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DYNAMIC DISPLAY BOARD USING RASPBERRY PI

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ABSTRACT

Notice board is an essential information gathering system in our life. In our day-to-day life, we can see notice boards in various places like educational institutions, railway stations, shopping malls, bus stations, offices etc. In conventional notice boards, paper is the main medium for information exchange. There is a usage of huge amount of papers are required for displaying those endless counts of the information. The project aims to develop a medium cost-effective dynamic display board using Raspberry pi 4. It can make information dissemination much easier in a paperless community through dynamic digital display board by admin and users in the form of speech to text, all over the campus within few seconds. This project is done using the Raspberry Pi, which is a low cost, credit-card sized computer that plugs into a computer monitor or TV or LCD or LED displays. Mic is used as input, Monitor or TV is used as output device and Ethernet, HDMI cable are used as other resources in this project. This project also contains a speech to text converter in offline mode. The admin or user can send text messages through his/her own voice. Thus the project completely computerized and maintains the details which the admin or user can send to the E-Notice board using through Intranet or Internet.

Key words: Digital Display, Embedded system, LED Display, LCD Display, Rasperry Pi.

1. INTRODUCTION

In this world everyone needs a comfort living life. Man has researched different technology for his sake of life. In today's world of connected people are becoming accustomed to easy access to information. Whether it's through the internet or television, people want to be informed and up-to-date with the latest events happening around the world. Wired network connection such as Ethernet has many limitations depending on the need and type of connection. Now a day's people prefer wireless connection because they can interact with people easily and it require less time. The main objective of this project is to develop a

wireless notice board that display message sent from the user and to design a simple, easy to install, user friendly system, which can receive and display notice in a particular manner with respect to date and time which will help the user to easily keep the track of notice board every day and each time he uses the system. Wi-Fi is the wireless technology used in this project. Notice Board is primary thing in any institution / organization or public utility places like bus stations, railway stations and parks. But sticking various notices day-to-day is a difficult process. A separate person is required to take care of this notices display. This project deals about an advanced hi-tech wireless notice board. A authenticated person can send message from a remote place which is visible on the LCD/LED Monitor.

2. SYSTEM STUDY

2.1. Existing System

A low cost, handheld, wireless electronic notice board by using atmel's Atmega32 microcontroller and different wireless technologies (bluetooth and zigbee) and their performance analysis based on the parameter such as range, BER (bit error rate), RSSI (received signal strength indicator), signal attenuation and power consumption.

Android based wireless notice board. They proposed system uses either Bluetooth or Wi-Fi based wireless serial data communication. For this purpose android based application programs for bluetooth and Wi-Fi communication between android based personal digital assistant devices and remote wireless display board are used. At receiver end, a low cost microcontroller board (arduino uno) is programmed to receive and display messages in any of the above communication mode.

2.2. Draw Backs

In the existing system, manual GPS is used to send the information to the particular notice board, which can have a problem with the network with the GPS module have a more cost as the number of E-Notice board increases.

3. PROPOSED SYSTEM

In this proposed system, Raspberry pi is installed with the interconnected campus network and the admin is given the privilege to send the E-Notice to any branch with the help of intranet / internet.

The main objective of the system is to develop a wireless notice board that displays notices in the form of text. It uses a Raspberry pi as a processor. Raspberry pi 4 is equipped with a Portable Projector/LCD/LED display. We can display messages and can be easily set or changed from anywhere in the campus. In addition an application is used to convert voice into text. Here the voice is pass through the voice reorganization system and converted into text. The system will sent this message to server. Then it passes to the notice board, which is connected to Wi-Fi. The device processes it and displayed on the screen. We can send the message to all the screens or desired screen.

Achieving the following criteria is the main designing goal for the architecture of the proposed system.

- Reduction of man power: Reduction in the effort of a separate person, who has stick notices manually on the conventional notice board.
- Reduction in time: The facilities in the high speed internet, the people can view transmitted information’s on the display board within seconds. There is less waiting time for accessing the information’s.

- Ease in accessibility: Here notice information's are accessed through internet, so there will be widespread of the information over a wide region. Also internet will give access to its respective nodes connected to its server and hence accessibility becomes easy.
- Improvement over technology: The sender and receiver are connected with each other with the help of internet. Thus it will enable the communication over a wide range without any physical connections between them.
- Reduction in the size of system: Only Raspberry pi is used for achieving overall performance of the system. This single hardware makes reduction in the system.

3.1. Advantages of the Proposed System

- The main advantages of this project is to help in reducing the human effort, paper, printer ink and cost for manual changing of the notices.
- It is a low cost, credit-card sized computer that plugs into a computer monitor or TV
- This project is used to develop a wireless dynamic notice board that display message sent from the user.
- Proposed system is simple and user friendly.
- This project that will help the user to easily keep tracking of notice board every day and each time a user uses the system

4. SYSTEM DESIGN

Systems design is the process of defining the architecture, modules, interfaces, and data for a system to satisfy specified requirements. Systems design could be seen as the application of systems theory to product development. There is some overlap with the disciplines of systems analysis, systems architecture and systems engineering. Figure 1 and Figure 2 illustrates the input design of display board using Raspberry Pi respectively.

4.1. Input Design

- In this project, an interconnected server is made to send the information. Admin have the privileges to send the information through the network Connect power supply for Raspberry pi
- Plug the HDMI cable in Raspberry pi from the monitor using VGA to HDMI converter cable Connect USB Mouse and USB keyboard to the Raspberry pi.
- Information will be displayed on the E-Notice board.

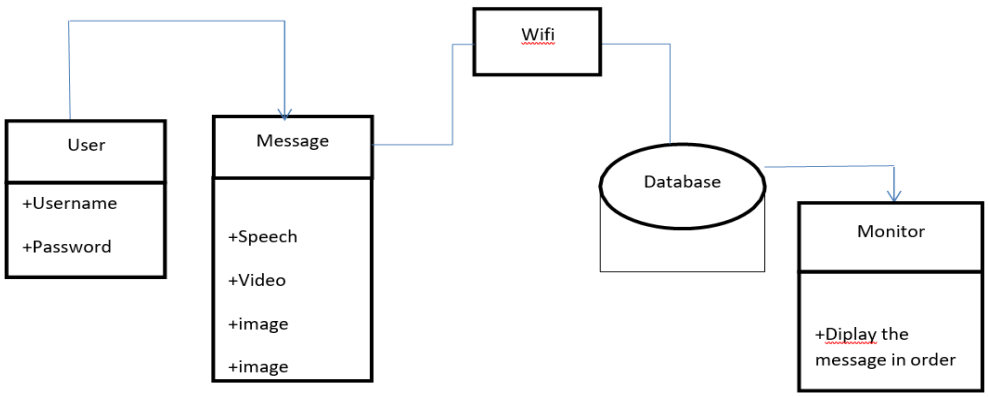

Figure 1 UML diagram of the digital display board

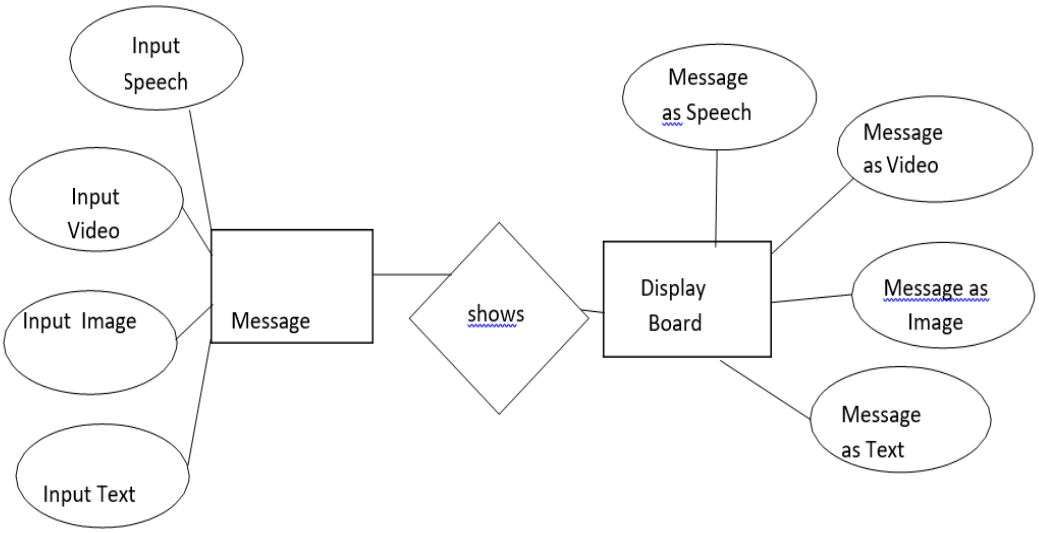

Figure 2 ER diagram of the table

4.2. Output Design

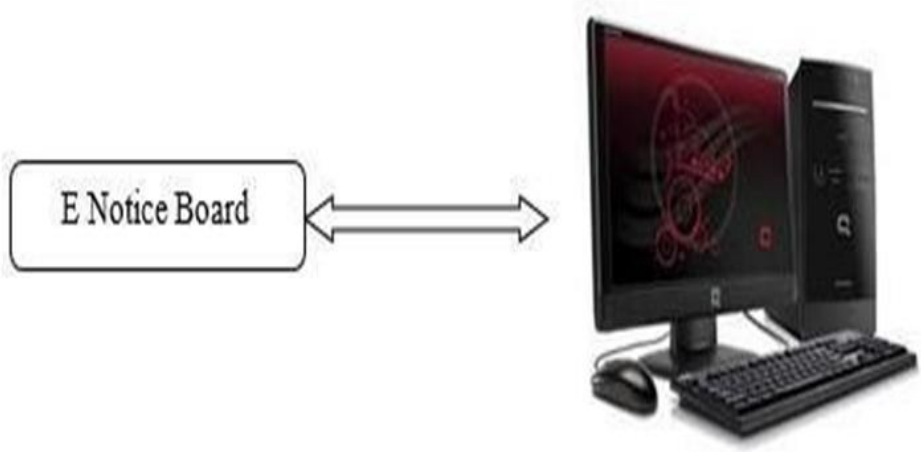

Figure 3

5. SYSTEM DEVELOPMENT

5.1. Modules

There are 6 types modules and they are

- Assemble of digital display board
- Admin module
- User registration module
- Speech to text conversion module
- Message posting module
- Message display module

The main objective of the system is to develop a wireless notice board that displays notices in the form of image, text, pdf. it uses a raspberry pi as a processor. raspberry pi is equipped with a portable projector/lcd display. we can display messages and can be easily set or changed from anywhere in the world. in addition mobile application is used to convert voice into text. here the voice is pass through the voice reorganization system and converted into text the system will sent this message to cloud. then it passes to the notice board which is connected to internet by wi-fi. the processor, process it and displayed on the screen. we can send the message to all the screens or desired screen.

Assemble of digital display board

- Assembling of digital display board by interfacing with raspberry pi
- The digital display board is assembled by the hardware resources
- After the hardware resources are assembled the user computer wants to connect with the raspberry pi in a same network using wifi.

Admin module

- Adding security by admin through authentication of user rights, approval and maintenance of messages.
- The admins has all privileges to control and modify the message.
- The admin must give the permission to create the user.
- User registration module
- Registration of users such as staff members and others.
- The users were permitted by the admin to register it.
- The user can only send the message but the user have privilege to access or control it.
- Speech to text conversion module
- Messages in the form of speech are given as input through mic by the user and the captured speech is converted to text using voice recognition system.

Message posting module

- The converted notices / circulars / messages in the form of text are posted to all notice board.
- In order to access Digital notice board the sender must enter into the corresponding web address.

Message display module

- The sent messages are displayed in all or concerned display board and maintained for a specific period.

6. SYSTEM IMPLEMENTATION

The proposed system was successfully tested to demonstrate its effectiveness and feasibility. In this project PC and android application is used as a transmitter and Raspberry is used as a receiver. Sender and receiver is interfaced through a wireless network Display is connected a. the receiver side. Raspberry pi is connected to Wi-Fi network to access data on the cloud. After establishing connection data stored on the cloud will be displays. For sending information sender must enter in to the login page. Figure 4 shows the login page of our IOT based digital system. Username and Password is predetermined

Figure 4 Login page

If we enter wrong username and password an error will displayed on the login page, which shown in figure 5. So after typing correct username and password in the respective columns, next page will displayed in the web server

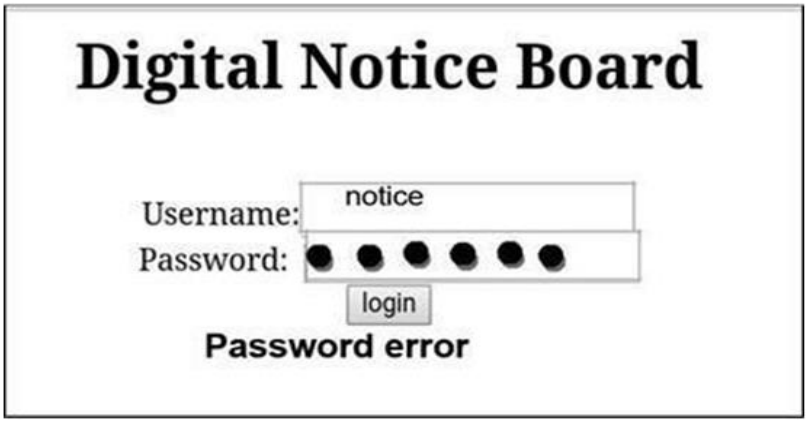

Figure 5 Invalid password detection

Upload page contain icons for sending text messages, pdf files, image files. In addition to this there is a separate icon for deleting previously send data. Figure 7 shows the uploading page on web server.

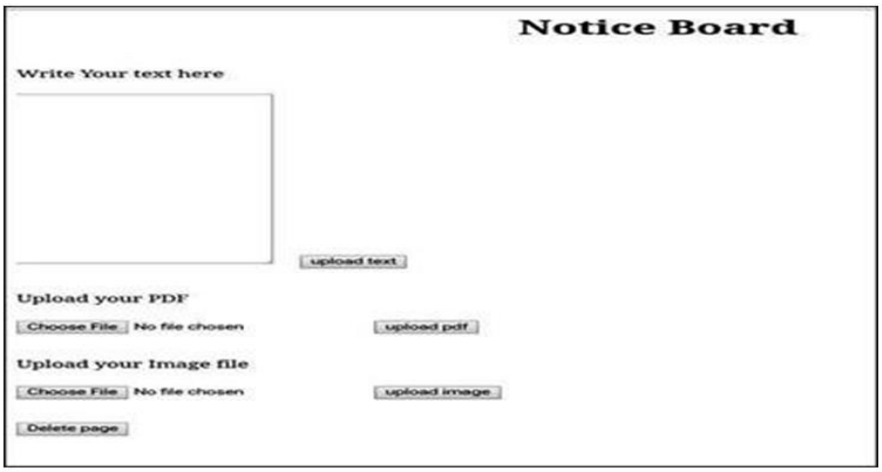

Figure 6 Upload page

For deleting previously send data simply click on the delete page icon. A new window will contain facilities to delete documents.

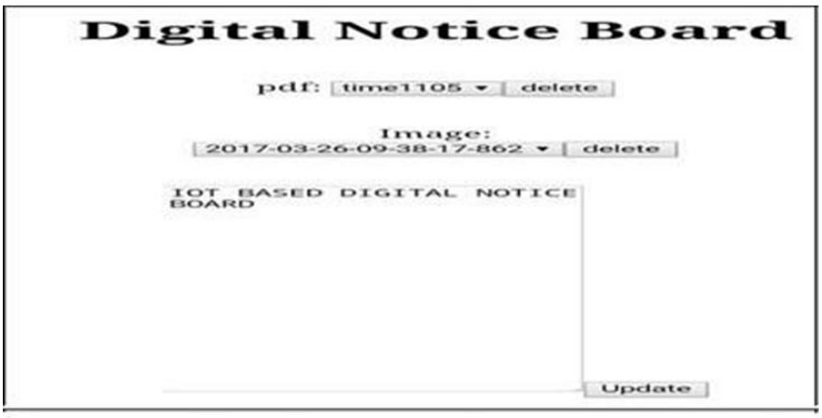

Figure 7 Digital Notice Board

Systems implementation is the construction of the new system and the delivery of that system into production. System implementation is the practice of creating or modifying a system to create new business process or recreate an existing business process. Technology integration is the practice of integrating multiple system activities to interact and generate information efficiently.

STEPS

- Testing the developed system with sample data
- Detection and correction of errors
- Marking necessary charges in system.
- Checking the report with that of the existing system.

7. CONCLUSION

The project mainly focuses on design of dynamic digital display board using Raspberry Pi with speech to text conversion that can be displayed messages anywhere in the campus using WiFi. Now our world is moving towards digitalization, so if we want to do some changes in the previously used system we have to use the new techniques. Wireless technology provides fast transmission over long range of data. It saves time, cost of cables, and size of the system. Data can be sent from anywhere in the campus. User name and password type authentication system is provided for adding securities. Previously the conventional notice boards were used. In that there was the limit of coverage area, but in our system Wi-Fi is used as communication medium. So, there is no problem with coverage area. Message can be displayed using speech to text conversion. Text messages can be sent as fast as possible with better quality.

FUTURE ENHANCEMENT

Future scope of this project makes use of wireless technology to communicate from user computer to LCD/LED display board with multimedia formats such as text, pdf, image, audio and video in android

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