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BRT Automation (Conventional Opening BRT Lanes Barricades)

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***ABSTRACT**:- In this paper we have concluded a solution on a problem of BRT lanes violation. Bus Rapid Transit (BRT) offers the opportunity for developing cities to develop a high-quality mass transit system at an affordable cost. This module of the Sustainable Transport Sourcebook provides an overview summary of the BRT concept and a brief description of the BRT planning process Effective public transit is central to development. For the vast majority of developing city residents, public transit is the only practical means to access employment, education, and public services, especially when such services are beyond the viable distance of walking or cycling. Unfortunately, the current state of public transit services in developing cities often does little to serve the actual mobility needs of the population. However, there is an alternative between poor public transit service and high municipal debt. Traditional approach is not efficient enough for finding the unauthorized entry of vehicles. We cannot rely on the traditional approach as it is very inefficient. Hence we are trying to present an automated system so that we could address the above mentioned issue with maximum efficiency and help BRT system to get back to the primary objectives.*

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I. INTRODUCTION:-

As the population in India is growing day by day. The number of people moving towards the metropolitan cities as well as other developing cities in search of jobs and better life styles. Hence population is increasing the need of transportation is also increasing by means of buses, private vehicles, local trains and other means. But due to increase in traffics government employed the BRT bus lanes to reduce the delay timings for buses. But the private vehicles like cars and bikes uses this BRT lanes to go faster. But this resulted in delay of buses and unavoidable traffics as well as accidents. To avoid this our government started to employee people and other staff to stand at the BRT lanes to stop the unauthorized vehicle entry in the lanes. But this resulted in adverse health effect of employee's health. As to reduce this incident we have come up with idea of BRT Automation project.

II. LITERATURE SURVEY

:- In India most of metro cities are finding their public transport system inadequate due to the fast improvement in socioeconomic condition in metro cities, which had resulted into increased demand for travel. It has been observed that with increase in the sprawl of the city, average trip lengths would naturally increase. The maximum trip length in metro cities is higher compared to medium and small cities. It has been observed that the average trip length is 2.4 km with population 5 lakh and it is 10.7 km for cities with population greater than 80 lakh. Significant decrease in public transport and a very high increase in private mode share for all city

categories are predicted and due to this phenomenon more street congestion develops in the metro city. A variety of modes such as walking, cycling, two-wheelers, Para-transit, public transport, cars etc. are used to meet the travel needs in urban areas. Public transit systems world over are struggling to complete with private modes and the shift is noticeable in the developing countries as well; the predominant modes being cars, two wheelers and other intermediary modes. People's personal choices and freedom get expressed in increased ownership and use of personalized vehicles. The public agencies operating public transport systems often fail to restructure service types to meet with the changing demand pattern. As a result public transport becomes financially less viable, speeds reduce, and congestion levels increase and the transportation becomes a source of environmental problem. The agencies operating public transport often fail to respond to demands. The resultant outcomes in most Indian cities have been of increasingcongestion due to increasing private modes, accidents and rising air pollution levels. Difficulties in foretelling the traffic levels, mode choice, affordability and willingness to pay for better services have compounded the problem. In 2007, it has been observed that about 39% of total trips in Indian cities are carried by walk and bicycles, whereas public transport carries nearly 27% of trips. Public transport share is considerably low, around 10% in metro cities, whereas it is 20-40% for mega cities which indicate the need of public transport in metropolitan cities. Kolkata is having highest share of trips by public transport modes; nearly 80%; followed by Mumbai with nearly 60%. Maximum share of trips by walk is observed in Kanpur with at 70% followed by Ahmedabad and Bangalore with more than 40% walk trips. In Pune usage of public transport and private motorized vehicle is 41% and 22% respectively. Cities like Kanpur and Lucknow having usage of less than 5%.In general, the larger the city size, the higher the percentage of urban trips served by public transport in India: 30 percent in cities with population between 1 and 2 million, 42 percent for cities with populations between 2 and 5 million, and 63 percent for cities with populations over 5 million.
Thus, the especially rapid growth of large cities suggests a further rise in future demands for public transport in India.

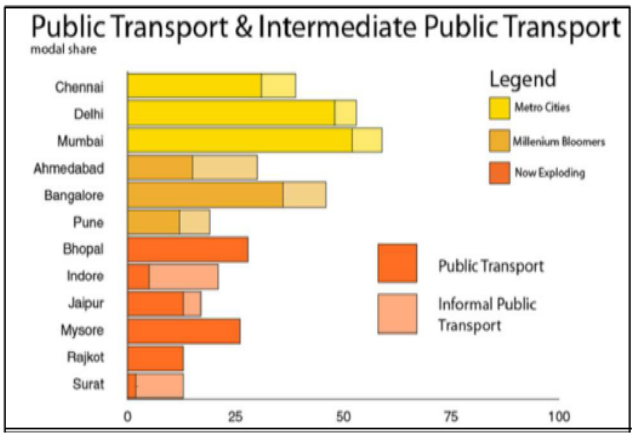


Figure No. 1

Fig 1: Describes the ongoing trends of the public and private transport in major cities of India. It classifies the different categories of the population and their way of commute.

III. METHODLOGY and SYSTEM BLOCK DIAGRAM:-

RFID FOR ASSET TRACKING

RFID has many advantages over manual and barcode processes for physically inventorying assets. The main advantages are...

RFID Can Read Multiple Tags Simultaneously

Performing a manual inventory process requires personnel to individually match tag ID's or serial numbers. This can be very time consuming and prone to inaccuracies. Using barcodes speeds up the inventory process and makes it more accurate, but still requires each asset to be scanned individually. Many handheld RFID readers for can read up to 20 tags or more simultaneously.

RFID Does Not Require Line-of-Sight

Both manual and barcode processes require that the tags be physically located and viewable. Another advantage of RFID is the ability to read tags that are not visible. Unlike barcodes and human readable tags that must be physically located and viewable to read, RFID tags do not need to be visible to be read. For example, tagging a PC up under a desk would require personnel to crawl up under the desk to physically locate and view the tag

when using a manual or barcode process. Using an RFID tag would allow personnel to read the tag through the desk without even seeing it. There are some exceptions to this rule when metal and liquid are involved.

RFID Improves Processes

Physically inventorying and auditing assets can be a time consuming process that can pull valuable employees from their normal job responsibilities to participate in an inventory. In many cases these employees are over-qualified and over-paid for the task. At a minimum, pulling these personnel away from their responsibilities can affect the bottom line. Implementing an RFID solution can dramatically reduce the man-power required to keep track of your assets and provide better visibility.

An electronic tag (transponder) is embedded with an integrated circuit (IC) that can store unique data about the object being tagged. A reader (interrogator) transmits radio waves at a specific radio frequency to communicate with and retrieve data from tags within its proximity.

IR sensor :-IR technology is used in daily life and also in industries for different purposes. For example, TVs use an IR sensor to understand the signals which are transmitted from a remote control. The main benefits of IR sensors are low power usage, their simple design & their convenient features. IR signals are not noticeable by the human eye. The IR radiation in the electromagnetic spectrum can be found in the regions of the visible & microwave. Usually, the wavelengths of these waves range from 0.7 µm 5 to 1000µm. The IR spectrum can be divided into three regions like near-infrared, mid, and far-infrared. The near IR region's wavelength ranges from 0.75 – 3µm, the mid-infrared region's wavelength ranges from 3 to 6µm & the far IR region's infrared radiation's wavelength is higher than 6µm.

Figure No. 2 IR Sensor.

Buzzer:-

Buzzer is a passive buzzer. Like a magnetic speaker, it needs voltage with different frequency so that it can make sound accordingly. The pitch becomes louder when the frequency gets higher

Figure No. 3 Buzzer.

Stepper motor:-

Stepper motors are DC motors that move in discrete steps. They have multiple coils that are organized in groups called "phases". By energizing each phase in sequence, the motor will rotate, one step at a time. With a computer controlled stepping you can achieve very precise positioning and/or speed control.

Figure No. 4 Stepper motor.

LCD display 16*2:-

A **liquid-crystal display** (**LCD**) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals combined with polarizers. Liquid crystals do not emit light directly,[1] instead using a backlight or reflector to produce images in color or monochrome.[2] LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden. For instance: preset words, digits, and seven-segment displays, as in a digital clock, are all good examples of devices with these displays. They use the same basic technology, except that arbitrary images are made from a matrix of small pixels, while other displays have larger elements. LCDs can either be normally on (positive) or off (negative), depending on the polarizer arrangement.

Fgure No.5

Ln293d motor driver:-

Motor drivers acts as an interface between the motors and the control circuits. Motor require high amount of current whereas the controller circuit works on low current signals. So the function of motor drivers is to take a low-current control signal and then turn it into a higher-current signal that can drive a motor.

IV. SYSTEM ARCHITECTURE& Circuit diagram

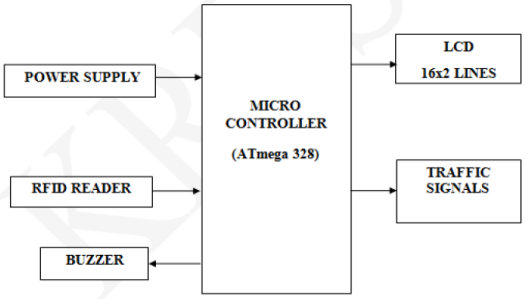


Fig 4.1 System Architecture

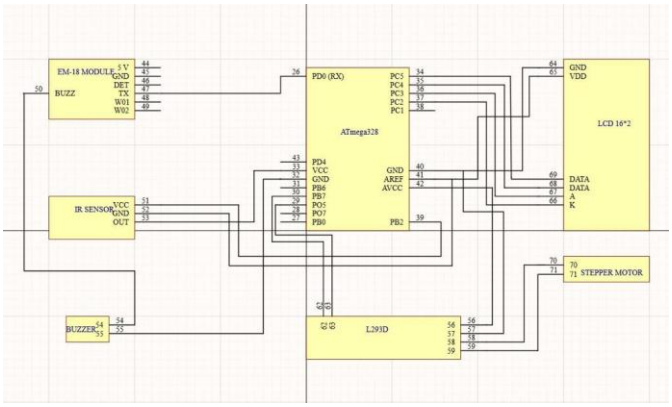


Fig. 9 circuit Diagram

V. PROGRAMING SCRIPT

```
// Include Libraries
#include "Arduino.h"
#include "LiquidCrystal.h"
#include "RFID.h"


// Pin Definitions
#define LCD_PIN_RS      8
#define LCD_PIN_E       7
#define LCD_PIN_DB4     2
#define LCD_PIN_DB5     4
#define LCD_PIN_DB6     5
#define LCD_PIN_DB7     6
#define RFID_PIN_RST    9
#define RFID_PIN_SDA    A3
#define SIM800L_SOFTWARESERIAL_PIN_TX    10
#define SIM800L_SOFTWARESERIAL_PIN_RX    3

// Global variables and defines

// object initialization
LiquidCrystal
lcd(LCD_PIN_RS,LCD_PIN_E,LCD_PIN_DB4,LCD_PIN_DB5,LCD_PIN_DB6,LCD_PIN_DB7);
RFID rfid(RFID_PIN_SDA,RFID_PIN_RST);

// define vars for testing menu
const int timeout = 10000;       //define timeout of 10 sec
char menuOption = 0;
long time0;

// Setup the essentials for your circuit to work. It runs first every time your circuit is powered with electricity.
void setup()
{
   // Setup Serial which is useful for debugging
   // Use the Serial Monitor to view printed messages
   Serial.begin(9600);
   while (!Serial) ; // wait for serial port to connect. Needed for native USB
   Serial.println("start");

   // set up the LCD's number of columns and rows
   lcd.begin(16, 2);
   //initialize RFID module
   rfid.init();
   menuOption = menu();

}

// Main logic of your circuit. It defines the interaction between the components you selected. After setup, it runs over and over again, in an eternal loop.
void loop()
{


   if(menuOption == '1') {
   // LCD 16x2 - Test Code
   // Print a message to the LCD.
   lcd.setCursor(0, 0);
```

```
   lcd.print("Circuito Rocks !");
   // Turn off the display:
   lcd.noDisplay();
   delay(500);
   // Turn on the display:
   lcd.display();
   delay(500);
   }
   else if(menuOption == '2') {
   // RFID Card Reader - RC522 - Test Code
   //Read RFID tag if present
   String rfidtag = rfid.readTag();
   //print the tag to serial monitor if one was discovered
   rfid.printTag(rfidtag);

   }
   else if(menuOption == '3')
   {
   // Disclaimer: The QuadBand GPRS-GSM SIM800L is in testing and/or doesn't have code, therefore it may
be buggy. Please be kind and report any bugs you may find.
   }

   if (millis() - time0 > timeout)
   {
      menuOption = menu();
   }

}


// Menu function for selecting the components to be tested
// Follow serial monitor for instructions
char menu()
{

   Serial.println(F("\nWhich component would you like to test?"));
   Serial.println(F("(1) LCD 16x2"));
   Serial.println(F("(2) RFID Card Reader - RC522"));
   Serial.println(F("(3) QuadBand GPRS-GSM SIM800L"));
   Serial.println(F("(menu) send anything else or press on board reset button\n"));
   while (!Serial.available());

   // Read data from serial monitor if received
   while (Serial.available())
   {
      char c = Serial.read();
      if (isAlphaNumeric(c))
      {

         if(c == '1')
                        Serial.println(F("Now Testing LCD 16x2"));
               else if(c == '2')
                        Serial.println(F("Now Testing RFID Card Reader - RC522"));
               else if(c == '3')
                        Serial.println(F("Now Testing QuadBand GPRS-GSM SIM800L - note that this
component doesn't have a test code"));
         else
         {
            Serial.println(F("illegal input!"));
```

```
            return 0;
          }
          time0 = millis();
          return c;
        }
    }
}
```

VI. Algorithm / Flowchart

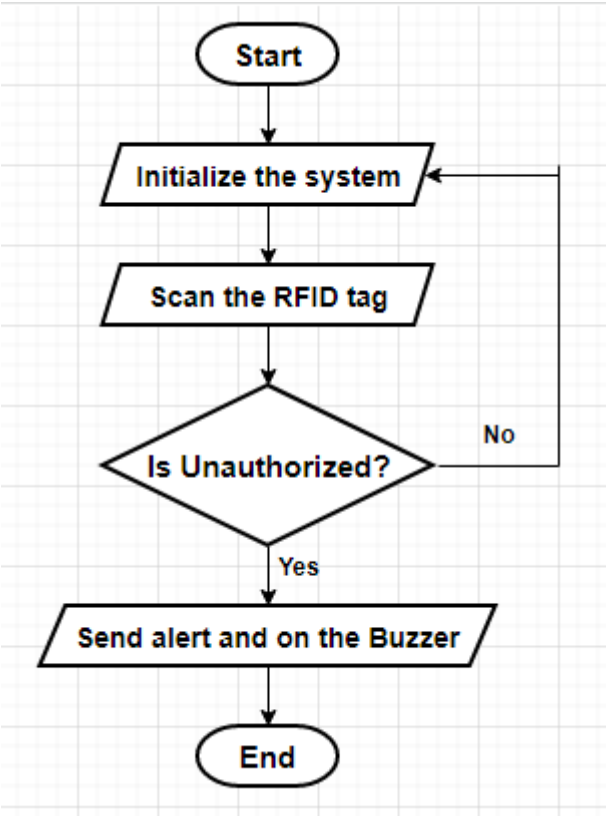


Fig 6.2 Flowchart of the System

VII. RESULTS:-

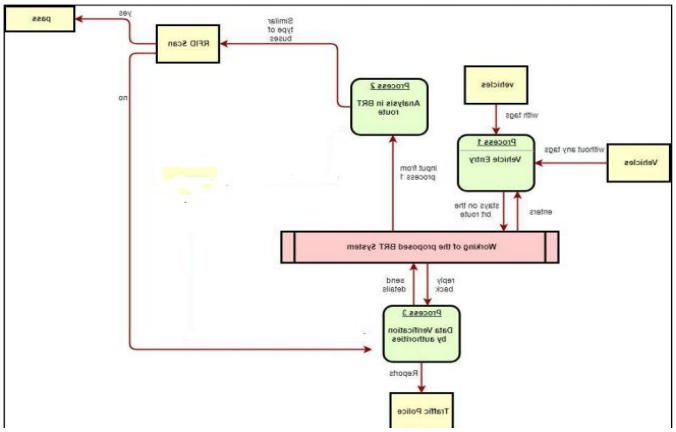
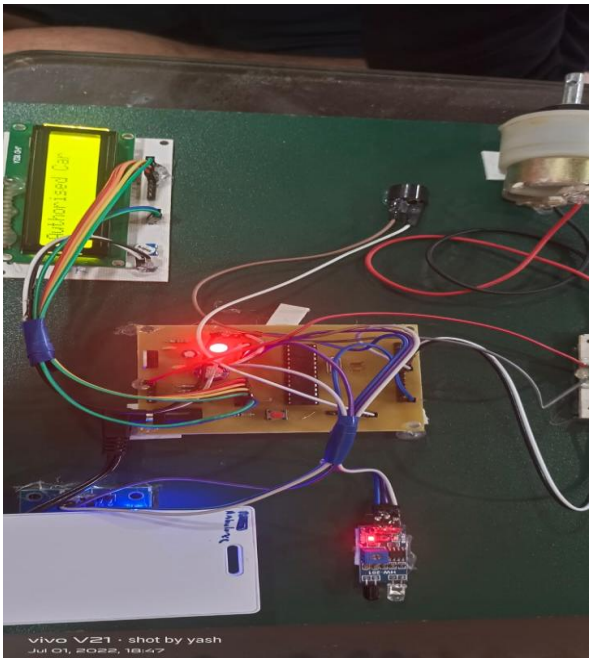
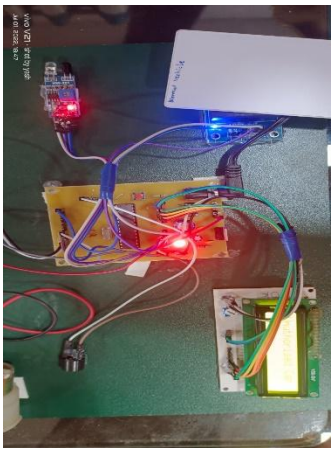


Fig Working of Proposed Model

This model consists of four processes which work simultaneously in a single environment. Vehicle entry checks for the length and informs to conduct the analysis of the unchecked vehicles and concerned authorities are notified by the information of the law breaking vehicle(s).





8.1 ADVANTAGES

- With the help of RFID reader used in this project we can easily detect the stolen vehicles or any unauthorized vehicles.
- It is the most efficient method when compared to the earlier methods where barcode detection system was used.

8.2 LIMITATIONS

- High Cost

8.3 APPLICATIONS

- RFID tags can be affixed to automobiles for activating hands free access.

- The RFID reader can also trigger surveillance cameras or video recorders whenever a vehicle enters or exits the controlled area.
- Eliminates manual record keeping, thereby increasing accuracy and staff productivity.
- Attendance system in educational institutions and other work places.

VIII. CONCLUSION:-

In Proposed system will be developed in order to track and report the unauthorized entries into the BRT. The system will successfully detect all the unauthorized vehicles and capture picture of those vehicles. The main aim of capturing the picture is to capture the number plate of the vehicle. The system will further send those captured pictures to the respective authority for further legal actions.

IX. FUTURE SCOPE:

Implementing RFID technique in toll tax system: Electronic toll collection system allows the vehicle drivers to pass the toll tax booths without stopping at the toll booths. The toll amount is deducted from the RFID card. This RFID card is rechargeable and account is stored on the records.

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