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Advance Facilities at Railway Station

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Abstract

This is a user friendly system providing smart facilities at railway stations. The system is providing horizontal automatic mobile surface platforms at the extremes of the railway station, by the use of which the passengers (especially senior citizens, physically disabled) can cross the platform easily, in less time, avoiding the foot over bridge. It is also helpful to transfer heavy goods. This system is also providing useful information to the passengers through NFC information corners placed at various places in the railway station. NFC tags are placed at those information corners. NFC tags are uploaded with the information which is useful to the passengers such as railway station map, railway timings, PNR status, city map, visiting places in city, boarding places in city etc. Arrived passengers at the railway station can receive this information by tapping those NFC tags with their NFC enabled phones. In addition to these features the system can also providing automatic room light controller facility at the waiting hall that takes over the task of controlling the lights and fans in order to save power. The sensors are provided at the corners of the seating arrangement to sense the presence of the passengers and accordingly switch the lights and fans over that seating arrangement.

1. Introduction

In this era of development, technologies come and go. A new upcoming technology outrages the existing one. Following are the three facilities at the railway station for the convenience of the passengers. **Automatic mobile surface platform (AMSP)**

The movement of AMSP is under the controller system, which works according to the information received from the sensor placed at two different distances from the railway station. Also the manual control of AMSP is provided at the station controller in the form of switch. As a information to the passengers regarding the arrival status of train and movement status of AMSP, LED (green, white, red) and buzzer indications are provided.

1.1 Near field communication (NFC)

Near Field Communication (NFC) is a spin-off of RFID with an aim to bring contactless communication for everyday use. NFC is a radio frequency interface intended for interactions between tags and electronic devices in very close proximity.

1.2 Automatic Room Light Controller (ARLC)

This project aims at providing automatic room light controller facility at the waiting hall that takes over the task of controlling the lights and fans in order to save power. The sensors are provided at the corners of the seating arrangement to sense the presence of the passengers and accordingly switch the lights and fans over that seating arrangement.

2. Project Setup

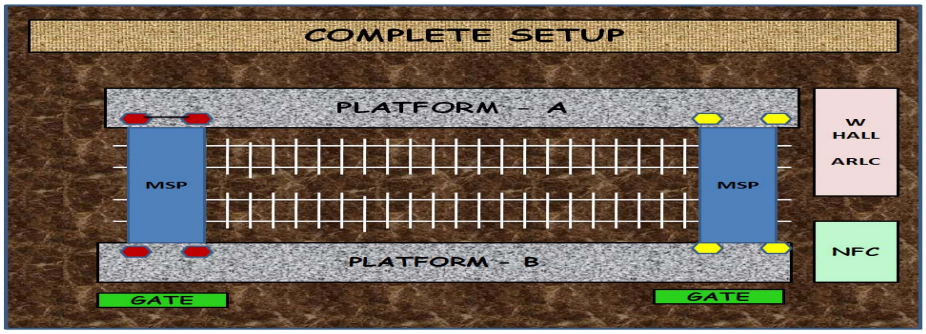

Fig. 1: Complete setup of the project.

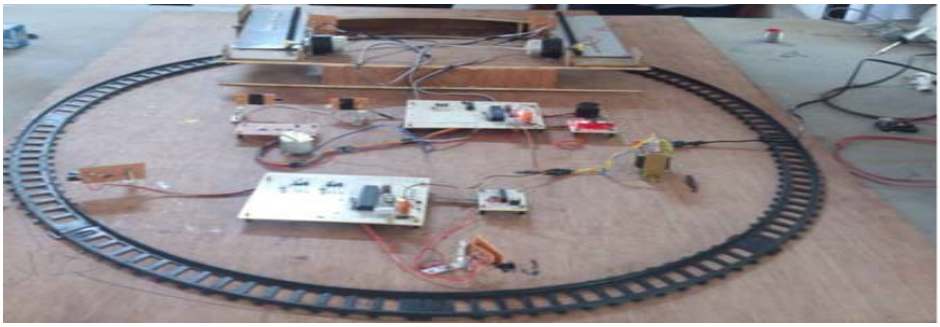

Fig. 2:-Practical Setup of the project.

3. Block Diagram

Transmitter

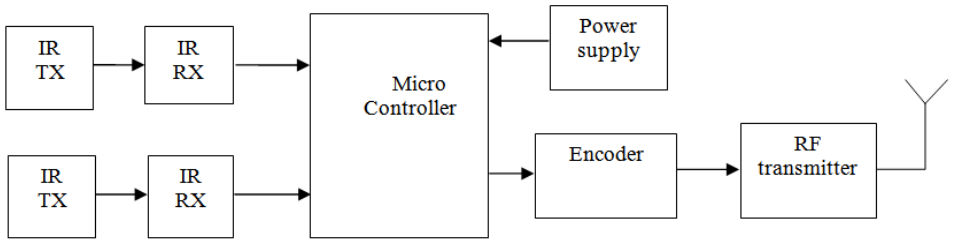

Fig. 4: Block diagram of RF transmitter.

Receiver:

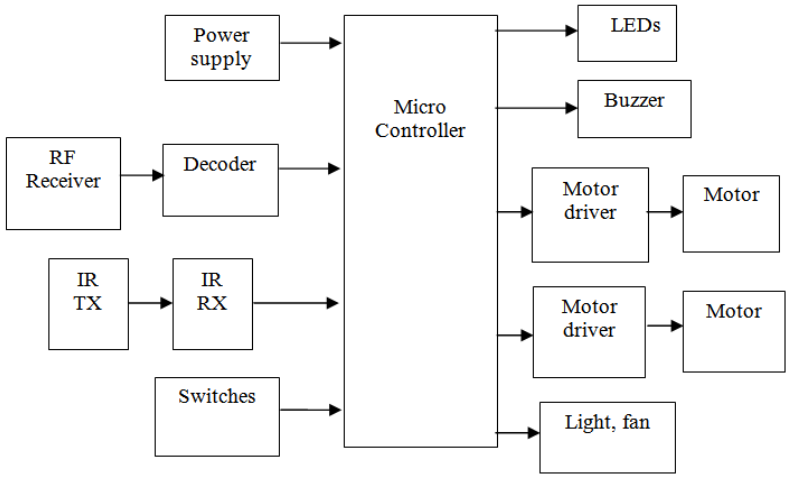

Fig. 5: Block diagram of RF Receiver.

Design and Implementation

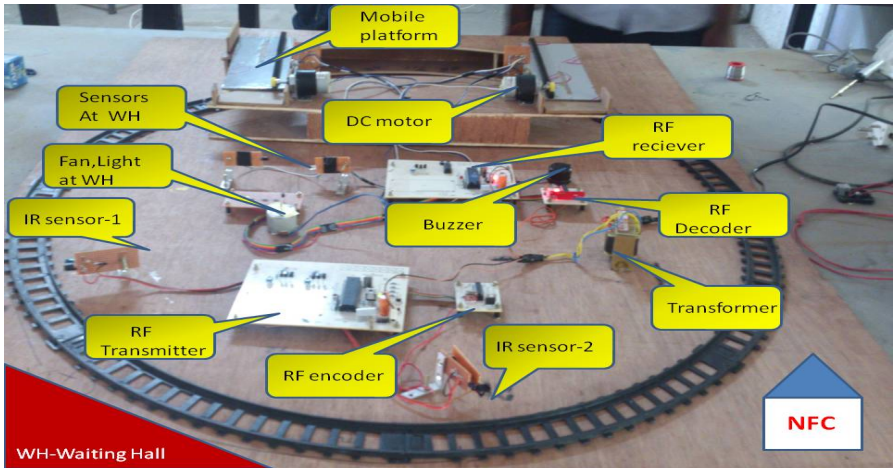

Fig. 6: Design of practical project setup.

4. Methodology

In this project we required operating voltage for Microcontroller AT89S52 is 5V. Hence the 5V D.C. power supply is needed for the IC's. This regulated 5V is generated by stepping down the voltage from 230V to 18V now the step downed A.C voltage is being rectified by the Bridge Rectifier using 1N4007 diodes. The rectified A.C voltage is now filtered using a 'C' filter. Now the rectified, filtered D.C. voltage is fed to the Voltage Regulator. This voltage regulator provides/allows us to have a Regulated constant Voltage which is of +5V. The rectified; filtered and regulated voltage is again filtered for ripples using an electrolytic capacitor 100µF. Now the output from this section is fed to 40th pin of AT89S52 microcontroller to supply operating voltage. The microcontroller AT89S52 with Pull up resistors at Port0 and crystal oscillator of 11.0592 MHz crystal in conjunction with couple of 30-33pf capacitors is placed at 18th& 19th pins of AT89S52 to make it work (execute) properly.The system has two sections transmitter section and a receiver section. The transmitter section consists of two IR sensors. When a train passes through the sensors they pass the information to the controller. Controller sends this information to RF encoder and transmits the information to the receiver section.

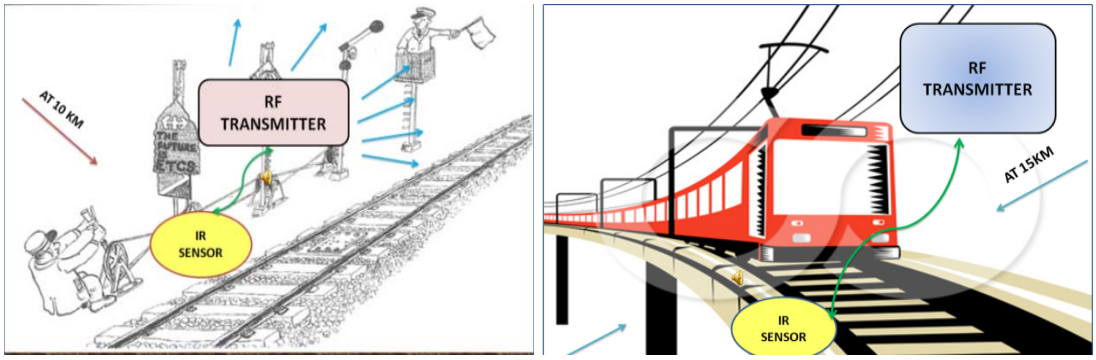

Fig. 7: RF transmitter and sensors location.

In receiver section the RF receivers the information and decodes it and sends the information to controller. According to the information received from the controller the respective LED (red, green, yellow) will glow. When the train passes through the first sensor a white LED will glow in the station indicating that the train is near to the station. When the train passes through the second IR sensor the red LED will glow, a buzzer indication is given and the mobile platform will open for the train to enter in to the station. After the train enters in to the station the station master closes the mobile platform with the help of switch1 for the passengers to cross the bridge. When all the passengers cross the bridge the station master will again open the bridge by pressing the switch2 and a green LED will glow indicating that the train is ready to leave the platform.

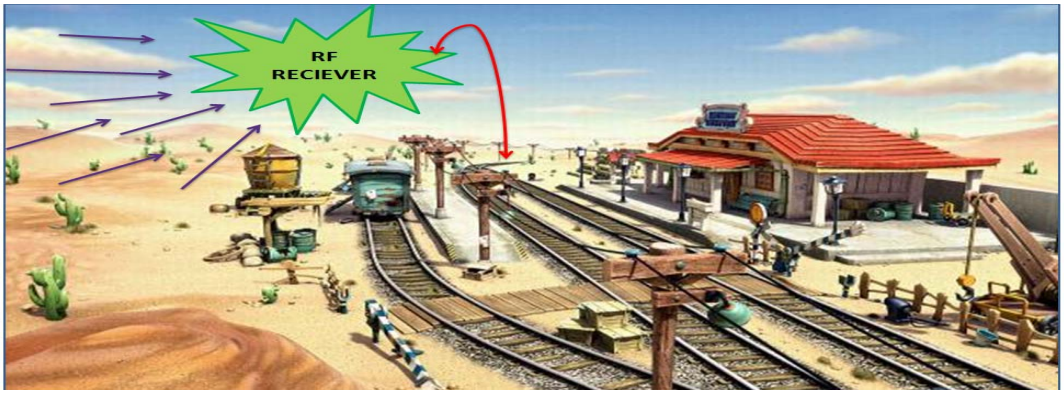

Fig. 8: RF receiver location.

After the train leaves the platform the station master will again close the bridge for the passengers to cross the bridge and a green LED will be in ON state. Generally we have waiting halls in the stations for the passengers to wait if there is any delay in the train timings. In this when a person enters in to the hall the IR sensor senses the person and sends the information to the controller. Controller will turn ON light and Fan automatically when it receives the information. NFC is one of the facilities in this project, provided in the railway station in the form of NFC information corners. NFC tags are placed at NFCcorners.NFC tags are uploaded with the useful information to the passengers, such as URL address of city railway station, city map etc. This information if required can be downloaded by passengers just by tapping the NFC phone to the NFC tag.

Fig. 9: Information through NFC tapping.

5. Applications

5.1 Fast facility is Mobile surface platform above the railway tracks.

- Mobile surface platform serves as shortest path along the platform surface to cross the railway tracks for the passengers(especially senior citizens, physically disabled and luggage carriers) as shown in fig.10.
- We can easily transfer heavy goods from one platform to another.

Fig. 10

- Secondly we are providing a Automatic room light controller in waiting hall of railway stations.
  - This facility will turn on and off the lights and fans only in presence of persons on the seating arrangement.
  - Third facility is NFC hub; here we will be providing these applications for public as a source of information.
  - NFC chips containing URL address of railway station which will help know PNR status just by tapping the NFC enabled cell phone(URL address)
  - NFC smart poster containing map of railway station and the city map (Image).
  - NFC chip containing the database of various lodging hotels in the city and also about the transportation facilities inside the city.

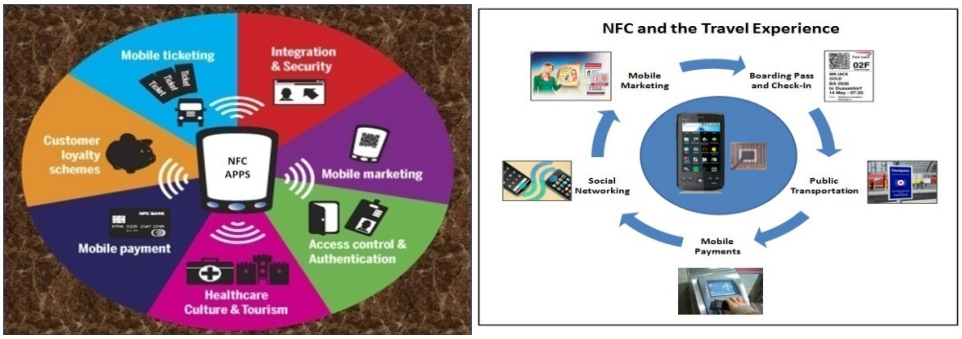

Fig. 11: NFC applications.

Merits

AMSP (Automatic mobile surface platform)

1. It provides shortest path to cross the platforms.
2. It consumes less time to cross the platforms.
3. It avoids discomfort to passengers (especially senior citizens, physically disabled people and also the luggage carriers) by avoiding up and down movement through foot over bridge

NFC (Near Field Communication)

1. It provides easy access to know the PNR status, railway livings etc., by one touch (tap).
2. Its echo friendly.
3. Its environmental changes independent.
4. It can be accessed by kids to the senior citizens.

ARLC (Automatic room light controller with single door bidirectional visitor counter)

1) It saves electricity.
2) Maintenance work is less.
3) Cost is less.
4) More reliable.

Result

AMSP: When train passes through IR sensor-1, the message 0x0a is encoded and transmitted by RF transmitter section and is received by RF receiver section after decoding it. The receiver microcontroller makes the white LED to glow. If train passes through IR sensor-2, the message 0x05 is encoded and transmitted by RF transmitter section and is received by RF receiver section after decoding it. The receiver microcontroller makes the red LED to glow, buzzer to blow, and closed AMSP to open. When station controller presses switch-1, opened AMSP closes white LED glows. When station controller presses switch-2, closed AMSP opens, green LED glows.

WAITING HALL: When the passenger takes rest on the seat, blocking the two sensors, placed at extremes of seat, the light and fan get ON.

NFC: When a NFC enabled phone is tapped to the NFC tag, the information i.e., URL address of city railway station and city map appears on the main screen of phone.

6. Conclusions

The project “has been successfully designed and tested”. Integrating features of all the hardware components used have developed it. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Secondly, using highly advanced IC’s and with the help of growing technology the project has been successfully implemented. The proposed system is found to be user friendly for the passengers, making their journey easy and comfortable, which can be implemented as a real time facility at the railway station.

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