An IoT Based Digital Notice Display and Announcement system on Linux Platform with Raspberry pi

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ABSTRACT

This paper is introducing a new notice system which does not require reaching to the display or any pinning or pasting of papers anywhere. The system is consists of the voice alert notice which can be built on single board known as Raspberry Pi which includes ARM8 quad core processor from Broadcom. So, the entire development will be on the linux based operating system and the hardware module is selected as Raspberry Pi. The new system is consist of a text to voice feature, also the message will can be remotely send through email.

Keywords: ARM8, OS, Raspberry Pi, TTS, speaker, Email

I. INTRODUCTION

Notice Boards are an important medium for displaying information and keeping people informed. The traditional notice boards involve the pinning up of printed or handwritten information on a board. But this has the disadvantages of dependency on a person for pinning up notices and wastage of paper. Some developments in notice boards, in an attempt to overcome above-mentioned drawbacks, include display of data on a screen using wireless communication. This has been implemented on Liquid Crystal Displays (LCD) and Light Emitting Diode displays. Some of the available methods can display only one message at a time. In the method, 16x2 character LCD has been used. The disadvantage of this system is that in order to view the message, the observer should be very close to the screen. With new day technology there some digital notice boards that are becomes very famous. It includes led display notice boards. But problem is the same that one has to reach to display to take notice on it.

Hence we are introducing a new notice system which does not require reaching to the display or any pinning or pasting of papers anywhere. The system is consists of the voice alert notice which can be built on single board known as Raspberry Pi which includes ARM8 quad core processor from Broadcom. There are some PA Systems that are used in railway stations, banks, school etc. A public address system (PA system) is an electronic sound amplification and distribution system with a microphone, amplifier and loudspeakers, used to allow a person to speak to a large public, for example for announcements of movements at large and noisy air and rail terminals or at a sports stadium or amplify other audio content, such as recorded music or the live sound of a band. The term is also used for systems which may additionally have a mixing console, and amplifiers and loudspeakers suitable for music as well as speech, used to reinforce a sound source, such as recorded music or a person giving a speech or distributing the sound throughout a venue, building or area.

Simple PA systems are often used in small venues such as school auditoriums, churches, and small bars. PA systems with many speakers are widely used to make announcements in public, institutional and commercial buildings and locations, such as schools, stadiums and large passenger vessels and aircraft. Intercom systems, installed in many buildings, have both speakers throughout a building, and microphones in many rooms allowing the occupants to respond to announcements.

The Raspberry Pi is a low cost, **credit-card sized computer** that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python. It's capable of doing everything you'd expect a desktop computer to do, from browsing the internet and playing high-definition video, to making spread sheets, word-processing, and playing games.

What's more, the Raspberry Pi has the ability to interact with the outside world, and has been used in a wide array of digital maker projects, from music machines and parent detectors to weather stations and tweeting birdhouses with infra-red cameras.

II. PROPOSED WORK

2.1. Overview

The proposed system is aimed at designing and development of voice alert notice or a notice announcement system which can be solve the problems as mentioned in the above chapter. The system will built on single board known as Raspberry Pi which includes ARM8 quad core processor from Broadcom which satisfy the size and also low cost. The notices will directly receive to the system by a wireless mean of SMS or an Email. So the user can send any notice to the system from the remote place.
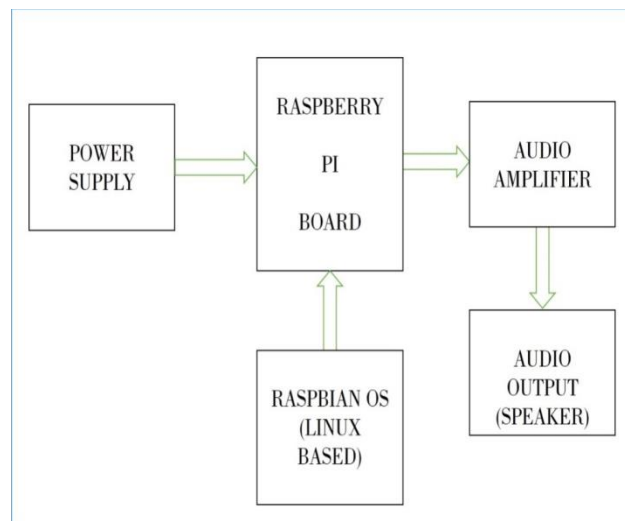
2.2. Proposed System

Figure 2.1: Proposed Block Diagram

Proposed system includes the raspberry pi board as the main controlling hardware unit which has the ARM8 microprocessor architecture. The board needs the operating system, hence we will use the RASPBIAN operating system which is based on the linux OS. The system should work for notice announcement, hence the speakers are connected as audio output. The output of the raspberry pi board is too small as we can only listen the audio in headphone from raspberry pi. Hence we are using here an audio amplifier circuit to enhance the volume through Raspberry pi. The power requirement of the raspberry pi board only 10 watt, but it should a regulated dc. Hence we are using 10 watt SMPS power supply to run the module.

The input to the system that is the texts that should be speak by the system are taken from the user's cellphone. The user will send the SMS or an email to the system in the form of text that should out as the speech. The whole development will be in linux based OS and on the python language which is highly supported and used in the raspberry pi board by the researchers.

III. METHODOLOGY

The proposed system is divided in the following modules,

- Preparation Of Raspberry Pi Module
- Development Of Algorithm For Message Receiving
- Development Of Algorithm For Text To Voice Conversion
- Development Of Audio Amplification

3.1. Preparation of Raspberry Pi Module

To start working on Raspberry Pi module, one has to choose which version of it should be used for our development purpose. After this, the next step is to select the operating system for it. As, there are lots of operating system for Raspberry Pi to work on from which all of them are open source. So choosing right RPi module with right OS, one has to prepare it for our first use.

3.2. Development Of Algorithm For Message Receiving

In this project, we are going to develop an algorithm for receiving the message, that should be spoken or its announcement has to be perform. With the developing algorithm, it should receive the message wirelessly either with SMS or and E-mail. For this the code will be in the python Language, as most of the systems with RPi are developed in python language, there is huge support for python development in RPi.

3.3. Development Of Algorithm For Text to voice conversion Conversion

The notice should be announce automatically through RPi, hence one has to develop an algorithm which can automatically give the output of the system in the voice form. Therefor as the message will receive in the text form, it will be spoken by the system or announce by the system which is developed on ARM based raspberry pi on linux based OS.

3.4. Development Of Audio Amplification

As, RPi module is work on the 5V regulated DC power supply, it can't be possible to use or connect the huge speakers directly to the output of raspberry pi, we have to develop an amplifier to make the sound output from RPi in the audible form or level. Hence at the last in the system that is after the development of system, one has to move towards the making of sound to the audible range for particular or defined area.

IV. RESULT AND DISCUSSION

Setup of project is shown below which allow us to take the final results for this research work
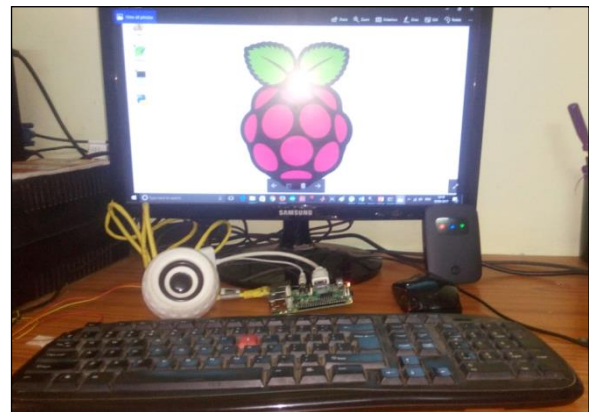

Figure 4.1: Project Setup

At first, we have to start the raspberry pi module with the internet connection and 10w power supply. When it get started it would looks like the following window,
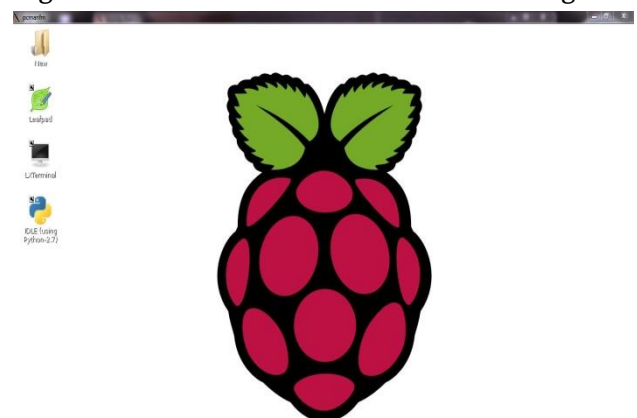

Figure 4.2: Window after the start of Pi module

Then open the python idle software to open the program and then press F5 to run the program in python shell,

After that send the message from your device such as smartphone, Iphone or a personal computer runs on windows, linux or mac-os as follows,

When, the system receives an email that has sent from user, it will receive and then fetch it. It start reading mail in the voice form and then display the message that the user sent to the system. Also if the user has attach any image with the same mail, it w3ill also display on the GUI designed itself.

V. CONCLUSION

A voice announcement of notice with raspberry pi has been presented in this project. It offers an edge over other traditional notice boards as well as the new era of digital notice boards because of features such as an announcement of notice that it received without any person to speak it and send message with user's cell which a common thing that carry every human being with them. The size and cost is very low as compared to other display that gives visual output not the audio. The system has capable to give the output in audio as well as a visual output.

VI. REFERENCES

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