that appear to shift on a daily basis. As your child grows older, the daily tasks and roles you play as a parent are bound to change. However, there is one responsibility that should never be overlooked: keeping track of your child's interactions with the environment around him or her. Parents must be mindful of their children's activities and interactions at all stages of their development. You are the link between your child and the outside world as a parent. According to research, keeping an eye on your child's activities is a crucial method to reduce the odds of him or her being engaged in situations you don't approve of, particularly those that can be hazardous. Not only does your involvement show your child that you care about them, but it also shows them that you care about and his activities are beneficial, it also allows you to notice changes in your child that may suggest a problem. It is extremely important to keep track of who is in your child's life in order to safeguard them from damage or abuse.

IV. FEATURES

Real Time Tracking

Tracking system is used so that the child's location and activities can be tracked and reported to the parent's device. We have used WFPS which means Wi-Fi Positioning System. It means it does not connect to the internet but takes the signal of the networks around it. It triangulates the signals of the network and shows us the location of the child with latitude and longitude.

Safe Zone Alerts

In this function the parents can mark the safe zone for their children. For example if the child is going to school, the school is the safe zone as he would be in the school premises with guided people so the parent can mark the school as the safe zone. And as the child leaves the school or tries to leave the school premises the parent would be notified on their webapp that their child has left the premises. The parent can add multiple safe zones.

Discrete Panic Button

The button is discrete which means it has no marking. So if any random person tries to fiddle with the device thinking of that as a power off button. He would click the button and an Alert email would be sent to the parent email. The mail would contain the latitude, longitude of the child location, date and time. The child can press the device if he panics. The notification would be multilingual; it would be in Hindi, English and Marathi.

Location History

The location history will help to track the child's activity so that the aren't will be updated. Location history will be there for 30 days. For example if the child's gets missing with the help of location history the aren't can track down their child's activity and also can find their child.

Long Battery Life

This feature is one of the important features as battery life should be long lasting. For example, if the child or parent forgets to charge the device for a whole one day then also the device will work. That's why we aim to make this device last the whole day with one charge.

V. HARDWARE AND SOFTWARE REQUIRMENTS

Software Requirements

The React JS: We are using react js as front end for our project.

Node JS For the back end we are using node js.

Python To program the Raspberry pi we are using python

Hardware Requirements [4]

Raspberry Pi:

Push Button:

Battery:

VI. SYSTEM DESIGN AND ARCHITECTURE

Layout

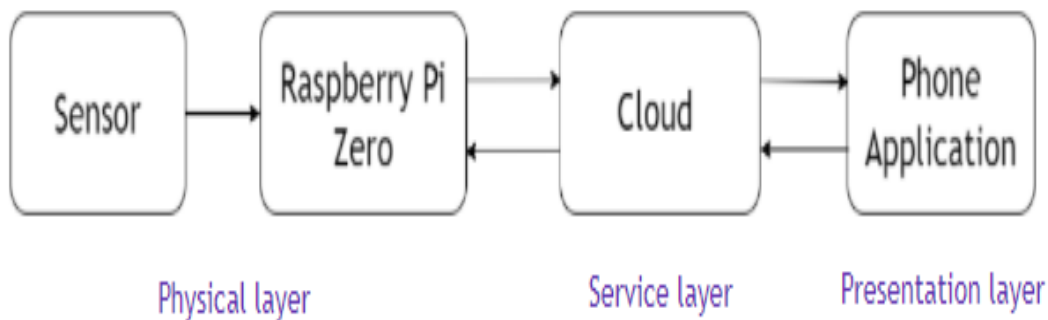


Figure 1: Layout of the Child Monitoring System [5]

Physical Layer consists of the sensors and the Raspberry Pi Zero. In the device the sensor is Geolocation. And the main hardware device is Raspberry Pi zero. Sensors will send the location to raspberry pi zero. The connection between them is one way.

The Second Layer is the service layer. In the service layer we have cloud and in cloud we will be having all the storage of the application. This is a two way connection. Location history will be stored in the cloud.

The last Layer is the presentation layer. The web application is in this layer. This application will be used by the Parents. All the notification and location will be there in this application.

Architecture Design

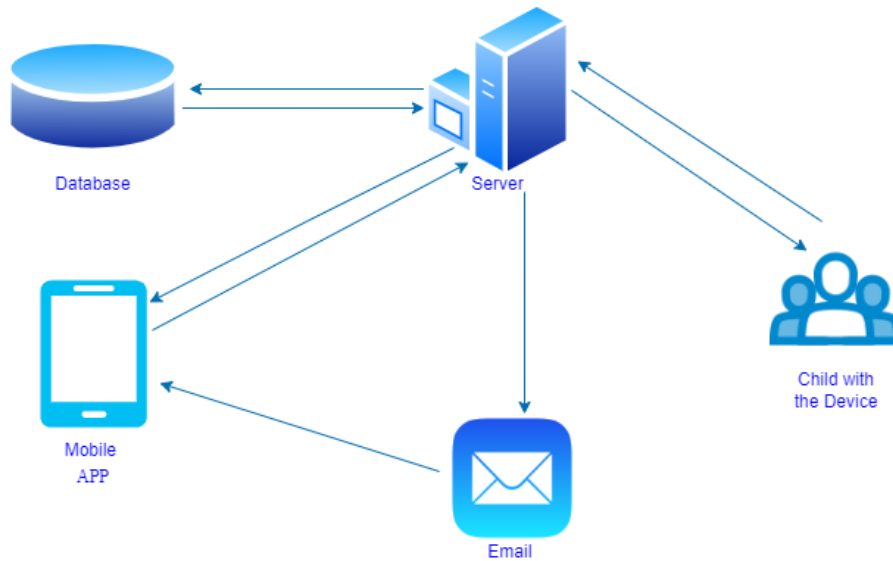


Figure 2: Architecture Design of the Child Monitoring System

Prototype Image

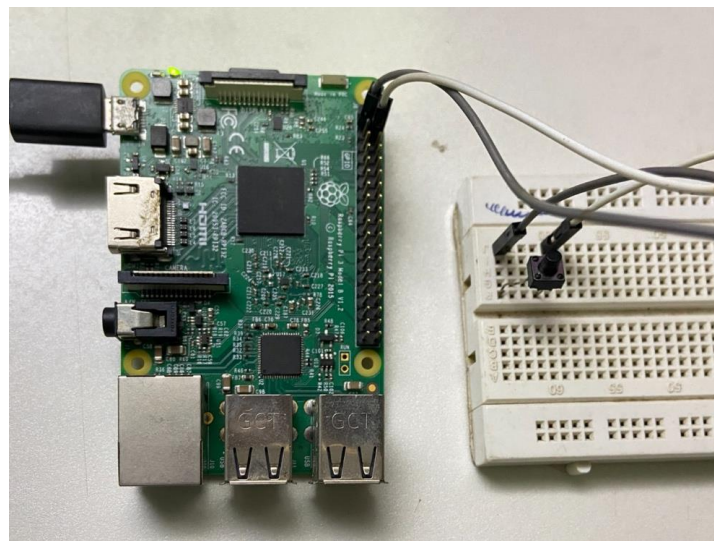


Figure 3: First Prototype of Tagsy - Child Monitoring System

VII. SCOPE

Nowadays, crime rates, particularly kidnappings of children, are on the rise. Furthermore, it is not always feasible to be there with them because most parents must work to support their families. The suggested approach has the potential to minimize the number of child missing instances. This system provides a tracking tool for parents to track their child's whereabouts outside utilizing WFPS, allowing them to know the exact location of the youngster. Furthermore, contribute to preventing this tragedy from recurring in the future.

A few scopes have been presented as a reference to fulfil project objectives to ensure the project runs successfully. The following are some of the scopes that will be discussed:

User Scope

This project was created to help parents keep track of their children's whereabouts. Children are more readily influenced by their peers these days, and they may be duped or abducted by strangers. This method may be developed to track a child's current position.

System Scope

The application will deal with the device and the parent's web app and is mindful to keep track of the location of the device. The child's account can also be edited by parents. The programme will have a route history trace,

which will show the parent the path their child took over a period of time. After a specific period, the Web application on the device will update the location of the kid to the application. By pushing the distinct button that has been introduced, parents may even take action if their kid is unstable or in an inappropriate area. WFPS, a WIFI positioning system that doesn't connect to the internet but connects to Wi-Fi access points, will be used to track the child's whereabouts. As a result, the position of the child is shown on the parents' web app

VIII. CONCLUSION

Through this device, the parent can track and monitor their child with just a simple app and one hardware device which will be with the child. It is not possible to always stay beside children as most of the parents need to go for work. With this project, parents can track the location of their children and get alerts whenever the child is in danger. It becomes easy for parents to look after their child while working. This device is efficient to use. Thus by keeping in mind the advantages and applications we are developing a child monitoring device. In order to avoid kidnapping cases, the child monitoring system is needed. [6]

IX. REFERENCES

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