ABSTRACT

In present time due to increase in number of kidnapping and missing cases, parents always worry about their children's security. This project recommends an android based solution which assists parents to track their children location in real time. To track the location, Active RFID module is used and to identify the child CAM is used which is in built in the system. Whenever a child boards the bus, the RFID scan is done in the bus, and the system will identify the child, capture photo by CAM and will send notification to the parents which consist of current location and time. Parents can see the location of bus, they will be notified when the children is getting into a bus or getting down from a bus. A vehicle monitoring system is implemented for tracking the movement of a bus from any location at a specific time. The proposed system makes use of a technology that combines a smart phone application with a Arduino. A device is placed inside the vehicle which determines the position of the bus using Global Positioning System (GPS) technology. Users will be able to continuously monitor the moving vehicle on demand using the application. This scheme uses a panic switch for the safety of the children. In case of emergency, the status of the bus is known to the school organisation as well as parents.

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1.INTRODUCTION

Student safety is a primary concern in our society as we see there are child missing cases and other incidents happening. The current system involves parents message the bus driver to ensure student has boarded the bus and to know the current location. Proposed system involves a low cost solution by allowing parents to track child location via a mobile application. The system involves allotment of a unique identification for each student using RFID (Radio Frequency based Identification system). Live tracking of the bus is enabled using GPS (Global Positioning System).The photo of the student is captured by CAM.

A Vehicle monitoring system is implemented for tracking the movement of a bus from any location at a specific time. The proposed system makes use of a technology that combines a smart phone application with a microcontroller. A device is placed inside the vehicle which determines the position of the bus using Global Positioning System (GPS) technology. Users will be able to continuously monitor the moving vehicle on demand using the application. This scheme uses a panic switch for the safety of the children. In case of emergency, the status of the bus is known to the school organization as well as parents.

In this project we are using ESP32CAM for sending photo alert to administrator. When the person is showing an RF-ID card to reader. Then ESP32CAM will take photo and send to alert on telegram app.

2.LITERATURE REVIEW

EXISTING SOLUTIONS:

1. Smart bus tracker with GRPS.
2. Smart bus tracker with FINGER PRINT.
3. Smart bus tracker with SCANNING STUDENT ID.

SMART BUS TRACKING WITH GPS: -

The smart bus tracking system is based on Arduino, it detects only bus location with GPS.

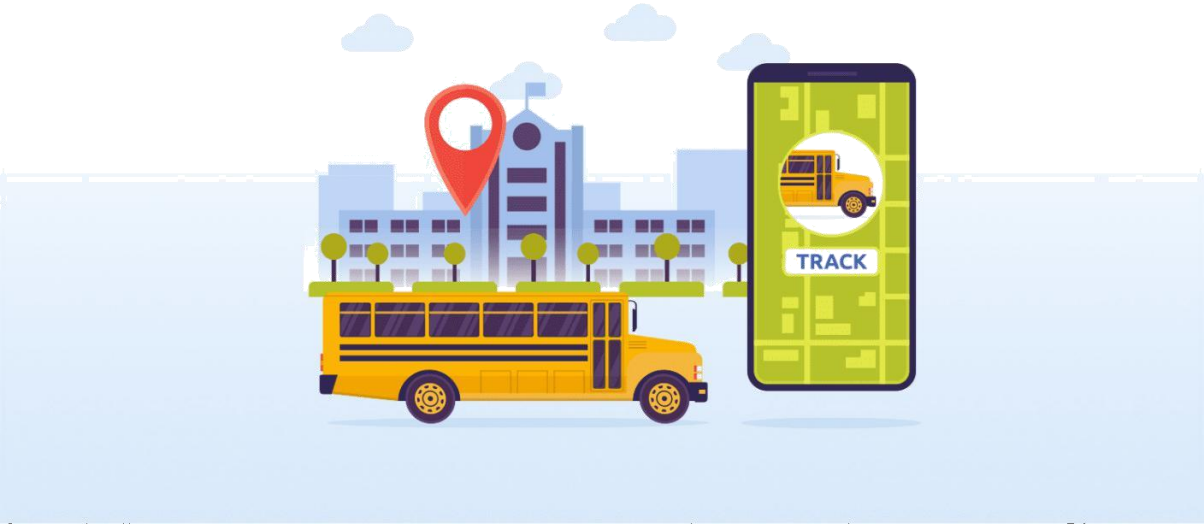

Figure: 2.1

- **Smart bus tracker with FINGER PRINT:**

Smart bus tracking with fingerprint just verifies whether the student is entering into the bus or not. There is a chance to miss the student from the bus.

3.PROBLEM DEFINITION

Our proposed solution is to modify existing solution. The school bus system is associated with student identification using RFID and location tracking using GPS. Each entry and exit in bus involves activation of RFID reader and acquisition of student ID. This is used to determine student status which is transmitted to server via Wi-Fi module. The location is transmitted at regular intervals to server to track the bus. Sending picture of student while scanning the ID to parent's telegram groups.

3.1. PROBLEM STATEMENT:

Student safety is a primary concern in our society as we see there are child missing cases and other incidents happening. The current system involves parents message the bus driver to ensure student has boarded the bus and to know the current location. Students while going to school they are missing in middle. By this project we can track the bus location. We can get the text messages to parent registered mobile number with that they will get photo of a student while scanning the ID card.

3.2.OBJECTIVE:

The main aim of our project is to decrease the children missing cases while going to school and while coming from the school. Parents don't have any tensions while there children are going to school.

3.3.METHODOLOGY:

Nowadays, Most working parents are busy with their office work.So it became tough to ensure their child's security as we hear about child missing cases and other incidents happening.The objective of this proposed system is to develop an application that will help to provide security for school-going children. This allows parents and management to check the status of secure school buses.

This project recommends an android based solution which assists parents to track their children location in real time. To track the location, Active RFID module is used. Whenever a child boards a bus, the RFID scan is done in the bus, and the system will identify the child and update log on a server will send notification to the parents which consist of current location and time. Parents can see the location of bus, they will be notified when the children is getting into a bus or getting down from a bus. A vehicle monitoring system is implemented for tracking the movement of a bus from any location at a specific time. The proposed system make use of a technology that combines a smart phone application with a microcontroller. A device is placed inside the vehicle which determines the position of the bus using Global Positioning System (GPS) technology. Photo is captured by CAM and sent to telegram. Users will be able to continuously monitor the moving vehicle on demand using the application. This scheme uses an panic switch for the safety of the children. In case of emergency, the status of the bus is known to the school organisation as well as parents.

3.4. WORKING MODEL:

The working model of smart school bus tracking system: -

1. While the system is on then system tracks the bus location and display on LCD.
2. The system is waiting to scan the ID card then we can place our ID card near the RFID module.
3. After scanning the ID card, the cam will clicks the student photo and send photo to parents telegram group.
4. After scanning the ID card, it sends a text message to parent whether the student in and out the bus.
5. The attendance is updated in the application with location.

4.CONCEPTUAL DESIGN:

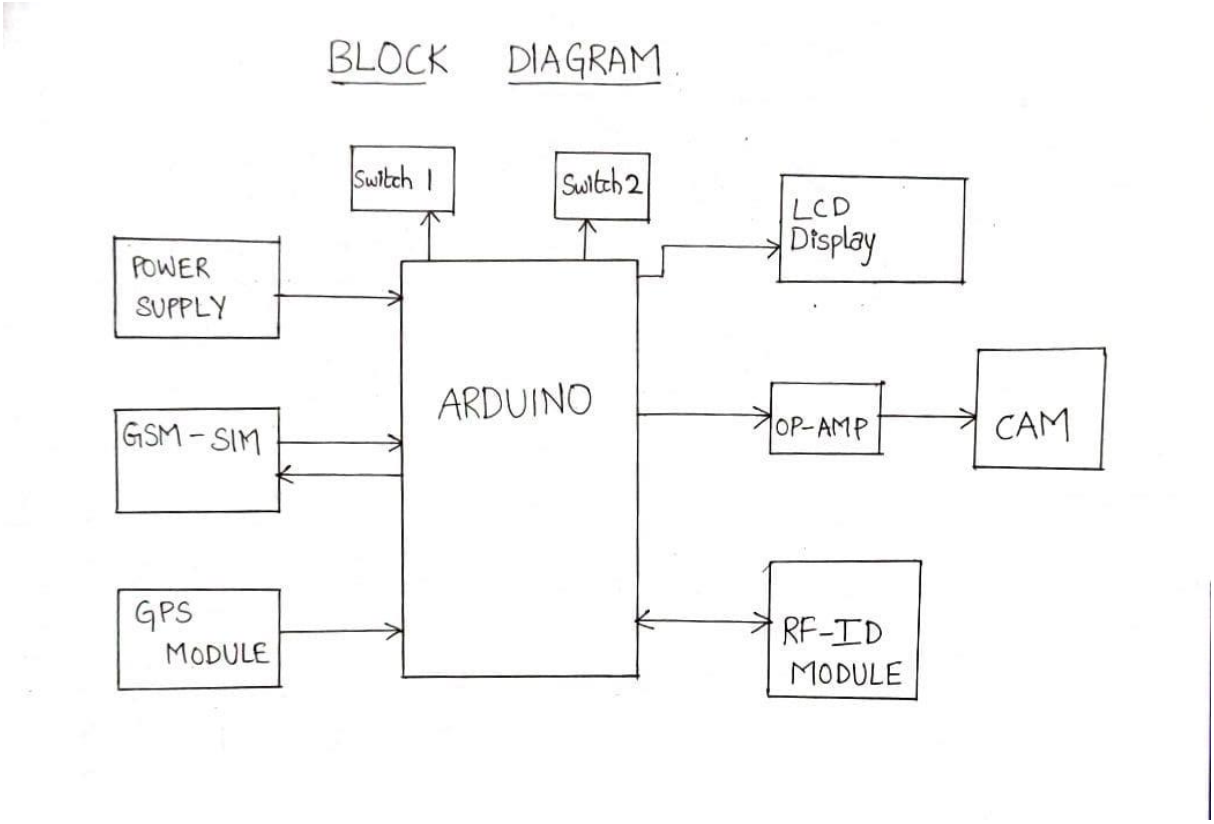

Figure 4: Conceptual Design

4.1. BLOCK DIAGRAM:

4.2.DESIGN DISCRIPTION:

- **HARDWARE DESCRIPTION:**
- ARDUINO MEGA 2560
- EM-18 RF-ID MODULE
- 16X2 LCD DISPLAY

- GSM SIM 800L
- GPS MODULE
- SWITCHES
- JUMPER WIRES, ADAPTER
- ESP32 CAM

SOFTWARE DESCRIPTION:

- ARDUINO MEGA2560
- EMBEDDED C language.

4.2.1. ARDUINO MEGA:

Arduino MEGA 2560 board is just like a brother of Arduino UNO board. It is way more powerful than Arduino UNO and also twice as long from it. This board is the successor of Arduino MEGA. It can be named as ATMega2560. It can have more memory space as compared to other boards of Arduino. Arduino MEGA 2560 is different from all other boards of Arduino that came before as they don't use the FTDI USB-to-serial driver chip. Instead it uses ATmega16U2 programmed as a USB-to-serial converter. It is programmed in Arduino IDE software like all other boards in terms of coding. We don't need to attach extra components or devices to make this board in running condition to use. As per ourequirements we can just plug and play with this board as everything is built in that makes it readily available

Figure 4.2.1 : Arduino MEGA

4.2.2. GSM MODULE:

A GSM modern or GSM module is a device that uses GSM mobile telephone technology to provide a wireless data link to a network. GSM moderns are used in mobile telephones and other equipment that communicates with the mobile telephone networks. They use SIMs to identify their device to the network.GSM is an open and digital cellular technology used for transmitting mobile voice and data services operate at the 850MHz, 900MHz, 1800MHz, and 1900MHz frequency bands. GSM technology was developed as a digital system using the time division multiple access (TDMA) technique for communication purposes.

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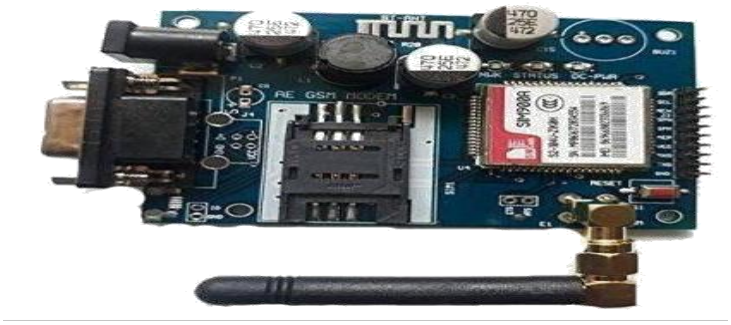

FIGURE NO: -4.2.2

3. ESP32-CAM：-

The ESP32-CAM is a full-featured microcontroller that also has an integrated video camera and microSD card socket. It’s inexpensive and easy to use, and is perfect for IoT devices requiring a camera with advanced functions like image tracking and recognition.

ESP32-CAM is a low-cost ESP32-based development board with onboard camera, small in size. It is an ideal solution for IoT application, prototypes constructions and DIY projects.

FIGURE NO: -4.2.3

4.2.4. EM – 18 RFID: -

RFID is an acronym for "**Radio-Frequency Identification**" and refers to a technology whereby digital data encoded in RFID tags are captured by a reader via radio waves. RFID based system has two basic components.1. RFID Tag 2. RFID Reader.

This module directly connects to any microcontroller UART or through an RS232 converter to a PC. It gives UART/Wiegand26 output. This RFID Reader Module works with any 125 kHz RFID tags. Read Distance: 10cm.

FIGURE NO: -4.2.4

4.2.5. LCD WITH I2C:

I2C_LCD is an easy-to-use display module, it can make display easier. Using it can reduce the difficulty of make, so that makers can focus on the core of the work. We developed the Arduino library for I2C_LCD, user just need a few lines of the code can achieve complex graphics and text display features**.**

FIGURE NO: -4.2.5

4.2.6. **JUMPER WIRES:**

A jumper wire is an electric wire that connects remote electric circuits used for printed circuit boards. By attaching a jumper wire on the circuit, it can be short-circuited and short-cut (jump) to the electric circuit. By placing the jumper wire on the circuit, it becomes possible to control the electricity, stop the operation of the circuit, and operate a circuit that does not operate with ordinary wiring.

FIGURE NO: -4.2.6

4.2.7. **PUSH BUTTON:**

Push buttons can be explained as simple power controlling switches of a machine or appliance. These are generally metal or thermoplastic switches that are intended to grant easy access to the user. The "push-button" has been utilized in calculators, push-button telephones, kitchen appliances, and various other mechanical and electronic devices, home and commercial.

FIGURE NO: -4.2.7

4.2.8. **GPS MODULE: -**

GPS Module. NEO-6MV2 GPS Receiver Module. Global Positioning System (GPS) makes use of signals sent by satellites in space and ground stations on Earth to accurately determine its position on Earth. The NEO-6MV2 GPS receiver module uses USART communication to communicate with microcontroller or PC terminal.

FIGURE NO: -4.3.8

5.IMPLEMENTATION:

If we talk about the current scenario of our education system than we found that we have lot of technologies to use but still we are following the traditional system. We if we talk about the attendance system in universities and schools, lecturers did that work manually. Lecturers took the attendance and update it manually in the database. If we talk about the technology than we found that there are lot of tools to use and reduce the burden of lectures. Using RFID is the one example of that. We if combine the RFID and IOT (Internet of Things) than we can do it automatically and there is no need to do it by lectures. Here we are planning to use the Cloud as storage for better performance. Using IOT and Cloud we can access it from anywhere and anytime which will provide us the better proficiency and flexibility.

The objective of this proposed system is to develop an application which will help to provide security for school going children. The school bus subsystem is associated with student identification using RFID and location tracking using GPS. Each entry and exit in bus involves activation of RFID reader. The messages are sent through GSM to phone. This is used to determine student status which is transmitted to server via Wi-Fi module. Location is transmitted at regular intervals to server to track the bus. Picture of student captured through CAM while scanning the ID and sent to parents telegram group and the attendance gets updated.

5.1. RESULT:

- The Android application gives information about the school bus for students.
- The proposed system is more user-friendly than the existing system. And it also gives a greater performance.
- There is no tension about there children while they are going to school.
- This device is very easy to use for students and bus driver.
- Thus, GPS and RFID based tracking systems are no longer a good-to-have but a must have investment for all schools; because they not only ensure superior safety and security for the children, but also enhance the school's profitability and public image.

5.2. CONCLUSION:

1. In this project we have presented a navigation system for school buses that has the ability to interconnect buses with the real world.
2. This relies on an IOT system, backend computing infrastructure, and a mobile SMS app required to receive messages from the proposed system in buses and provide continuous real-time navigation of a bus journey..Thus, GPS and RFID based tracking systems are no longer a good-to-have but a must have investment for all schools; because they not only ensure superior safety and security for the children, but also enhance the school's profitability and public image.

5.3. SOURCE CODE:

ESP32 TELEGARM CODE

```
#include <Arduino.h>

#include <WiFi.h>

#include <WiFiClientSecure.h>

#include "soc/soc.h"

#include "soc/rtc_cntl_reg.h"

#include "esp_camera.h"

#include <UniversalTelegramBot.h>

#include <ArduinoJson.h>

const char* ssid = "project";

const char* password = "project1234";

// Initialize Telegram BOT

String BOTtoken = "6050636101:AAG11-2C6B809AA4B0p1lBELkpG5n0oAtcs"; // your Bot Token (Get from Botfather)

// Use @myidbot to find out the chat ID of an individual or a group

// Also note that you need to click "start" on a bot before it can

// message you

String CHAT_ID = "1136770228";
```

```
bool sendPhoto = false;

WiFiClientSecure clientTCP;

UniversalTelegramBot bot(BOTtoken, clientTCP);

#define FLASH_LED_PIN 4

bool flashState = LOW;

int gpioPIR = 13;

#define RLED 12

#define GLED 14

//Checks for new messages every 1 second.

int botRequestDelay = 1000;

unsigned long lastTimeBotRan;
//CAMERA_MODEL_AI_THINKER
#define PWDN_GPIO_NUM       32
#define RESET_GPIO_NUM   -1
#define XCLK_GPIO_NUM        0
#define SIOD_GPIO_NUM       26
#define SIOC_GPIO_NUM       27
#define Y9_GPIO_NUM         35
#define Y8_GPIO_NUM         34
#define Y7_GPIO_NUM         39
#define Y6_GPIO_NUM         36
```

```
#define Y5_GPIO_NUM        21
#define Y4_GPIO_NUM        19
#define Y3_GPIO_NUM        18
#define Y2_GPIO_NUM         5
#define VSYNC_GPIO_NUM   25
#define HREF_GPIO_NUM       23
#define PCLK_GPIO_NUM       22
void configInitCamera(){
  camera_config_t config;
  config.ledc_channel = LEDC_CHANNEL_0;
  config.ledc_timer = LEDC_TIMER_0;
  config.pin_d0 = Y2_GPIO_NUM;
  config.pin_d1 = Y3_GPIO_NUM;
  config.pin_d2 = Y4_GPIO_NUM;
  config.pin_d3 = Y5_GPIO_NUM;
  config.pin_d4 = Y6_GPIO_NUM;
  //CAMERA_MODEL_AI_THINKER
  #define PWDN_GPIO_NUM                32
  #define RESET_GPIO_NUM   -1
  #define XCLK_GPIO_NUM                0
  #define SIOD_GPIO_NUM                26
  #define SIOC_GPIO_NUM                27
  #define Y9_GPIO_NUM                  35
  #define Y8_GPIO_NUM                  34
  #define Y7_GPIO_NUM                  39
  #define Y6_GPIO_NUM                  36
  #define Y5_GPIO_NUM                  21
  #define Y4_GPIO_NUM                  19
```

```
#define Y3_GPIO_NUM                18
#define Y2_GPIO_NUM                5
#define VSYNC_GPIO_NUM   25
#define HREF_GPIO_NUM              23
#define PCLK_GPIO_NUM              22
void configInitCamera(){
camera_config_t config;
config.ledc_channel = LEDC_CHANNEL_0;
config.ledc_timer = LEDC_TIMER_0;
config.pin_d0 = Y2_GPIO_NUM;
config.pin_d1 = Y3_GPIO_NUM;
config.pin_d2 = Y4_GPIO_NUM;
config.pin_d3 = Y5_GPIO_NUM;
config.pin_d4 = Y6_GPIO_NUM;
config.pin_d5 = Y7_GPIO_NUM;
config.pin_d6 = Y8_GPIO_NUM;
config.pin_d7 = Y9_GPIO_NUM;
config.pin_xclk = XCLK_GPIO_NUM;
config.pin_pclk = PCLK_GPIO_NUM;
config.pin_vsync = VSYNC_GPIO_NUM;
```