

Electronic notice board using GSM and Raspberry Pi

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Abstract - The project deals with an electronic notice board using Raspberry Pi 3 microcontroller and GSM SIM900 module. An idea behind that notice board is widely used for displaying notices, at public places for people awareness and various advertisements; now we are using same technology for displaying message as notice using GSM and Raspberry Pi. This project is a remote device with GSM modules connected to Raspberry Pi controller, so when the user wants to display a notice, user will send the notice as message on mobile and send it as notice. That message will update the display on the LCD as it is.

Key Words: Raspberry Pi 3 microcontroller, GSM SIM900, LCD display, High Definition Multimedia Interface, Python GUI programming, TKinter

1. INTRODUCTION

In this project, a Raspberry Pi used as controller which controls LCD display using GSM. To access LCD through Raspberry Pi by using GSM technology. A remote device project with GSM modules, so if the user wants to display some notice, user will send the notice as messages just by typing through mobile and send it. That message will update notice on the display LCD as it is. This project uses a compact circuitry build around Raspberry Pi controller. Program are developed using Python GUI programming (TKinter). Raspberry Pi 3 module use GSM technology of mobile communication network module which uses SIM card to communicate digital notice board through message.

The think behind such project is now-a-days advertisements goes digital. Big shops and in shopping malls they are using digital moving displays. In Airports, Railway station, Bus stands, everything like tickets, platform numbers..., etc. is displayed on digital/electronic moving display. But in these displays if they want to show another message the message or to change style of display format they have to go there and connect the display to PC or laptop. If they want to display new message about something 5 minutes requires. Here were designing a new technique to display notice which can access remotely. We are using Raspberry Pi controller with GSM technology to access the display through by

communication between microcontroller and mobile. It also reduce usage of paper as notices are displayed everywhere by electronically and make communication easier and faster. It can be operated by direct messages form SIM or by using particular website created by us for sending messages.

1.1 COMPONENTS

The components used in this project are:

A. Raspberry Pi module

Raspberry Pi is series of small single board computer. It consists of quad -core 64 bit ARM Cortex A53 clocked at 1.2 GHz, CPU: 400 MHz video core TV multimedia, 1 GB LPDDR2-900 SDRAM memory, HDMI, composite video (PAL and NTSC) via 3.5 mm jack, 4 USB port, 17 GPIO peripherals, support 802.11n wireless LAN, 10/100 Mbps Ethernet[8]. System on chip used Broadcom BCM2837.

B. GSM SIM900 Module

A GSM SIM900 module has been interfaced with Raspberry Pi based on quad -core 64 bit ARM Cortex A53. It is connected to Raspberry Pi with wires. GSM consist of a SIM card holder, connection using serial ports, to sending/receiving signals to the SIM through an antenna and an LED as status for power, signal and incoming call. It support features like data/ fax, voice, SMS and GPRS at both 1800 MHz and 900 MHz. Can be operated at temperature range -40°C to 85°C, and also it consist of TCP/IP protocols

C. LCD display

This LCD has been used to display the notice sent by user. It is 16:9 resolution screens. In this project we used 16:9 resolutions Alphanumeric and also graphical display. We also can use monitor of computer for displaying these messages and also can use LED displays.

D. High-Definition Multimedia Interface

HDMI (High-Definition Multimedia Interface) is the audio and video interface for transmitting/receiving digital audio data and video data from HDMI-

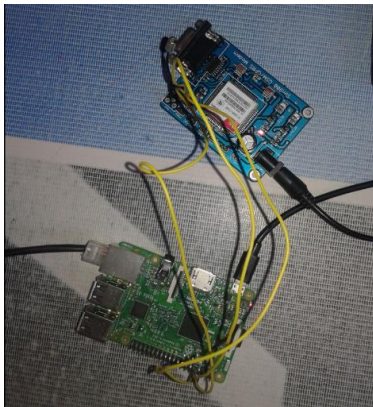
compliant source devices like a display controller, to a compatible computer or laptop monitor, video projector, digital television. It is Digital Video interface backward compatible. It has high bandwidth digital connection protection.

E. Python GUI programming

Python having different options for developing with graphical user interfaces (GUIs) .Tkinter having the standard GUI library provided for Python. Tkinter provides various controls, such as buttons, labels and text boxes used in GUI applications.

1.2 INTERFACING CIRCUIT AND SOFTWARE

1.3 HARDWARE INTERFACING



Interfacing of Raspberry Pi with GSM module

Fig -1: Interfacing diagram of Raspberry Pi and GSM

Interfacing of Raspberry Pi and GSM module using GPIO pins of controller. Raspberry Pi is 64 bit microcontroller with 40GPIO pins, for GSM interfacing we has to do three connection , first from TXD (GPIO 14) of controller to GSM RXD pin, and RXD(GPIO 15) of controller to GSM TXD pin and connect GSM ground (GND) pin to controller GND pin.

I. Interfacing of Raspberry Pi with LCD



Fig -2: Interfacing diagram of Raspberry Pi with LCD

Interfacing of LCD with Raspberry Pi using HDMI cable. Raspberry Pi supports HDMI cable for interfacing audio and video for transmitting/receiving audio and video information. Raspberry Pi have in built HDMI port so not

required special interfacing connection, we have to just plugged the HDMI cable.

A.SOFTWARE SIMULATION

Raspberry Pi has its own operating system. To program the Raspberry Pi we used Python language with the help of Python GUI programming (TKinter). Tkinter is the standard GUI library for Python. It provides object oriented interfacing to the TK GUI toolkit

2. RELATED WORK

An Xbee was used communication rather than GSM for smart home automation system [1]. Some of home automation system using PIC16F887 IC with GSM module use SMS service of mobile [3]. In [2], they used sensors for smart phone application using microcontroller. In [4] a wireless remote power controller was built in 2011. Also some important GSM based system was developed in [5], [7].

3. CONCLUSION

The project is developed using 64 bit microcontroller, GSM and digital display successfully. It reduces effort of user just by sending only a SMS, as it consist of GSM that operate from anywhere. This digital display has very fast and quick response. This digital display updates notice quickly by a simple SMS. In future SMS system can be replace by using other messaging systems like WhatsApp, Facebook or twitter etc.

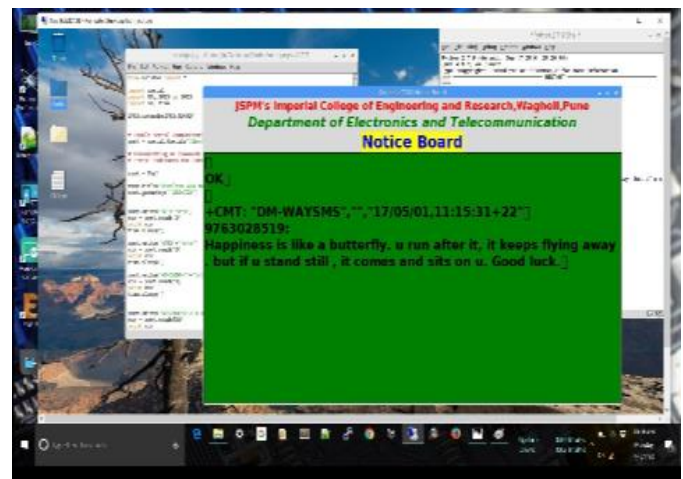


Fig : actual output window displayed on LCD screen

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