

A Smart City Approach for Child Tracking With Video Streaming

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ABSTRACT: In everyday's morning newspaper the child kidnapped, the child was locked in school bus, the child was dropped at the wrong bus stop or due to school bus drivers mistake many students lost their lives, every parents read this news and worry about their child safety while going to school and coming from school in school bus. This paper focuses on strong child tracking system to avoid the above incidents with affordable cost. Though the existing system are not robust enough to prevent crime against children as they give information about the child location, the child crying sound or the SMS when child is picked or dropped from school bus. But any parent is not satisfied that his child is safe, till they doesn't see their child with their own eyes. The proposed system includes the transmitter module and the receiver module. The transmitter module includes the Beagle Bone Black development board, USB Camera, Global positioning System (GPS), Power hub and Router with modem. The Receiver module is the Android mobile in parent's hand. The implementation results for proposed system are provided in this paper.

KEYWORDS: Video streaming, child tracking, Black Beagle Bone, GPS, School bus etc.

I. INTRODUCTION

[1] Child tracking system is widely used all over the world for tracking the each and every movement of their child while going to and coming from school in school bus. The Schools are providing the facilities for child safety and assuring their parents that their child is happy in school atmosphere without crying. But the crime level is increased at extreme level and according to that the security technologies must be improvised. Today both mother and father are working but the child responsibility of boarding him in school bus and picking him back to home need to be followed. In case bus is arriving late parents need to wait for long and if the bus is arrived early he need to rush for school bus. While picking him back to home if the school bus dropped the child on bus stop before the timing than there is fear of above suspicious incidents to take place. Than when the child is travelling in bus is he safely boarded the right bus?, is he sitting with safety in school bus?, is someone teasing him in school bus?, is the driver driving the bus safely? Parents worry about such questions for their child.

The System developed here uses the "Video streaming technique"[2] which answers the all above questions and also inspired me to implement this system for child safety, as the parents are able to see their child in real time video with one click on their smart android mobile. The systems implemented before made use of Global positioning system (GPS) [2] for tracking the child location details or the school bus location transfer to the GSM module, Global System module (GSM) is used for the mobile communication or to receive the location details through SMS. This communication is not that effective as any person does not read the SMS regularly so this can be ignored, radio frequency identification detector (RFID) was attached to the I card of each child and sensors were at the school bus door will detect the child arrival in school bus or getting down from the school bus. This detected data will be match to the stored database and the child arrival and getting down from school bus[3] details will be send to the school server and also to his parents, the voice tracker system was used for tracking if the child is crying. If the child is out of this sensors range than the details will be send to parents through SMS, this shows that the system is not that effective for providing the strong child safety. As it is said that the technologies are made for man, than this designed system will

really bring the change towards the smart city approach and will also prove as the reliable and effective system for child safety

II. RELATED WORK

Crime against children is increasing and every parent is requesting the respective school for the security to their child while travelling from school to home and visa versa in school bus. The system was developed using the android terminal .The proposed system includes one child module and two receiver module to track the missing child. The child module includes [4]ARM7 microcontroller (lpc2378), Global positioning system (GPS) Global system (GSM) for mobile communication. The voice playback circuit and receiver module include android device which is in parent hand and the other as monitor database in control room at school. The child module is fixed to each and every child and the GPS is used to track the moving child position and send to controller. The GPS send the lat & long values to GSM module and this will send the location details to the two receivers. When the child will cry the voice playback circuit will trigger the ARM 7 microcontroller and intimate about the child details to parents.[5] The android application is created using the eclipse software. The code is written in Embedded C using IAR embedded work bench. The project analysis and implementation results are proposed in this paper.

III. SYSTEM DESIGN

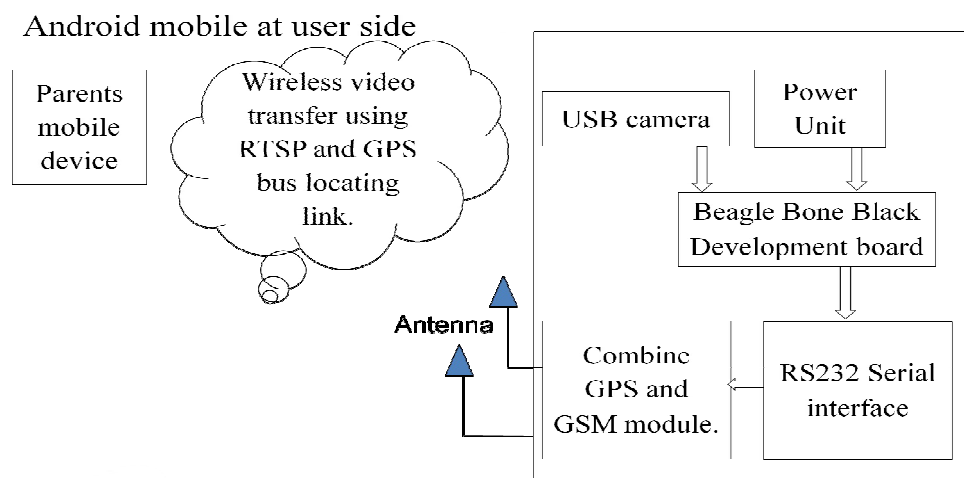


Fig.1 Block Diagram of proposed System

This section consists of the conceptual design description (Fig.1) of a child tracking system. This real time video is capture by the camera interface to the beagle bone black development board. As today’s people are all mobile savvy so every parents have the Android smart phone[6]. With this system working parents can see their child at any time when their child is travelling is school bus. Provides the robust child safety with this system. [7]The Global positioning system (GPS) tracker is used to locating the current geographic position of the bus and sends the real time GPS data on Ad fruit platform. The Ad fruit platform plots the real time school bus route map as per the school bus travels from school to school bus stop or from school bus stop to school. This school bus location tracking map is also provided to parents on one click. This will avoid the long time wait for the arrival of the school bus.

HARDWARE SYSTEM DESIGN:

1. Beagle bone black Development board: Beagle bone is central processor core model Sitara AM3359AZCZ100 which is based on ARM-cortex A8 with clock frequency is about 1GHz. This processor is equipped with 10/100 Ethernet interface for network interfacing. Real time steaming protocol (RTSP)[8] is a network control protocol used in communication to control streaming media server. This captures the audio/video signal and encodes the data in proper

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profile for visualizing on server through IP address.[9] This processor is well known for its cost effective multicast video streaming by real time protocol so used in project.

2. USB Camera: The USB Intex 305wc camera with CMOS sensors is used which improves the video streaming[10] speed and quality of streamed video. The USB camera is interfaced to the processors USB port. The USB camera captures the real time video compressed files and transfers the decompressed data in packet form on the server. The camera includes the following features:

Sr. No.	Parameters	Description
1	Pixels	5megapixels camera with CMOS sensors
2	Frame rate	30 frames per sec
3	Video Capture	640x480 pixels
4	Power consumption	160mw

Table1. USB Camera Features

The above table gives the features of the camera used in this project. Due to the above features the camera used gives the excellent video streaming output when interface to black beagle bone.

3. GPS: The global positioning System (GPS)is the multiple satellites based radio positioning system in which each GPS satellite transmits data that helps user to easily measure the distance from selected satellite to his antenna and to compute position ,velocity and time parameter at high accuracy with low power consumption. [11]GPS module design is flexible to accommodate various RF interference. In my project the GPS is used to track the location of the school bus and send the data GPS data (Latitude and longitude) on cloud using Ad fruit platform to track the school bus travelling route map.

Sr. No.	Parameters	Description
1	Chipset	SiRF Star III GSC 3f/LPx-7989
2	Baud Rate	9600bps
3	Power supply	12V 1.5 amps
4	Protocol	NMEA

Table2. GPS Features

The above table gives the features of the GPS used for tracking the school bus location when interface to the Black beagle bone processor.

4. Router: Router is used for the LAN Ethernet connection required for the beagle bone black for internet connection dongle is used which is connected to the router.

5. Power Hub: As the complete system will be fitted in the school bus so here Intex power hub is used which provides 5V power supply to the beagle bone black development board. The power hub also provides the power supply to the router which is used for the internet connection.

Software System Design:

The OS installation for the beagle bone is Armstrong. Armstrong is the default operating system and usually the best choice. Because of the built-in network services in beagle bone, it makes it much easier to access electronics projects remotely over the Internet. For video streaming we need to install the motion files in the SD card of Black Beagle Bone processor. This will start the process of capturing video with the command ‘start service motion’. Enter the “IP address: 8081” in the browser and you will be able to see the streamed video as shown below. Later ‘stop service motion ‘will stop the video streaming.

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For the GPS the code for python is written in python language. The python files are installed in processor and then the GPS code is written in python language. For GPS we need the latitude and longitude values ,this values are obtain when we run the code in putty software. The GPS python code file need to run using the command ‘sudo python final_backup.py’. The latitude and longitude values are sending to the Ad fruit IOT platform. [12]The MQTT protocol is used to send the values to the Ad fruit stream initialize and the School bus location map will locate the real time tracked latitude and longitude value and on the Ad fruit dashboard we are able to see the map with school bus tracked location path.

VI. SIMULATION AND RESULTS

Video Streaming:



Fig 2. Real time video streaming

As shown in above fig 2, here for video streaming [13] camera is interfaced to beagle bone development board. The camera will capture the video only when the camera files are installed in the OS of beagle bone. The camera will capture the video than video will be processed and then the real time video can be viewed on mobile using IP address allotted for streaming.

GPS: 1

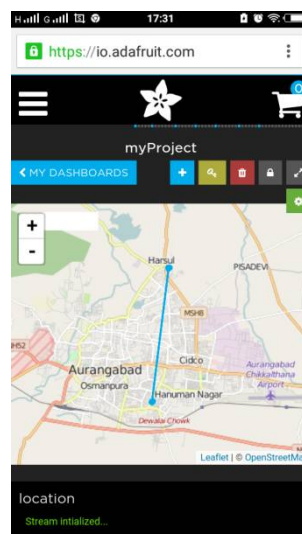


Fig 3. Real time location tracking

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In above fig 3, here the Ad fruit platform [14] is used for the GPS location tracking. The code for GPS is flashed in beagle bone processor. When the code is run the latitude and longitude values are send on the cloud using ad fruit platform and the GPS map is traced and the location of the school bus will be tracked as the school bus moves from one source to another destination. This GPS real time location tracking map is able to see on our mobile screens also.

V. FUTURE SCOPE

The above system is successfully implemented and is performing well. In this the IOT concept is used for the GPS Map. In future we can develop the android app for the same and locate the IP address of video streaming and GPS map link in android app. The second we can also use the GSM module to send the SMS to the parents about the details that in how much time the school bus will reach at their bus stop in case they forgot to see the GPS map.

VI. CONCLUSION

The above is the low cost and efficient system for child tracking while going to school or while coming home from school in school bus. The project implementation is done and the performance is as shown above images. The systems have its application not only for children safety but it can also be used in cabs, industries, offices for security purpose.

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