

# International Journal of Innovative Research in Science, Engineering and Technology

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## Pi phone –A Smartphone using Raspberry Pi

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**ABSTRACT:** The Raspberry Pi is a low cost single-board computer which is nowadays become so popular. In this system we used a low cost stand-alone device which transmits data using the Raspberry Pi and has a resistive touch screen display providing a user interface. The display contains a graphical user interface which provides data entry via an onscreen keyboard. Also the system for the same has been developed in python environment which the default is programming environment provided by Raspberry Pi. Results show the efficient implementation of proposed system for smartphone. With a smartphone, waiting for things becomes less of a pain because you can keep yourself entertained. Having a smartphone makes it much more convenient to check your email, social media or even your bank account while on the go. But there are also limitations of smartphone because we cannot connect directly to a USB or Ethernet cable with our phone and other multiple devices. So we provide the solution of that making pi phone using raspberry pi which is advancement in smartphone.

**KEYWORDS:** Global Positioning System (GPS), Global System for Mobile Phone (GSM), Raspberry pi, Smartphone, Touch Screen.

### I. INTRODUCTION

Mobile Phones and their related technologies are becoming so popular. Various technological in the field of Tele-communication and Embedded Systems have come near to the common people. The people having cell phones are on the rise day by day. A day will come, somewhere in the future, when the mobiles are referred to in the same class of Food, clothing and shelter. Improvements in the Networking technologies are increasing. Land line telephones have been becoming outdated and people now prefer communicating while on the move. It's more of a proof of concept to see what could be done with a relatively small form factor with cheap components. The mobile phone or cellular phone is one from of telecommunication that is based on wireless connection via a network of broadcast towers distributed within a certain area. The development of mobile phones led them to be more than merely voice communication means. But have started to be used as small computer devices to receive and send emails, surf the internet.

In this Raspberry Pi Mobile Phone Project, we have used GSM module and Raspberry Pi to control whole system's features and interfacing all the components in this system. A TFT is used for taking all kind of inputs like Enter mobile number, type messages, make a call, receive a call, and send SMS, read SMS etc. We also use python language. GSM Module SIM900A is used to communicate with the network for calling and messaging purpose. We have also interfaced a MIC and a Speaker for Voice Call. We also execute programs on smart phone. We can install electronics related software into raspberry pi using mobile phone so that we can design mobile phone itself instead of carrying laptop or computer. Global positioning System is used for location tracking of mobile phone and shows its current position.

A majority of new mobile phones from the 21st century are smartphone. These phones can be used for email, browsing the internet, playing music and games, and many other functions that computers can perform. This is because mobile phones basically are small computers. Older phones also used computer technology, but lacked many of the parts of a computer that were too big to fit into a phone. Modern phone makers have been able to use smaller parts. The

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proposed system which consists of GPS receiver, GSM modem, and embedded controller. The users of this application can monitor the location graphically on Google Earth.

## II.LITERATURE SURVEY

Pi Phone - A Raspberry Pi based Cellphone [1] this paper they successfully designed smartphone using raspberry pi kit 3. In this they made Raspberry Pi 3 using cellphone. From this interfacing with different modules and also information of smartphone using raspberry pi. Design a Mini Operating System for Mobile Phone [2] Due to the development witnessed in the field mobile phone and the development of their operating systems added to the increase in number of users and many businesses that have relied on them, a large number of programmers have started to develop special operating systems for these phones and building applications that meet the demands of the users and facilitate a great number of businesses. The proposed work is designing a mini-operating system for managing some special features of the mobile phone. The operating system designed in this work is based on multitasking –multithreading with mixing of preemptive and cooperative mode. The functions and features chose where those related to message management for sending and receiving SMS.

Smartphone application that used in healthcare [3] Mobile technology has the potential to revolutionize how physicians practice medicine. During recent years, many physicians have been simultaneously using a pager, cellular telephone, and personal digital assistant (PDA) to keep in communication with the hospital and to access medical information or calendar functions. Many physicians have begun replacing multiple devices with a “smart-phone,” which functions as a cellular telephone, pager, and PDA. The goal of this article is to provide an overview of the currently available platforms that make up the smart-phone devices and the available medical software. Each platform has its unique advantages and disadvantages, and available software will vary by device and is in constant flux. Intelligent Anti-Theft and Tracking System for Automobiles [4] an efficient automotive security system is implemented for anti-theft using an embedded system occupied with a Global Positioning System (GPS) and a Global System of Mobile (GSM). The client interacts through this system with vehicles and determines their current locations and status using Google Earth. The user can track the position of targeted vehicles on Google Earth. Using GPS locator, the target current location is determined and sent, along with various parameters received by vehicle’s data port, via Short Message Service (SMS) through GSM networks to a GSM modem that is connected to PC or laptop. Location Based tracking [5] as the user travels with an Android device, our Route Tracker application monitors the user’s location and bearing, visually displaying a route on a map. The user touches the ‘Start Tracking’ toggle button to begin tracking a route. The map shifts as the user moves, keeping the users current location centred on the screen. The route is basically a red line with black dots appearing every 10 data points received by the application.

## III.PROPOSED SYSTEM

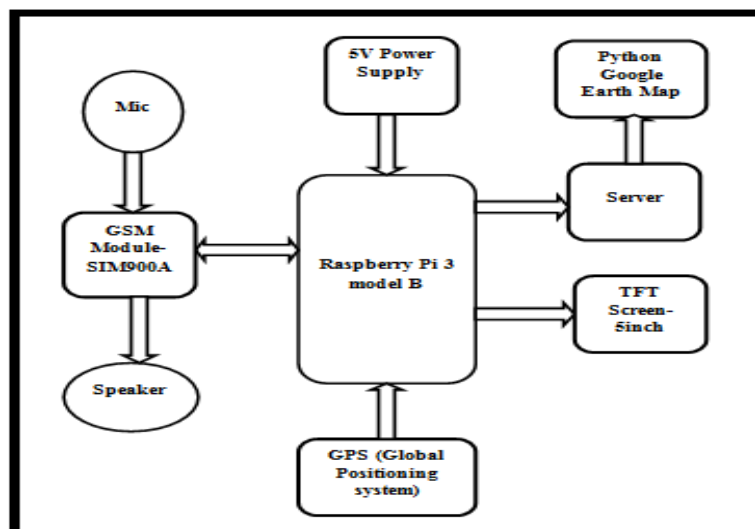


Fig 1: Block diagram of Proposed System

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The block diagram of proposed system is shown in Fig.1. When a mobile phone is switched on, its radio receiver finds a nearby mobile phone network base station, and its transmitter sends a request for service. Computers in the base station check if the phone is allowed to use the network. The base station covers an area called a cell. A phone can move between different cells, but will only communicate with one cell at a time. This is why mobile communications are sometimes called cellular communications. This is using GSM module SIM 900A. GSM is used for calling and messaging. Mic and speaker are used for voice call. Once connected to a station, the mobile phone can make calls. Because the network knows that the phone is connected to that particular cell, it can also route calls to the mobile phone. Sometimes the radio connection to the cell is lost, for example when you go underground. This means the phone cannot make or receive calls until the connection is made again. GPS is used location tracking of mobile phone and it show current position of phone using google earth.

### 3.1 Hardware Description:

1. *Raspberry pi 3 model B*: It is used for controlling and management of all functions which having following features.
  1. Processor: Broadcom BCM2387 chipset.1.2GHz Quad-Core ARM Cortex-A53802.11 b/g/n Wireless LAN and Bluetooth 4.1
  2. Memory: 1GB LPDDR2, Operating System Boots from Micro SD card, running a version of the Linux operating system or Windows 10
  3. Dimensions: 85 x 56 x 17mm
  4. Power : Micro USB socket 5V1, 2.5A
2. *GSM Module-SIM900A*: It is used for calling and messaging of mobile phone.
  1. Dual band GSM/GPRS 900/1800MHz.
  2. SIM card holder.
  3. Built in network status LED.
  4. Operating voltage: +12V DC
  5. Weight: <140g
3. *TFT Screen*: It is used for performing task and displays all functions.
  1. AR 110 Restive touch screen
  2. 24 bit color pixel
  3. Display resolution: 800 \*480
  4. Display: 5' with 50mA backlight.
4. *Mic*: It is used to when we dial a number or make a call then it will decode our speaking sound.
  1. Model CML
  2. Omni directional
  3. Low impedance
  4. Range 100cm
  5. *Speaker*: Speakers on mobile phones are used to produce sound alerts for events such as incoming calls, incoming messages and alarms. It is used to decode the data when we will receive the call.

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### IV.FLOWCHART

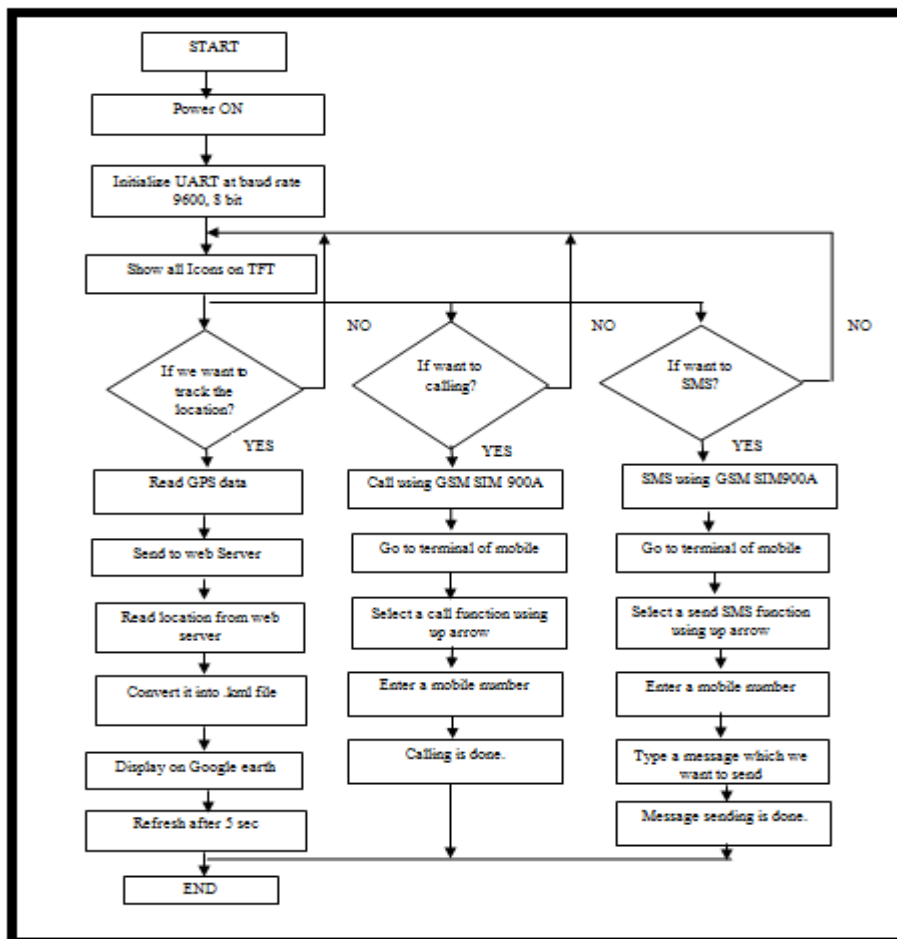


Fig 2: Flowchart of System

#### 4.1 Flowchart Description:

- Step1: When mobile phone is turn on, wait for reception of values from GSM 900A and Connecting with GSM.
- Step2:TFT can show all icons on mobile screen, if we want call facility then click on the call icons then go to keypad ,dial a number and make a call using GSM 900A.
- Step3: If we want to call the calling function is done by using GSM900A first go to terminal.
- Step4: Select the calling function by using upward arrow the calling function is sudo python swati.pi
- Step5: Enter the mobile no which we want to call
- Step6: Calling is done
- Step7: For send SMS go to terminal
- Step8: Select a send SMS function using arrow
- Step9: Enter a mobile number which we want to send the SMS
- Step10: Type a message
- Step11: Message sending is done
- Step12: For finding the location of our phone

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- Step13: Read the GPS data
- Step14: Send to the web server
- Step14: convert in to the kml file
- Step16: display on Google earth
- Step17: Refresh after 5 sec

## V.RESULT

### 5.1 Calling function:



Fig 3: calling function.

Results of calling and messaging functions are shown in above figures. Fig.3 shows the execution of calling function in that first go to terminal then go to start accessories then take key pad now select the calling function by using up word arrow the calling function is sudo python swati.pi then click on return button that is on key board then system will ask to enter the mobile no after entering the mobile number call will connect to the called party. The result is shown in fig.4

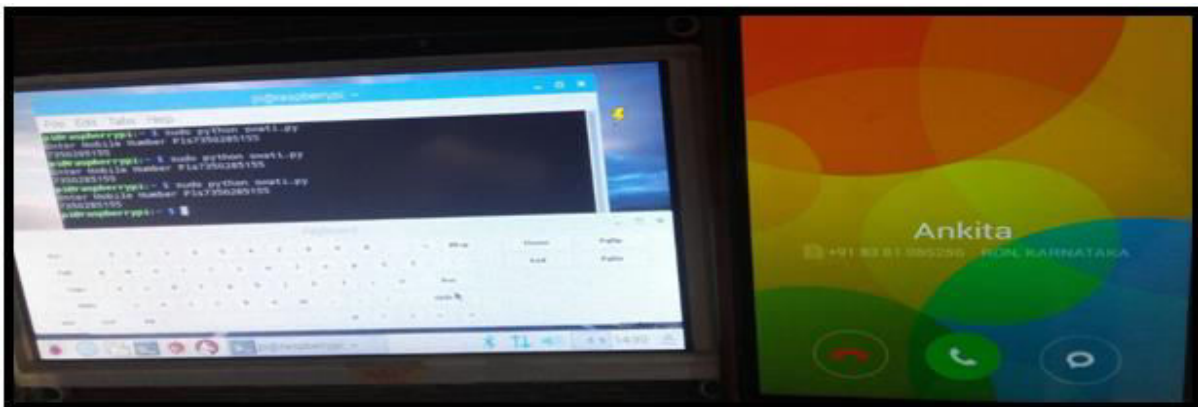


Fig 4: calling function result.

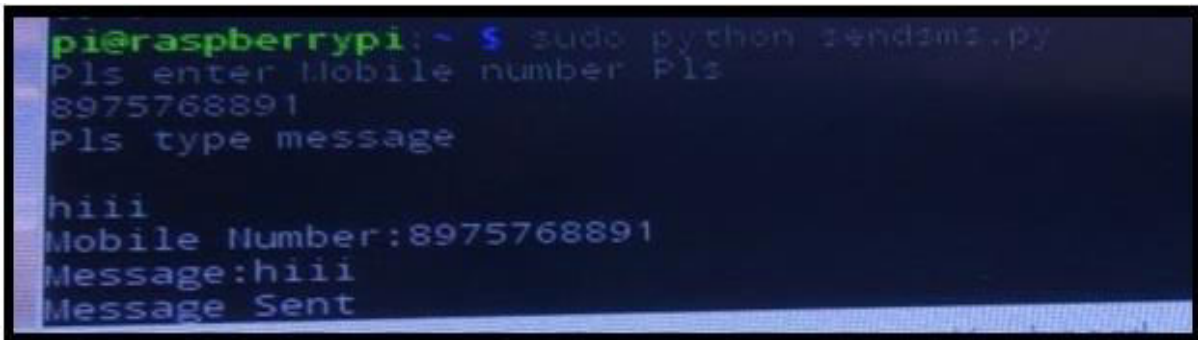
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### 5.2 Messaging function:



```
pi@raspberrypi:~$ sudo python sendsms.py
Pls enter Mobile number Pls
8975768891
Pls type message
hiii
Mobile Number:8975768891
Message:hiii
Message Sent
```

Fig 5: messaging function.

Fig.5 shows the execution of messaging function in that first go to terminal then go to start accessories then take key pad now select the messaging function by using up word arrow the messaging function is sudo python sendsms.py then click on return button that is on key board then system will ask to enter the mobile no after entering the mobile number it will ask for entering the message. After typing the message click on return button then now message is send. The result is shown in fig.6



Fig 6: messaging function result.



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### 5.3 Other function:

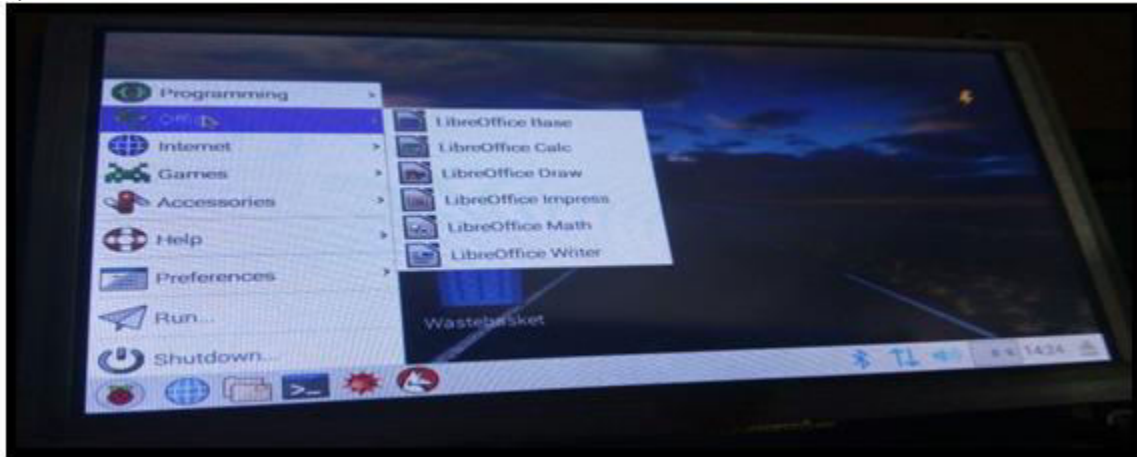


Fig 7: result of windows office.

Our system perform Microsoft office application that will help to create the document files power point presentations then result tables it can be useful for official use and educational purpose application provide by our system is shown in above figure.

### 5.4 Internet Applications:

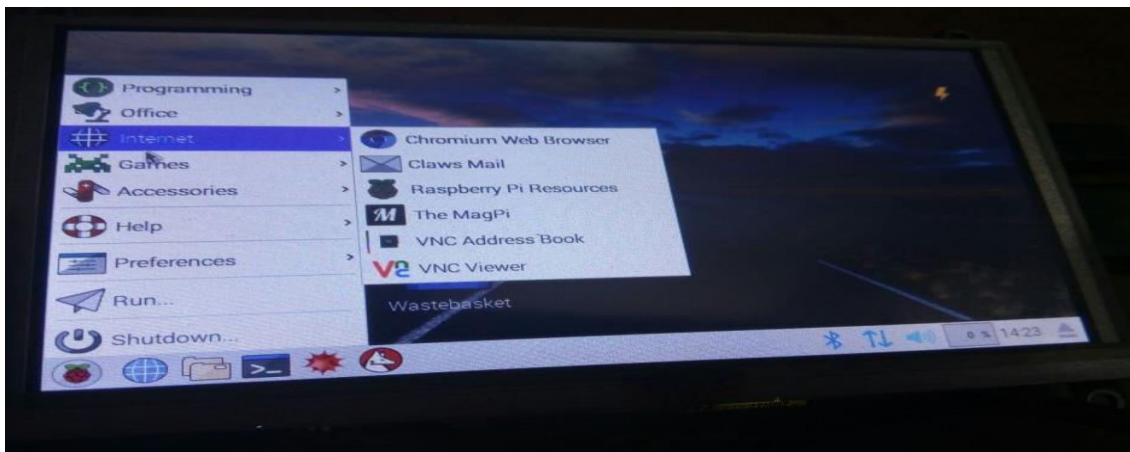


Fig 8: Internet browsing applications.

By using our system we can connect the LAN cable directly to the mobile phone by use of internet i.e. USB tethering by using that we can access the internet by sing LAN cable or by using Wi-Fi or by data. The internet applications are that support to our system is chrome mail and many applications that is shown in fig.8

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### 5.5 Final result:

When everything is built then our proposed system can be shown in following fig.9



Fig 9: phone model.

### VI.CONCLUSION

Recently, smart phones are becoming increasingly popular and the number there of has increased greatly in the past few years. It is clear that smart phones have become well integrated for the educational and industrial field, the proposed smart phone is more efficient because in that all features and function of laptops easily available, this is possible only when we used raspberry pi. There is no need of carry laptop other than carrying smart phone becomes easier. We successfully made a smartphone using raspberry pi 3 in which calling, messaging are possible. There is we write programs on editor and executes the programs on different platform or programming tool and also we design electronics circuits on mobile itself. There is various option to be available internet browsing, games, calendar, etc. We could locate current location of mobile phone so there are no chances of failure or misused of any user. Whatever important features available in laptop or computer could cover in our system.

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