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Automatic Timetable Management System Using Raspberry Pi and RFID Reader

P.Kanvitha[1], D.Suneel Varma[2]
ECE department[1,2],CIET,Guntur[1],BEC Guntur[2],
Email: kanvitha.prv@gmail.com[1]

Abstract-In recent days the problem faced by many education institutes is scheduling the timetable and modifications in case of any employee absent. Many automatic timetable scheduling software already exist but the problem arises when any employee is unable to attend his work. The main aim of this paper is to schedule the timetable and make change in the timetable when sudden changes or modifications are required. The changes are to be done when any employee is unable to attend his duties then it must be attended by co-employee. In this paper a hardware module is designed which reminds the employee about his duties before 10 minutes and also in any modification cases the modified duties also reminded before 10 minutes through short message system(SMS). The hardware module used in this is Raspberry Pi, which have loaded information about the timetable schedule and corresponding modifications.

Index Terms-Raspberry Pi 2, RFID, GSM board, timetable, display, classroom.

1. INTRODUCTION

The main aim of this paper is to intimate staff about their class. In this system we use GSM (global system for mobile communication) modem to communicate the staff. This is a wireless technology, which shows the improvement in technology in a right way's. GSM normally the data required is been loaded in microcontroller's ram and the total schedule of the college is considered here. This is an emerging technology which is regularly in use, but data must be loaded. Normally staff check's the time table for every class by using this system we can overcome these types of problems. Normally these are placed near HEAD OF THE DEPARTMENT or any person who assign time table. By this system, employee doesn't require to check the time tables every time. Simply they are been intimated through sms before 10 minutes. In case faculty not attended for the class automatically after 10 minutes message will be sent to the HEAD OF THE DEPARTMENT, then he can take care of the issue.

Existing Method: Normally every faculty member has to check about their next class. Sometimes faculty may forget about their next class. As a result faculty did not attend his/her class in time. By this existing method, we can alert the faculty for their next class and also come to know that whether the faculty member is to attend the class in time or not using GSM technology and RFID Reader. In this existing method, message will send to faculty before 5 minutes about their next class and If the faculty member did not come class in time, then message will automatically send to HOD that particular faculty did not attend his/her class in time using RFID Reader.

2. IMPLEMENTATION METHOD

The main reason behind this implementing method is to write a code for changing the timetable or any sudden modifications are happen or occur in the timetable using Python language in raspberry Pi. In this implementing method, messages send to the faculty about their next class before 5 minutes using GSM Module, HOD come to know that faculty member attend the class in time or not using RFID Reader as well as if there is any one of the hours has to change in timetable, it is also possible and sends message to faculty and HOD according to changed timetable.

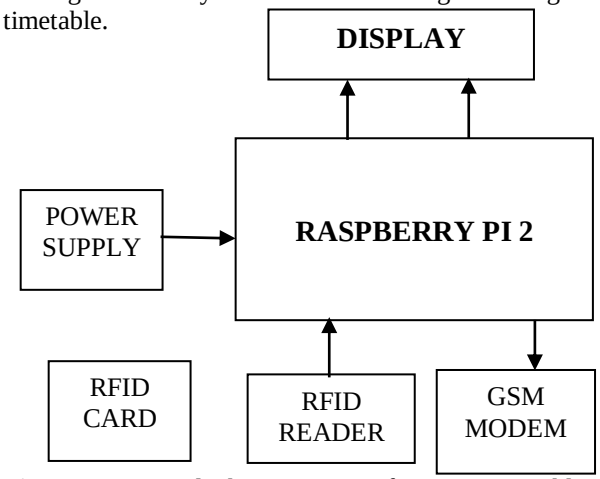

Figure 1 : Block Diagram for Time Table Management System using Raspberry Pi and RFID.

3. HARDWARE MODULES USED

3.1 GSM

GSM (Global System for Mobile communications) is an open, digital cellular technology used for transmitting mobile voice and data services.GSM supports voice calls and data transfer speeds of up to 9.6 kbps, together with the transmission of SMS

(Short Message Service).GSM operates in the 900MHz and 1.8GHz bands in Europe and the 1.9GHz and 850MHz bands in the US. GSM services are also transmitted via 850MHz spectrum in Australia, Canada and many Latin American countries. The use of harmonized spectrum across most of the globe, combined with GSM's international roaming capability, allows travelers to access the same mobile services at home and abroad. GSM enables individuals to be reached via the same mobile number in up to 219 countries. Terrestrial GSM networks now cover more than 90% of the world's population. GSM satellite roaming has also extended service access to areas where terrestrial coverage is not available.

3.2 Raspberry pi

The Raspberry Pi is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Found at ion to promote the teaching of basic computer science in schools and in developing countries. The original model became far more popular than anticipated, selling outside its target market for uses such as robotics. It does not include peripherals (such as keyboards, mice and cases). However, some accessories have been included in several official and unofficial bundles. According to the Raspberry Pi Foundation, over 5 million Raspberry Pis were sold by February 2015, making it the best-selling British computer. By November 2016 they had sold 11 million units, and 12.5m by March 2017, making it the third best-selling "general purpose computer". In July 2017, sales reached nearly 15 million.

Figure 2 : Hardware Raspberry Pi

4. OVERVIEW

4.1 RaspberryPi2ModelB

TheRaspberry Pi 2Model B is the third generation Raspberry Pi. More than 10x faster than the original Raspberry Pi B. Wireless LAN & Bluetooth have been added to this powerful credit-card sized single board computer which makes this ideal for connected & IoT applications . Same footprint & connections allow easy migration. The new 5V1 2.5A power supply is required as well as the NOOBS software rev.1.5m for the RaspberryPi2 ModelB.

4.1.1 *RFID*

Radio-frequency identification (RFID) is an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders.An RFID tag is an object that can be applied to or incorporated into a product, animal, or person for the purpose of identification using radio waves. Some tags can be read f Radio Frequency Identification (RFID) involves contactless reading and writing of data into an RFID tag's nonvolatile memory through an RF signal. An RFID system consists of an RFID reader and an RFID tag. The reader emits an RF signal and data is exchanged when the tag comes in proximity to the reader signal. The RFID tag derives its power from the RF reader signal and does not require a battery or external power source.

Specifications:

Audio Type	3.5 mm Jack, HDMI USB 4 x USB 2.0 Connector
Brand/Series	Raspberry Pi 2Series
Card Slot	Push/Pull Micro SDIO
Dimensions	85 x 56 x 17 mm
Interface	USB, Bluetooth 4.0,HDMI
Memory	LPDDR2
Operating System	Boots from Micro SD Card, running a Version of Linux or Windows 10 IoT
Power	Micro USB Socket 5V1, 2.5A
Processor Speed	1.2 GHz
Processor Type	Quad-Core ARM Cortex- A53
RAM Size	1 GB
Special Features	802.11 b/g/n Wireless LAN and Bluetooth 4.1 (Bluetooth Classic and LE)
Type	Single Board Computer (Open Frame)
Video Output	HDMI, Composite RCA (PAL and NTSC)

4.2 Transponder Tk 5530

The TK5530 is a complete transponder, which implements all important functions for immobilizer and identification systems.

Features:

- Identification Transponder in Plastic Cube.
- Basic Component: e5530 IDIC Includes Coil and Capacitor for Tuned Circuit Antenna Carrier Frequency: 125 kHz.
- It consists of a plastic cube which accommodates:
- The read-only IDentification Integral Circuit (IDIC) e5530.

- The antenna is realized by a LC-circuit.

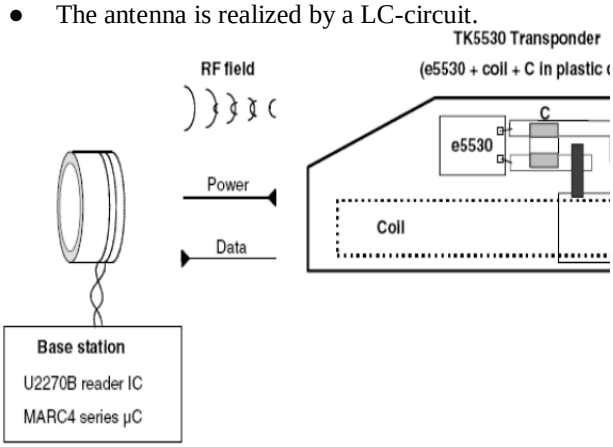

Figure 3 : TK5530 transponder

4.3 Antenna

The antenna consists of a coil and a capacitor for tuning the circuit to the nominal carrier frequency of 125 kHz. The coil has a ferrite-core for improving the readout distance.

4.4 Python Idle

IDLE is Python's Integrated Development and Learning Environment.

4.4.1 *IDLE has the following features:*

- Coded in 100% pure Python, using the tkinter GUI toolkit.
- Cross-platform: works mostly the same on Windows, UNIX, and Mac OS X.
- Python shell window (interactive interpreter) with colorizing of code input, output, and error messages.
- Multi-window text editor with multiple undo, Python colorizing, smart indent, call tips, auto completion, and other features.
- Search within any window, replace within editor windows, and search through multiple files (grep) debugger with persistent breakpoints, stepping, viewing of global and local namespaces configuration, browsers and other dialogs.

Advantages

- Reduce paper work.
- Saves the time with mobile.

Disadvantages

- In case of GSM, SIM cards, individual authentication keys users are stored in the authentication centers.
- If the SIM gets lost, one can lose all the data, if the same is not saved in the phone.

5. EXPERIMENTAL RESULTS

In this section the hardware module implemented, the python code for the Raspberry Pi and the remainder SMS received faculty are shown. Figure 4 shows the hardware implementation which connects the modules to Raspberry Pi. The python code is loaded to the Raspberry Pi. In normal situation faculty receive a message reminder about the class before 10 minutes. If any faculty is unable attend his duties the modification has to be done in the python code which is shown in figure 5. In figure 6 it shows the reminder sending to the faculty who adjusted the duties of other. In case the faculty not attended class then a message is send to the HOD about the absence of faculty in the class through message and its corresponding python code is shown in figure 7. In figure 8 it shows the message received by HOD when faculty not attended the class after 10 minutes of commencement of class time on left and on right it shows the message received by the faculty about the class.

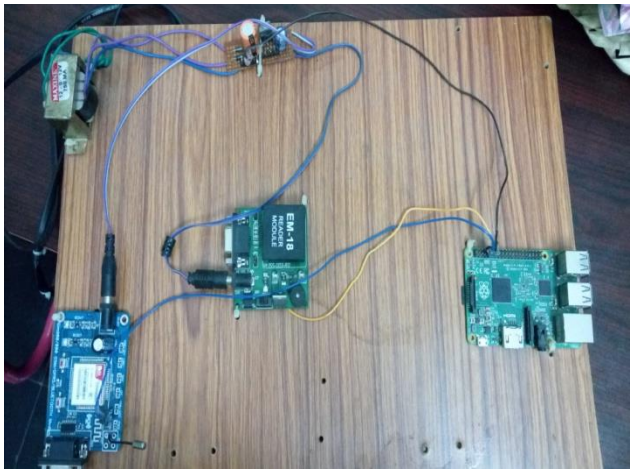

Figure 4 : Hardware implementation

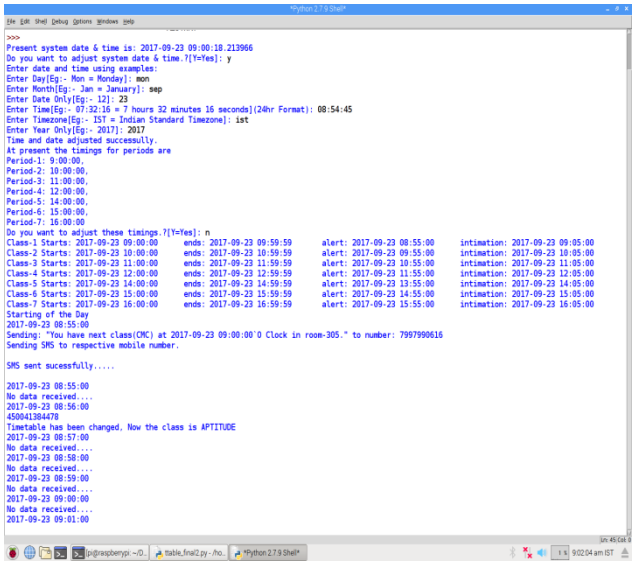

Figure 5 : Modifications in timetable.

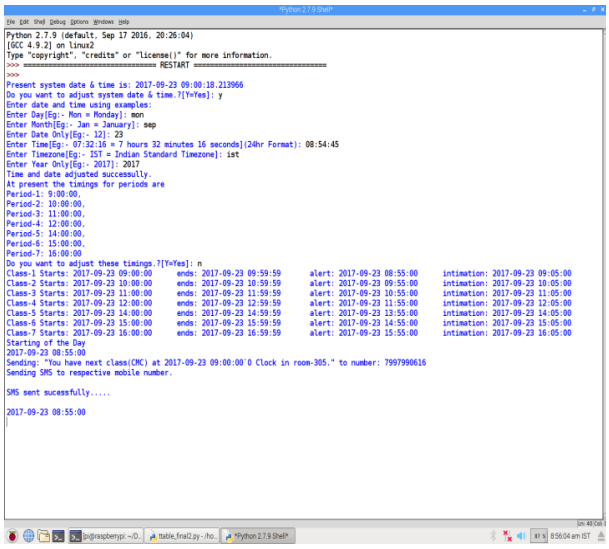

Figure 6 : Sending remainder to faculty with modification.

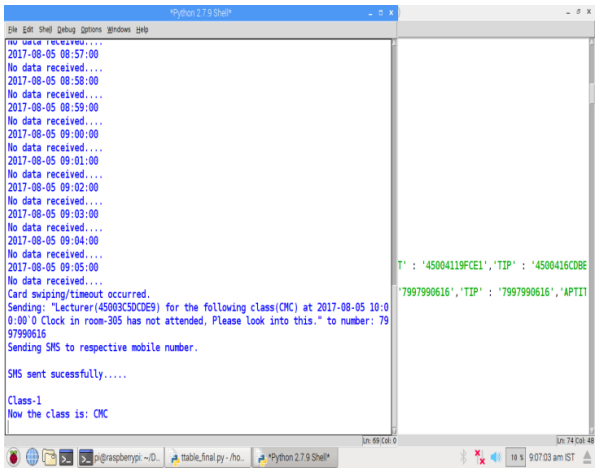

Figure 7 : Sending information to HOD about class room without faculty.

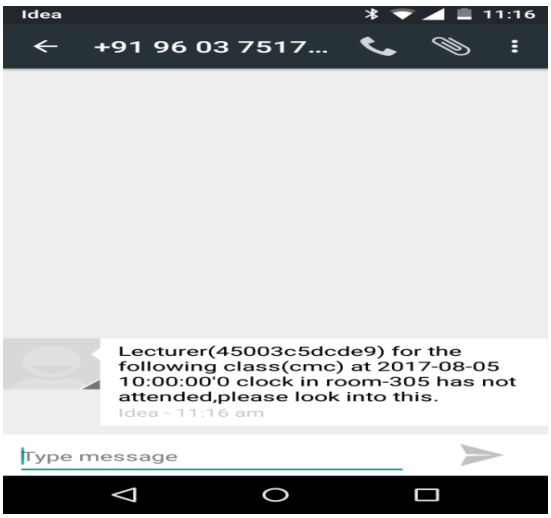

Figure 8 : Message to HOD about the class without faculty.

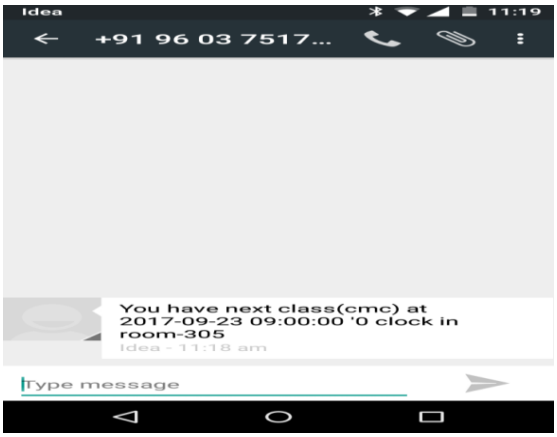

Figure 9 : Message received by faculty before 10m of class.

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