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A PROTOTYPE OF SELF PROPELLED QUAYLINK USED FOR SMART CITIES

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ABSTRACT:The primary point of this undertaking is to make an auto piolet quaylink which is customized to run between different stations .This model follows a particular way which consists of Station name announcement, timing of the train and the distance between two stations. This model gives travelers tallying framework and creates cautioning signal when the compartment are full. Inside this quaylink we set a press Button which is utilized for Medical crisis. Some extraordinary highlights like programmed entryways, Announcements, Rail deficiency location, Solar controlled lights and Air conditions which is set inside on this autopilot loco. And all the stations are expressed by the arrival and flight of quaylink. Lastly a created Website which is utilized to buy the train tickets at station. The travelers can undoubtedly purchase their tickets utilizing their advanced cells without remaining in a long line.

Keywords: auto piolet quaylink, travelers tallying framework, Rail deficiency location

I.INTRODUCTION

The auto piolet quaylink is developed to understand the technology used in the driverless metro train system which is mostly used by some other developed countries like Germany Japan and France. It solves the problem of mass transportation as well as the high transportation cost in the metro train system. It also reduces the energy consumption by 30% of the metro train as it also uses the solar panels on the top for running the accessories of the train. It also gives accurate timing control of the train on station arrivals and departures. The operation of the driverless metro train is controlled by a central processor unit like Arduino controller, 8051 processor or PIC controllers. The main aim of this project is to illustrate the technology used in metro train movements which are used in most of developed countries. This train is driverless train equipped with control system, it stops automatically whenever the train arrives at the station as sensed by RFID reader. Then the door open automatically so that the passenger can go inside the train. Numbers of passengers leaving and entering the train are counted by passenger counting section. Motor driver IC controls the movement of the train. As the train reaches at the destination the process will be repeats.

II. LITERATURE SURVEY

[1] Victoria J. Hodge, Simon O'Keefe, Michael Weeks, and Anthony Moulds, "Wireless Sensor Networks for Condition Monitoring in the Railway Industry: A Survey" IEEE Transactions On Intelligent Transportation Systems, 2017.

In the paper titled "A Driverless Metro Train using ARM7" by Parkash Ratan Tambare, and Chandra Jogi, tell us how a metro train can be made to travel from one platform to another without the aid of driver by using ARM 7 processor with the LPC2148 microcontroller. The functions are not only limited to travelling but it also automatically opens the door, waits for the passengers to board and deboard and closes the door automatically. The system will know if the train has arrived at the station or not, through the IR reflectance sensors. The walls adjacent to the train runs out when the station arrives because of which the IR rays are not reflected back, indicating to the train that the station has arrived.

[2] Juanjuan Zhao, Fan Zhang, Member, IEEE, Lai Tu, Chengzhong Xu, Fellow, IEEE, Dayong Shen, Chen Tian," Estimation of Passenger Route Choice Pattern UsingSmart Card Data for Complex Metro Systems", IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS.

In the paper entitled with "Estimation of Passenger Route Choice pattern using Smart card data for complex metro systems",Juanjuan Zhao, Fan Zhang established a proposal using Automated fare collection (AFC) which helps to estimate how the passengers movements are forwarded to various routes and trains. Since existing system works in particular situations this paper going to make the system to work for complicated situations. This model can estimate from empirical analysis how the passenger flows are dispatched to different routes and trains.

III. METHODOLOGY

1. ARDUINO UNO

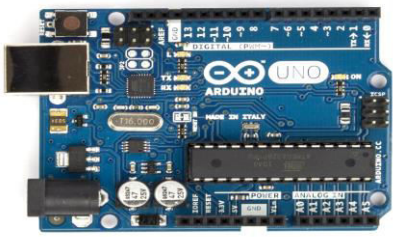

Figure 1: ARDUINO UNO

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button.

2. L298N MOTOR DRIVER

Figure 2: L298N MOTOR DRIVER

This dual bidirectional motor driver, is based on the very popular L298 Dual H- Bridge Motor Driver Integrated Circuit. The circuit will allow you to easily and independently control two motors of up to 2A each in both directions.

3. DC MOTOR

Figure 3: DC MOTOR

These motors are simple DC Motors featuring gears for the shaft for obtaining the optimal performance characteristics. This DC Motor (150RPM and 1000RPM) - 12Volts can be used in all-terrain robots and a variety of robotic applications.

4. INFRA RED SENSOR

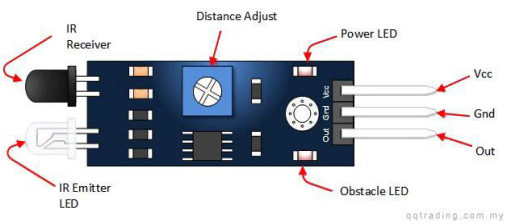

Figure 4: INFRA RED SENSOR

IR technology is used in daily life and also in industries for different purposes. IR signals are not noticeable by the human eye. Usually, the wavelengths of these waves range from 0.7 µm 5 to 1000µm.

5. SERVO (SG90) MOTOR

Figure 5:SERVO (SG90) MOTOR

A servo motor is a type of motor that can rotate with great precision. Normally this type of motor consists of a control circuit that provides feedback on the current position of the motor shaft, this feedback allows the servo motors to rotate with great precision.

6. MQ2 SENSOR

Figure 6: MQ2 SENSOR

The module version of this sensor comes with a Digital Pin which makes this sensor to operate even without a microcontroller and that comes in handy when you are only trying to detect one particular gas.

7. VIBRATION SENSOR

Figure 7: VIBRATION SENSOR

Vibration Sensor Module comes with SW-420 vibration sensor, integrated with adjustable sensitivity via on board potentiometer. It has a simple and straight forward 3-pin interface, VCC, GND and the DO (digital output). It supports 3.3V or 5V power.

8. GSM MODULE

Figure 8: GSM MODULE

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.

9. PUSH BUTTON

Figure 9: PUSH BUTTON

A Push Button switch is a type of switch which consists of a simple electric mechanism or air switch mechanism to turn something on or off. Depending on model they could operate with momentary or latching action function. The button itself is usually constructed of a strong durable material such as metal or plastic.

10. LCD DISPLAY

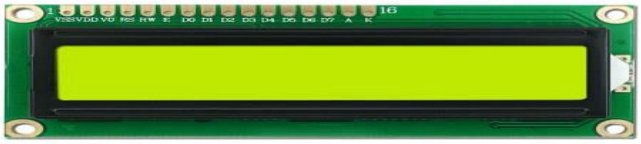

Figure 10: LCD DISPLAY

LCD modules are very commonly used in most embedded projects, the reason being its cheap price, availability and programmer friendly.

IV BLOCK DIAGRAM

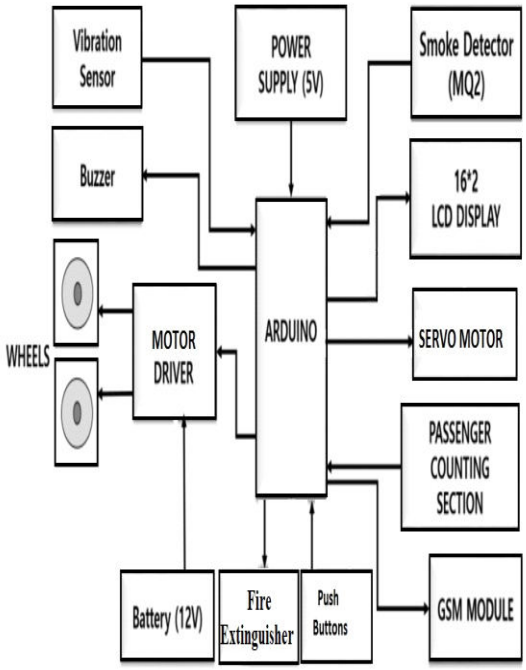

Figure 11: BLOCK DIAGRAM

V CIRCUIT DIAGRAM FOR PROTOTYPE

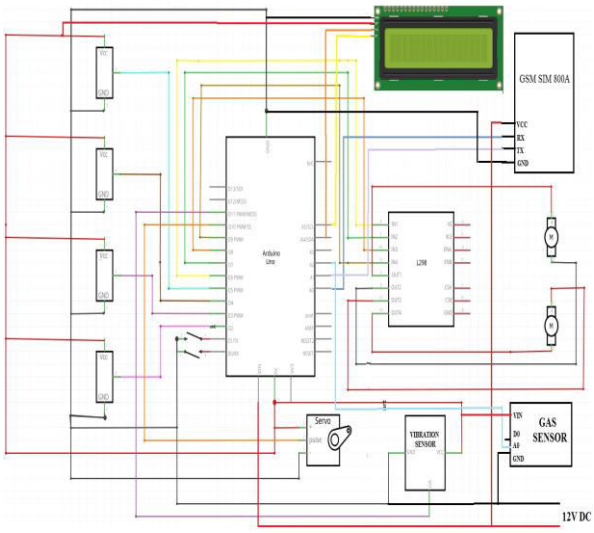

Figure 12: CIRCUIT DIAGRAM FOR PROTOTYPE

VI RESULT AND DISCUSSION

The project demonstrated by a prototype model of driverless metro train. A simple CD drive is used for automatic door operation. A DC motor is used for door operation. It is to be noted that a buzzer will operate at every door operation function. By running this prototype model the results as getting messages like the name of the station, the number of passengers and door position on LCD display. The passenger counting is completed by using IR module and displayed on LCD. The speed of the motor is controlled by the motor driver IC and the supply to the motor driver IC and door motor is given by battery of 12 volts. The door is automatically open and close with detection of the station by RFID sensors. There is some delay is provided between opening and closing of the doors by means of programming. Detection of the station is done by sensing RFID tags by RFID sensor and it gives a signal to change the motor state from on state to off state. The solar panel on the top of the train is used to supply the train auxiliaries. The LED is used for load or auxiliary of the train. This reduces the overall power consumption of the train. The buzzer works for each LCD message and for entryway operation. The passenger counting areas tally the travellers by using IR modules and display it on the LCD. The vibration sensor has come into action when the vibrations in the train due to some fault is exceeded from the predefined limit. It sends the signal to Arduino and that signal can be sent to control center by using GSM module. RFID sensor is fixed on the train and RFID labels are fixed close to the station. By location of RFID labels by RFID sensor, the train changes its condition of engines from on state to off state.

This venture additionally incorporates smoke identification by means of the MQ2 smoke sensor. A vibration sensor is also

used to detect any vibrations in the track that might cause accidents and halts the train.

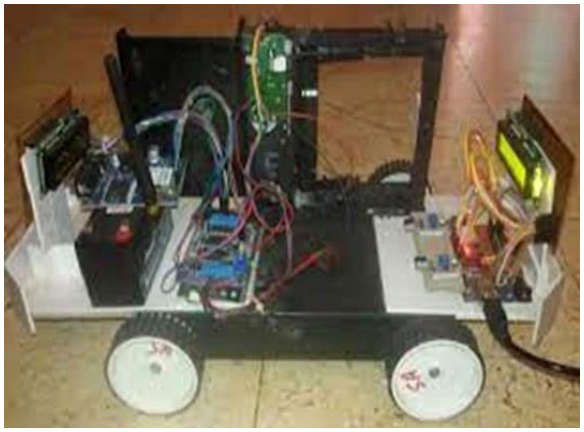

Figure 11: EXPERIMENTAL OUTPUT

VII CONCLUSION

The driverless metro train project provides the unique features like it provide fully automatic driverless operation with less traveling time, less consumption of electricity, smoke detection etc. Driverless metro system provides better quality services as well as exact timings of the train for arrival and departure. It reduces the overall running cost of the system and by use of solar panels, it also reduces the power consumption of the train. One advantage of this system is to transport more people than the normal metro train services. This project makes a better way to build smart cities as well as to provide better metro rail services to the society.

VIII REFERENCE

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