

Real Time Child Locating System Using ARM-7 with GPS and GSM Technology

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Abstract- Many cases of missing children between 14 and 17 years are reported and a higher possibility of the kidnapers. This work aims to focus on these cases where the children are kidnapped. This work includes a child module and school module. Once the child is reached to school campus a message will be sent from school module to the parent. We have introduced a sensor to detect the child voice. A microcontroller ARM-7 (LPC2148) is used with a Global system for mobile communication and Global positioning system module. This helps to track and find the child movements.

Keywords: ARM7 microcontroller (lpc 2148), Global System for Mobile Communication (GSM), Global Positioning System (GPS), RFID reader, voice recognition module, Atmega328 microcontroller.

INTRODUCTION

Child tracking system is totally remote phone tracking based on android application. It remotely track the location of child and alert the parents if their child is moving outside of define area through SMS. Because of this parents will have a powerful tool to keep the observation on their child even when they can't physically see them. Following techniques are used to track child activities.

SMS tracking- To alert the parents when child is in trouble by child voice and if he/she moved away from define area.

GPS tracking- To provide current location of child to parents and also define the area.

Browser Tracking - Monitor all web browser activity on the target phone.

Call tracking/blocking- Parents can track and block Call from particular number if necessary, in case of cell phone tracking system.

OVERVIEW OF SURVEY

J.Saranya et.al.[1], proposed the system that includes a child module and two receiver modules. The child module includes ARM7 microcontroller (lpc 2378),GPS,GSM, Voice playback circuit and the receiver module includes Android mobile device in parent's hand and the other as monitoring database in control room of the school.

Rohit N. Bhoi et.al.[2], proposed the system that includes a child module which have GPS, GSM, and ARM7 and voice playback circuit and parent module which includes mobile

phone (which supports internet connectivity) for getting the information about the missed child on periodical basis.If child is crying then alert message will be send to parents. Loganathan.M. et.al.[3] proposed the system that includes a geo fencing campus, a child module and a parent module. The geo fencing campus is to find the location and to track the child movements. Once the child is out of the campus a message will be sent from the child module to the parent module which alerts the receiver.

Rita H. Pawade, et.al. [4], proposed the system that includes a two sides out of them one is parent module and another is the child module. The child module consists of ARM7microcontroller (LPC 2148), GPS, GSM and voice chip where the parent module consists of android mobile phone. This work gives the information about missing child from school campus. There are two android mobile phones for the safety of the both module. The system tracks the child from source to destination i.e. from home to school or anywhere.

P. SANTHA RAJ, et.al. [5], proposed the system that includes a child module and two receiver modules for getting the information about the missed child on periodical basis. The child module includes ARM7 microcontroller (lpc 2378),GPS, GSM,Voice playback circuit and the receiver module includes android mobile device in parent's hand and the other as monitoring database in control room of the school.

PROPOSED SYSTEM-

The proposed system includes two modules viz. Child module and school module.

3.1 Child module-

The child module acts as a transmitter which includes , ARM7 microcontroller (lpc 2148),GSM module, GPS module and Voice recognition module.Child module is fixed to each and every child. Following figure 1 shows the block diagram of child module.

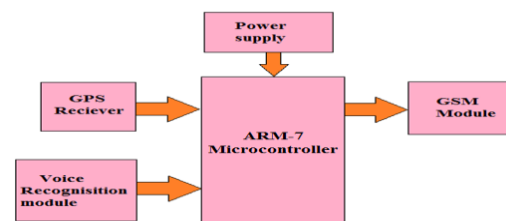


Fig.1 Block diagram of Child Module

The position of the moving child is tracked by GPS and is sent to atmega328 microcontroller. This Controller forwards the GPS data (latitude and longitude) to GSM board. GSM will in turn send the position of the moving child to receivers. Firstly clip of short duration of voice of child is saved which is treated as reference. When the child repeated their voice, voice recognition module is triggered atmega328 microcontroller and intimation about corresponding child is given through text message to their parents. Whenever switch is pressed GPS data will be sent to the parents by using GSM. An app is also included in the parent mobile to locate the GPS location values on the GMAP.

3.2 School module-

School module also act as a transmitter which includes atmega328,Global positioning system (GPS), Global system for mobile communication (GSM),LCD display ,RFID reader. The following figure 2 shows the block diagram of school module.

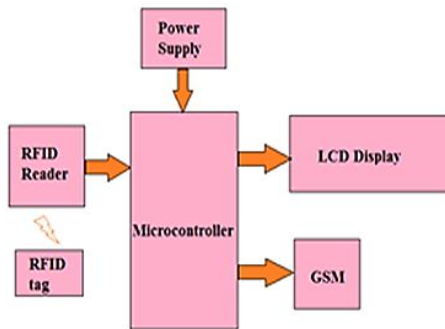


Fig.2. Block Diagram of School Module

When the power supply is switched on, the system is started. When student enter/exit to the school, RFID reader scans a smart card of child. In smart card RFID tag is inserted. RFID reader catch the frequency of the card and sends data to the microcontroller. Microcontroller compares the data with stored database. If card is match then the card is valid and display message on LCD display about student present/exit the school. If card is not match then the card is invalid and display invalid message on LCD display. Receiver section contains android mobile phone to parents. SMS is send to the parents number about child reached/exit the school.

4 METHODOLOGY-

4.1Children Tracking-

In children tracking system every child is given one small module contained GSM,voice recognition module and GPS using this parents can get detail information about the child. This system provides GPS location of the child so that parents can track the location of the child. Algorithm for this method is given below-

4.1.1 Algorithm for child module-

- Step 1- Start the system
- Step 2- Check all the IO devices and sensor status.
- Step 3- Stored the voice of the child in voice recognition module.
- Step 4- In child module voice recognition module is wait for the input.
- Step 5- When child is in trouble, child repeated the voice and voice of child is sense by voice recognition module.
- Step 6- Voice recognition module compares the previously stored voice with current voice of child.
- Step 7- If match the previously stored voice and current voice, then location of child is tracked by GPS and sent to the microcontroller.
- Step 8- Microcontroller forwards GPS data to GSM board.
- Step 9- sends child current location SMS to parents.
- Step 10-If child press the emergency button, then child current location is send to the parents.
- Step 11-Stop.

4.1.2 Flowchart for child module-

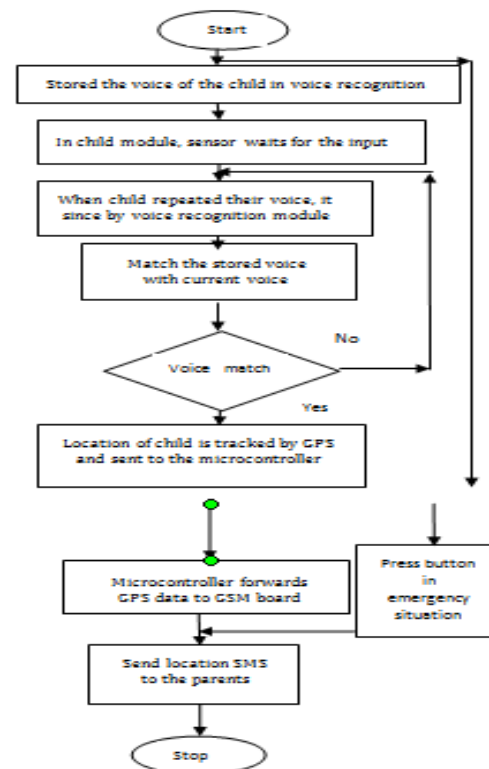


Fig .3.Flowchart for child module

4.2 Student entry/exit SMS module-

When student enter/ exit to the school, RFID reader scans a smart card of a child which has inbuilt RFID tag. RFID reader catch the frequency of the card and sends data to the microcontroller. Microcontroller compares the data with stored database. Receiver section has an android mobile phone towards the parents and accordingly SMS is send as per the status of child to the parents number about child reached/exit to the school.

4.2.1 Algorithm for school module-

Step 1- Start the system

Step 2- Check all the IO devices and sensor status.

Step3-When student enter /exit the school, RFID reader scans a smart card of child.

Step4-RFID reader catch the frequency of the card and sends data to the microcontroller.

Step5-Microcontroller compares the data with stored database. If card is match then the card is valid and display message on LCD about student reached /exit to the school.

Step6-SMS is send to the parents number about child reached /exit to the school.

Step7- If card is not match then the card is invalid and display invalid message on LCD.

Step8- Stop

4.2.2 Flowchart for school module-

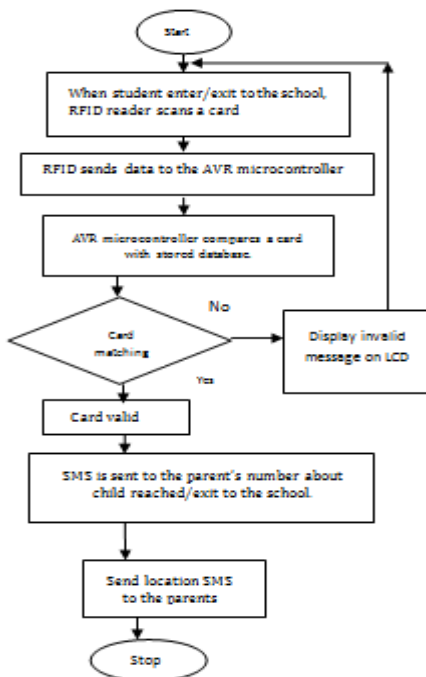


Fig.4.Flowchart for school module

5 RESULT AND DISCUSSIONS-

This work is divided into two parts. The experimentation is carried out on school module and child module. The detail of results is discuss as below.

5.1 Experimentation on school module-

Every student enter in school has an unique RFID card. When student enter in to the school, RFID reader scans a smart card of child. The smart card contains information about child. The information of the particular student is match according to algorithm with the stored database. According to the validity, the information about child is send to the parents. The card is match then the card is valid and display message on LCD display about student present in school. Figure5 shows the school module status at entry time



Fig.5. school module status at entry time.

Receiver section has an mobile phone to parents. SMS is sent to the parents number about child reached the school.

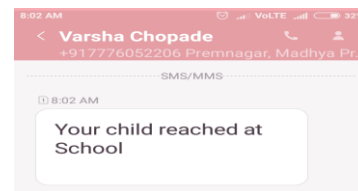


Fig.6. SMS after reached the school

The card is not match then the card is invalid and display invalid message on LCD display.



Fig.7. School module status when card is invalid.

When student exit the school, RFID reader scans a smart card of child. If card is match then the card is valid and display message on LCD about student exit the school. Figure 8 shows the School module status at exit time.



Fig.8. school module status at exit time.

SMS is send to the parents number about child exit the school.



Fig.9.SMS after exit the school.

5.2 Experimentation on Child Module-

Experimentation in this module is carried out on various 10 persons which are located at different locations. Accordingly, the database is created and store in microcontroller system. These 10 cases includes 5 samples of school boy(below 10 years) and 5 samples of school boy(between 10 to 20 years). The location for this experimentation is chosen in periphery of 10Km.Table no 6 shows the result of experimentation includes SMS send to their parents in which child location is available. Following table no. 1 shows the result of SMS send to their parents including their child location.

5.2.1 School boy(below 10 years)-

Table 1-SMS send to their parents including their child location.

S. N	User ID	GPS Location	Verified GPS Location(SMS)
1	1	Nath Mandir, Nhavi	
2	2	Durga Devi Temple, Nhavi	

3	3	J.T.M. College of engineering, faizpur	
4	4	D.N. College, Faizpur.	
5	5	Khanderao wadhi Temple, Faizpur	

Table 2- shows the school boy (below 10 years) location at different places in GMAP-

S.N	User ID	GPS Location	Verified GPS Location(Map view)
1	1	Nath Mandir, Nhavi	
2	2	Durga Devi Temple, Nhavi	
2	2	J.T.Mahajan college of engineering, faizpur	

4	4	D.N. College, Faizpur.	
5	5	Khanderao Wadhi Temple, Faizpur	

5	5	J.T.M. College of engineering, faizpur	
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Table 4- shows the school boy (between 10 to 20 years) location at different places in GMAP-

5.2.2 School boy(between 10 to 20 years)-

Table 3- SMS send to their parents including their child location -

S N	Use r ID	GPS Location	Verified Location(SMS)	GPS
1	1	Khanderao Wadhi Temple, Faizpur		
2	2	Nath Mandir, Nhavi		
3	3	Durga Devi Temple, Nhavi		
4	4	D.N. College, Faizpur.		

S. N	Use r ID	GPS Location	Verified GPS Location(Map view)
1	1	Khanderao Temple, Faizpur	
2	2	D.N. College, Faizpur.	
3	3	Durga Devi Temple, Nhavi	
4	4	Nath Mandir, Nhavi	
5	5	J.T.Mahajan college of engineering, faizpur	

6 CONCLUSIONS-

This work focuses on tracking a child's position along with its location which will be sent to their parent's. Here, the recording of child voice which is already stored as dataset is matches with the voice of the child in school and accordingly the text message about child reached/exit school along with their location is sent to their parents. By using longitude and latitude values, the location of a child can be traced in the parent's mobile. In future it can be extended to perform the same for all children in the school by reducing the size of the child module. It can be also extended by interfacing a camera to the child module and intimating the missing child or child cry information both to the parents mobile and to the police control room.

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