A Futuristic Approach For Towerless Mobile Networks

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Abstract: -- **This project is an attempt to develop the mobile networks to have a wireless voice call happening without the help of the mobile networks. In order to develop an environment friendly wireless communication, our main aim is to remove the towers in the communication process. The towers have been hazardous to many birds and animals.This project uses the Raspberry Pi boards with the inbuilt wifi on board. The Rasberry Pi with the wifi is used for the prototype, which would be used to develop a voice call application which would transfer the voice through the wifi communication. It is proposed to develop this technology to be able to access only till the distance of 30 metres which is the distance limit of the wifi communication. It would be possible to move this communication to be expanded by the use of the Wimax technology which would be able to communicate in the range of kilometres. This project uses two Raspberry Pi kits with Wifi inbuilt on it and would be able to communicate by developing the voice call application and would be able to use the audio jack on the kit . A hardware implementation would be developed and the results would be analysed for performance.**

I. INTRODUCTION

The Raspberry Pi platform has gained wide popularity in the last few years because of its wide availability, ease to use and having excellent support and documentation, along with its low cost. The Raspberry Pi have mostly useful in the development of educational projects. It is capable of doing all those things such a PC can do, right from browsing the internet and playing high definition video, to make spreadsheets, word-processing. The processor of a Raspberry Pi system is a Broadcom BCM2835 system-on-chip (SoC) multimedia processor. But it does not have internal memory so that the SD card is used for booting and storage . This uses Linux and Debian based operating systems. We are using "Raspbian Wheezy".

The model we are going to use is Raspberry Pi B+ model which has 4 USB ports, and HDMI port and a 10/100 Ethernet controller. It requires 5V, 1.2 Amp power supply with micro-USB connector.
Taking the advantages of all features of raspberry pi live transmission of audio and video has been carried out with the help of VOIP protocol. Live chat on the raspberry pi nothing but to perform the audio transmission based on the ARM cortex V8 Raspberry Pi platform. Raspberry pi capable to perform the live audio & video streaming by using the gstreamer & gst-launch libraries. Live video streaming is done by connecting webcam to both the system & audio transmission by connecting speaker and usb mic to the system with keypad like old model mobile phones. It acts as the standalone system for the live audio data transmission without PC.

II. PROBLEM STATEMENT:

The higher usage of the tower in the communication has introduced lot of health hazards in the life of the human being and also there are many environmental issues like it uses more space for there would be a need to cut more trees. And in the same way it has disturbed lot of birds in the nearby areas and has made a big issue in the food cycle. Thus there is a immediate use of the towerless communication in the near future.

III HARDWARE REQUIREMENT:

Audio Jack: Regular available speakers are used for audio purpose.
USB camera: Easily available USB port camera is used for capturing image.

IEEE 802.11: This is IEEE standard used for the wireless Wi-Fi Network.

III. PROPOSED SYSTEM:

This project starts with the installation of LINUX operating system. After that we have to configure WI-FI Setting. Each device will have its own unique IP address. So we need to detect the IP address first and then connect. Next step is to connect the USB camera to the device .After configuring the camera configure USB headphones and also create WI- FI network ,if there is necessity one can create a password in order to secure the network. Install the IP address of Raspberry Pi kit. Install and configure VOIP and SIP protocol. At last connect a second user through VOIP and SIP. Same system arrangement is present to the second user.

Raspberry pi does not have in built memory for storing operating system and software packages, so it is necessary to boot a SD with raspbian operating system. raspbian wheezy OS is downloaded from official website of Raspberry pi foundation. For transmission of audio and video from one raspberry pi to another raspberry pi configuration of USB headphone, USB camera, Wi-Fi network and GUI is desired.

A) Installation of the "Raspbian Wheezy" Operating System:

Raspbian is a Debian-derived free OS optimizing specially for the Raspberry Pi hardware. Raspbianmostlyuses a Linux kernel also popular as the Debian GNU/Linux distribution. It comes along with over 35,000 packages and pre- compiled software bundled in a format that is easy for installation on the Raspberry Pi. The "wheezy-raspbian.Zip"OS file can be directly downloaded from Raspberry Pi"s official website. After downloading this ZIP file it is necessary to extract the OS image file into the SD memory card, for that purpose an image writer application "win32diskimager- v0.9-binary"[2] can be used. This software is used to write a raw disk image to a removable memory device. It is a free of cost and the program for it is open source. It is useful for any embedded development because of the source code can be branched and modified as per the requirement. After writing to SD card is finished, it is put in the SD card

slot of Raspberry Pi and switch it on so that initial booting of raspberry pi can start.[1]

B) Configuration of Audio jack and Mic:

The Raspberry Pi doesn't have socket for headphone. To record audio, it is necessary to use soundcard. Here we are using regular and easily available inexpensive speakers and mic for this purpose. For checking if Raspberry pi can read usb speakers and mouse , "lsusb" command is given in terminal window. This command displays all the devices those are connected to the respective USB ports. For speaker settings, ALSA (Advanced Linux Sound Architecture) is used. The ALSA provides audio and MIDI functionality to the Linux operating system. ALSA supports upto 8 sound cards, numbering from 0 to 7, each card is capable of input and output. Raspberry Pi image has already alsa-utils for sound. We can set up usb port by opening alsamixer GUI. We can set the desired settings there.

C) Wi-Fi configuration of Raspberry Pi:

The Raspberry Pi's network interface settings are configured according to desired Wi-Fi network.Wi-Fi connection with router present in the network.Mostly enterprise area and home networks connect to Wi-Fi network through gateway (router). These networks have certain settings and to connect them the Raspberry Pi must be configured accordingly. All the interfaces(local loop, Ethernet, Wi-Fi interfaces) are defined inside the network directory.

The static IP address assigned to the eachRraspberry Pi, the following configuration are used for matching the IP, Netmask and Gateway of the network.
allow-hotplug wlan0
iface wlan0 inet manual
address<desired static IP>
netmask<netmask used for that network>
gateway<router IP address of that network>wpa-roam /etc/wpa_supplicant/wpa_supplicant.conf.
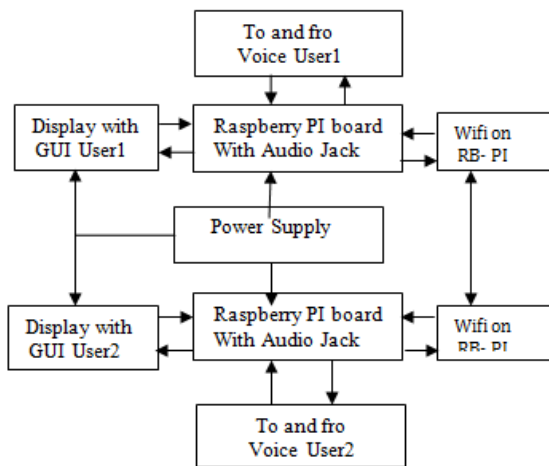
IV. PROGRAMMING USING PYTHON:

Python is a high-level language. This means that Python code is written in largely recognizable English, providing the Pi with commands in a manner that is quick to learn and easy to follow. This is in

marked contrast to low-level languages, like assembler, which are closer to how the computer ─thinks but almost impossible for a human to follow without experience. The high-level nature and clear syntax of Python make it a valuable tool for anyone who wants to learn to program.

It is also the language that is recommended by the Raspberry Pi Foundation for those looking to progress from the simple Scratch to more hands-on programming. Python is published under an open-source license, and is freely available for operating systems like Linux, OS X and Windows computer systems.

This cross-platform support means that software written using Python on the Pi can be used on computers running almost any other operating system as well except where the program makes use of Pi-specific hardware such as the GPIO Port.

V.   BLOCK DIAGRAM

VII   CONCLUSION:

The above mentioned disadvantages can be overcomed using this eco friendly model by replacing towers gradually, thus contributing to Digital India in order to develop our country. Be wise Using "WHEESY-PI"

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