LOST CHILD DETECTOR

Dr. T. ADILINE MACRIGA M.E., Ph.D.,
INFORMATION TECHNOLOGY
(PROFESSOR)
SRI SAIRAM ENGINEERING COLLEGE
(Anna university)
Chennai, India

POOJA V
INFORMATION TECHNOLOGY
(B.tech)
SRI SAIRAM ENGINEERING COLLEGE
(Anna university)
Chennai, India

NEHA S
INFORMATION TECHNOLOGY
(B.tech)
SRI SAIRAM ENGINEERING COLLEGE
(Anna university)
Chennai, India

Abstract—**Nowadays the crowded mall and the other crowded areas are the most vulnerable spots from where the children are lost. One of the scariest things that can happen to a parent is losing a child in a crowded area. However, in the mall, this was surprisingly a most common occurrence. While this problem was solved by introducing a small device for finding lost children at a large venue using facial recognition and a GSM module. This system is developed to help parents to find their children in public places. The CCTV system in all public areas is linked together with the help of face matching algorithms. Once the child is detected, the device could then send a notification to a given number.**

Keywords—missing child,RFID,Crowded area,CCTV, GSM.

I. INTRODUCTION

Recently, the news of missing children is often been reported. Most parents will bring along their kids during shopping and traveling. So, such problems have to be resolved by identifying and deploying suitable technologies available now. In the current trend, parents may have an opportunity to track their children's locations and their health issues by using smartwatches and GPS tracker devices with the help of WIFI and Bluetooth. But, WIFI and Bluetooth are providing to be an inefficient means of communication between parents and children, and also in the crowded area if the wearable watch getting lost, it is very difficult to search the children. This system plays a significant role in the safety of children until they are reunited with the parents. The device running in this project is Arduino Uno and uses a programming language called MATLAB for face matching. we are using an RFID card in it so that the parent will get to know the information about the children by swiping the card with the reader. We are using SMS in this project as a means of communication between parents and children.

II. EXISTING SYSTEM

In the existing system, hardware and software implementation of the school bus security system are discussed. Figure 5 shows the overall architecture of the system. The hardware components used in this project are shown in Figure 6. Software implementation using Arduino IDE is also discussed.

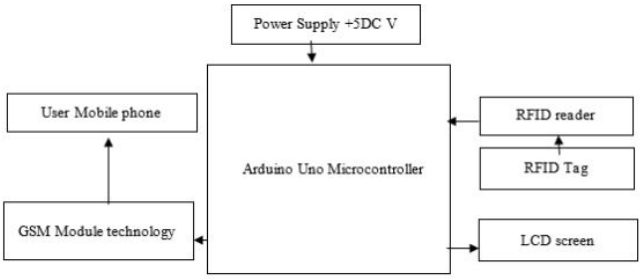


Fig 2.1: Block diagram of overall design system

The Arduino Uno, as shown in Figure 6(a), has been used as the microcontroller to control the input and output of the system. It operates as a CPU to govern the operation between components. Arduino Uno can be programmed and reprogrammed easily compared to the other type of microcontroller i.e., PIC and ATMEL. This board consists of 32Kbytes of Flash memory and 2Kbytes SRAM [17]. Arduino Uno has been successfully implemented for smart homes utilizing the Internet of Things (IoT) [18-21] and many other applications. Figure 6(b) shows the RC-522 RFID module (reader) with a 0 to 10mm distance range. The RC-522 RFID tag is defined by a unique ID number that can be read by the RFID reader. The RFID reader and tag communicate through the 13.56MHZ electromagnetic field. The halal Kit identifier also used the same frequency range in its application [9]. The power requirement of the RFID RC-522 reader is 3.3V which is connected to the Arduino Uno board. The reader is then decoding the inquiry signal from the tag and sends a response to the microcontroller.

(a) Arduino Uno

(b) RC-522 RFID Reader Module

(c) SIM-800L GSM Module

(d) DS-1302 RTC Module

(e) LCD 16x2

Fig 2.2: Hardware Components of Existing System

Real-Time Clock (DS-1302), as shown in Figure 6(c), is capable to store the time and date in a single chip circuit. The single-chip circuit integrated inside the DS-1302 RTC module is known as a Timekeeping chip. This chip is embedded with a Trickle-charger circuitry where the function is to ensure the capacitor can maintain the operation of a clock while the power supply is absent [22]. The frequency of the RTC oscillator is about 32.768 kHz and having a pull-up resistor up to 2.2 KΩ. This module has lower power consumption (about less than 1µW). SIM-800L GSM module is a telecommunication device that is used to send and receive a message from the user, as shown in Figure 6(c). It acts as a mobile phone network when a SIM card is inserted. The module has a GSM modem and able to operate over the wireless network. This concept has been used to develop a low-cost digital wireless meter and controlling and monitoring an electric feeder [23, 24]. Before using it with Arduino Uno, the GSM module needs to be initialized its signal coverage. The suitable operating voltage for this module to send a notification message is about 3.7V to 4.2V. A 16x2 Liquid Crystal Display (LCD), as shown in Figure 6(e), is used to display the status information of a student either in/out of the school bus. The software part was implemented using Arduino IDE (Integrated Development Environment).

III. PROPOSED SYSTEM

To overcome the drawback of the existing system, we implemented the project using a programming language called MATLAB for face matching, using CCTV the children can be found with the help of the MATLAB face matching algorithm and also uses a hardware component called Arduino UNO. Arduino UNO has been used as a microcontroller to control the output given by MATLAB. It operates as a CPU to govern the operation between components.Liquid Crystal Display (LCD) is used to display the status information of children either detected or not.The RFID reader is then decoding the inquiry signal from the RFID tag and sends a response to the microcontroller and that command has been sent to the given number with the help of the GSM module.

IV. BLOCK DIAGRAM

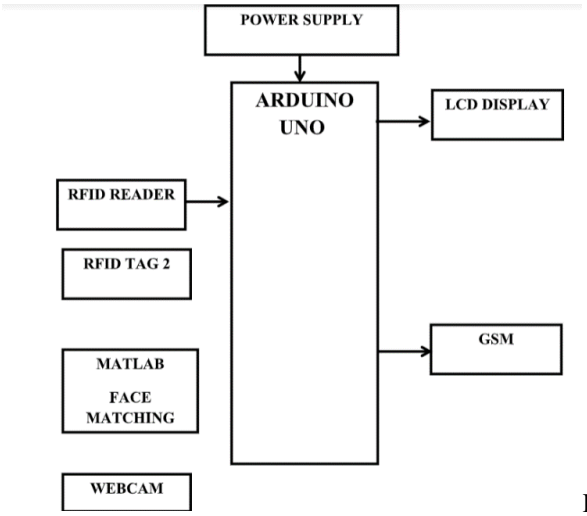


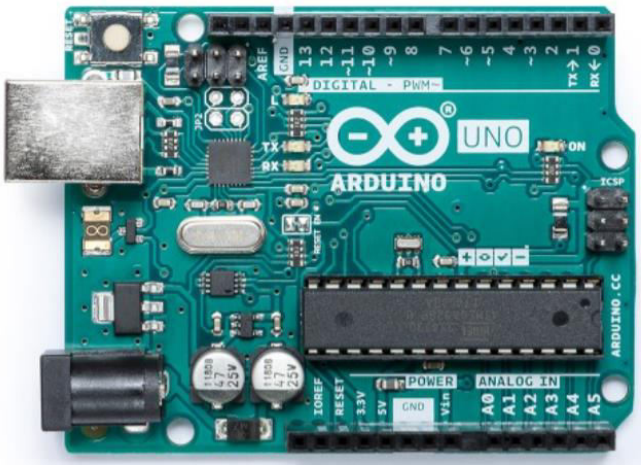
Fig 4.1: Block diagram

V. OPERATION

In this system, Arduino UNO is used to monitor and control the input and outputdevices. The face matching algorithm is implemented in MATLAB. The input image (child image) is stored in the MATLAB folder and trained. The CCTV camera, which helps usto match the child's face using the trained image, and the information is passed to the controller. LCD is used to display the status information of the children whether the child is found or not. When the child is found, it will show," the child is detected". When the child is not found, it will show, “the child is not detected”. The RFID reader is then decoding the signal from the RFID tag by swiping the tag with the reader. The RFID tag isused to send the CCTV cameras as general locations to the microcontroller using camera id and then it will send the command to the GSM module. The GSM is used tosend the alert message to the already set number.

VI. MATERIALS AND METHODS

ARDUINO UNO:The UNO is the best board to get started with electronics andcoding. If this is your first experience tinkering with the platform, the UNOis the most robust board you can start playing with. The UNO is the most used and documented board of the whole Arduino family**.**



Arduino Uno is a microcontroller board based on theATmega328P (datasheet). It has 14 digital input/output pins (of which 6can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, aUSB connection, a power jack, an ICSP header, and a reset button. Itcontains everything needed to support the microcontroller; simply connectit to a computer with a USB cable or power it with an AC-to-DC adapter orbattery to get started. You can tinker with your UNO without worrying toomuch about doing something wrong, in the worst-case scenario you can replacethe chip for a few dollars and start over again.

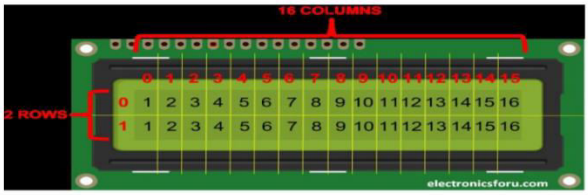
“Uno” means one in Italian and was chosen to mark the releaseof Arduino Software (IDE) 1.0. The Uno board and version 1.0 of ArduinoSoftware (IDE) were the reference versions of Arduino, now evolved tonewer releases. The Uno board is the first in a series of USB Arduinoboards, and the reference model for the Arduinoplatform; for anextensivelist of current, past, or outdated boards see theArduino index of boards**.**

LIQUID CRYSTAL DISPLAY(LCD): LCD screen is an electronic display module and finds a wide range of applications.

A 16x2 LCD is a very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi-segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations, and so on.

A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in a 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to the LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling the display, etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD. Click to learn more about the internal structure of an LCD.

We come across LCDs everywhere around us. Computers,calculators, television sets, mobile phones, digital watches use some kind of display to display the time. An LCD is an electronic display module that uses liquid crystal to produce a visible image. The 16×2 LCD is a very basic module commonly used in projects. The 16×2 translates to a display of 16 characters per line in 2 such lines. In this LCD each character is displayed in a 5×7-pixel matrix.



GSM modem:A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. The working of the GSM modem is based on commands, the commands always start with AT (which means Attention) and finish with a <CR> character. For example, the dialing command is ATD <number>; ATD3314629080; here the dialing command ends with a semicolon.

The AT commands are given to the GSM modem with the help of a PC or controller. The GSM modem is serially interfaced with the controller with the help of MAX 232. Here max 232 acts as a driver which converts TTL levels to the RS 232 levels. For serial interface, the GSM modem requires the signal based on RS 232 levels. The T1_OUT and R1_IN pin of MAX 232 is connected to the TX and RX pin of GSM.

RFID READER AND TAG: An RFID reader is a device that is used to interrogate an RFID tag. The reader has an antenna that emits radio waves; the tag responds by sending back its data.

An RFID tag is a microchip combined with an antenna in a compact package; the packaging is structured to allow the RFID tag to be attached to an object to be tracked. ” RFID” stands for Radio Frequency Identification. The tag’s antenna picks up signals from an RFID reader or scanner and then returns the signal, usually with some additional data (like a unique serial number or other customized information).

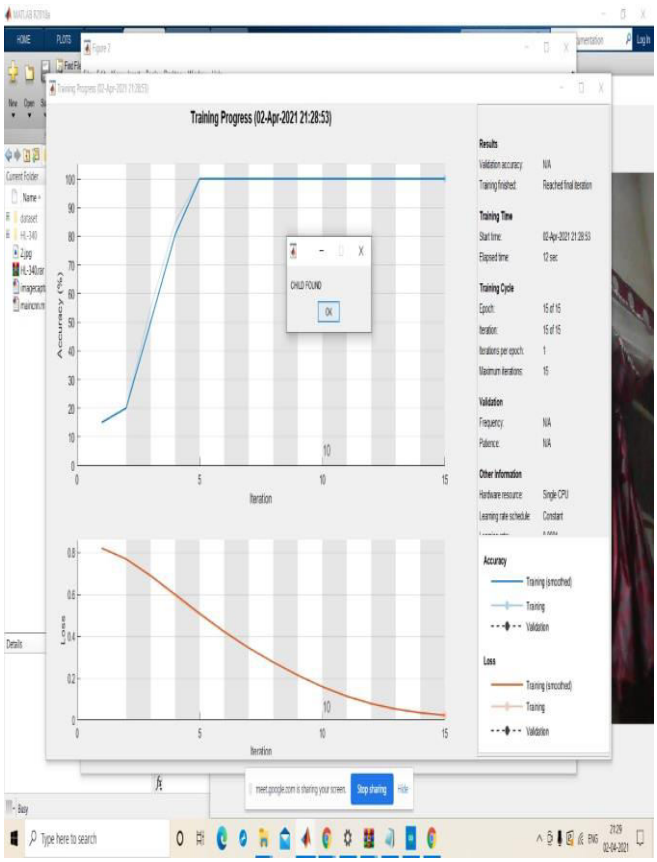
A passive tag is an RFID tag that does not contain a battery; the power is supplied by the reader. When radio waves from the reader are encountered by a passive RFID tag, the coiled antenna within the tag forms a magnetic field. The tag draws power from it, energizing the circuits in the tag. The tag then sends the information encoded in the tag’s memory.

The RX and TX pins of RFID reader connected to Tx and Rx pins of 8051 Microcontroller respectively. Then the reader senses the data from the Tag and transmits the sensed datato the microcontroller via serial port.

The EM-18 RFID Reader module operating at 125kHz is an inexpensive solution for your RFID-basedapplication. The Reader module comes with an on-chip antenna and can be powered up with a 5Vpower supply. Power up the module and connect the transmit pin of the module to receive the pin of yourmicrocontroller. Show your card within the reading distance and the card number is thrown at theoutput. Optionally the module can be configured for also a Wiegand output.

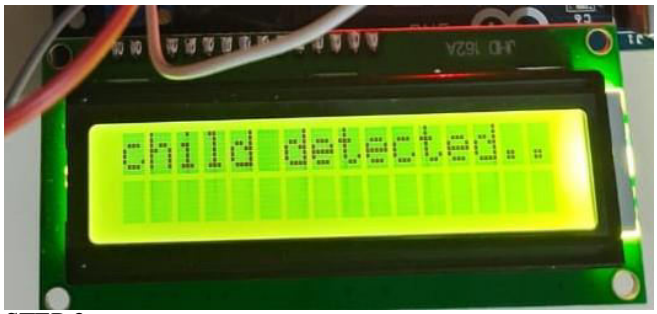
VII. RESULT AND DISCUSSION

MATLAB OUTPUT:

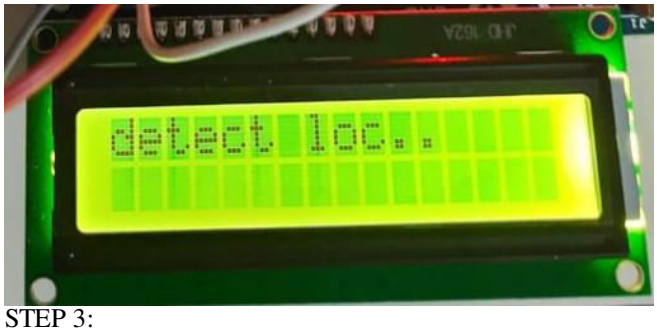


LCD OUTPUT:

STEP1:

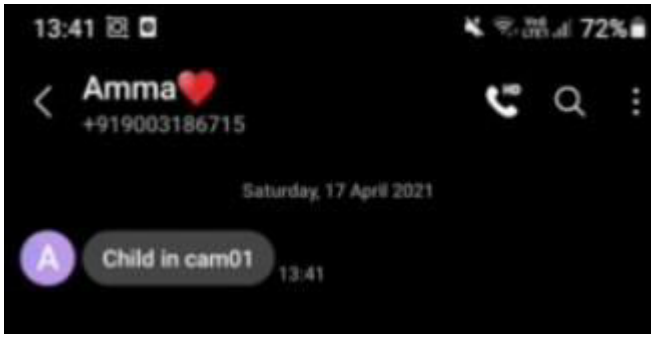


STEP 2:



STEP 3:

GSM OUTPUT:



VIII. CONCLUSION

Hence, the lost child can be detected easily using facial recognition, and information about the children's location is sent to the already set number. So, this proposed system will solve the issues faced by the parents.

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