Voice Based Enquiry System For Library Resource Management Using Raspberry Pi

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Abstract- In present age voice recognition technology changed the digital world completely. There were time where all we have to do is work totally based upon a keyboard and a mouse. But as a technology changes so the scope of the work. This technology plays vital role in everyday life. Now we can search anything on phone using this technology even we can manage the phones internal functions with the help of the same. In previous system there exists lots of vulnerabilities. The library wasn't wholly automated and it takes lots of time to issue one single book. User needs to interact with librarian directly to ask for a book then librarian needs to check the book in every shelf manually, it consumes so much time so we thought to bring the library under digital banner. Hence if we apply voice recognition system in library, it will make the librarian task easy and save lot of time as he doesn't need to check for the book manually and user can communicate with the system and check for the availability. It is the enquiry system which operates on the voice input given by the user. There is no interaction which is understood more neatly than voice. This paper also uses the voice commands and gives the respective info. in a form of voice. This paper will be develop using php and java programming language. This system uses sql server for keeping the keywords to be provided to the user. It uses raspberry pi to detect voice from the user and uses the speech control for the output. Raspberry pi would help convert the speech into text.

Keywords- Ajax, Mike, Raspberry pi, Speech into Text, Speaker.

I. INTRODUCTION

This is the age of speed. Everything happens in the speed of supersonic. With an advancement in Information Technology, next generation of user interface is desired to be more user friendly and powerful. As the choice for expressive means of communication, speech is more desirable for the human computer interaction. Here is one such need of information fast enough. We have experienced in waiting to a library terminals for library controllers to get the information about the books which is available in the library. We find so many times there will be no person for providing these information which wastes the time just to know whether there is any facility or not. Here we can do is lessens the human intervention in providing such information in the library system. The system in this paper is the enquiry system which operates based on the voice input given by the user. There is no communication which is understood more appropriately than voice. So this system also uses the voice commands & provide the information in the output form of voice. This paper system can be installed in any public or private terminals like school or college libraries In modern civilized societies for communication between human speeches is one of the common methods. Many ideas generated in the mind of speaker are told by speech in the form of words, and sentences by applying some proper grammatical rules. The speech is first mode of communication between humans and also the natural form of exchanging information between human in speech. This enquiry System is operates based on the voice input provided by the user. There is no communication which is understood more appropriately than voice. This system uses the voice commands as a input and gives the particular info. output in the form of voice and displays. This paper is going to develop using php and java Programming language. This uses SQL server for storing the information to be provided to the user. This uses Raspberry Pi to detect the voice from the user and uses the speech control to deliver the voice output. Raspberry Pi would help in converting the speech into text. Library resources management is very lengthy work. So to overcome this issue we are proposing the management using voice recognition technique. Using this technique we can input in the form of voice then there after the voice string will get converted into text. The respective text string then checked by the system in the database when the string is matched with the database string then the result will be displayed in the LCD panel attached to the raspberry pi.

II. RELATED WORK

The research for the system included study of some algorithms for Library resource management using voice recognition system, there exists KIOSK system for library management. Kiosk software is the system and user interface software designed for an interactive kiosk or Internet kiosk. Kiosk software locks down the application in order to protect the kiosk from users. Kiosk software may offer remote

monitoring to manage multiple kiosks from another location. Email or text alerts may be automatically sent from the kiosk for daily activity reports or generated in response to problems detected by the software. Other features allow for remote updates of the kiosk's content and the ability to upload data such as kiosk usage statistics. Kiosk software is used to manage a touchscreen, allowing users to touch the monitor screen to make selections. A virtual keyboard eliminates the need for a computer keyboard. But this KIOSK system lacks the ability of voice recognition and yearly maintenance is costly So we are going to introduce this new system with voice support and upgrade features.

III. SYSTEM ARCHITECTURE

This System is the enquiry system which operates based on the voice input given by the user. In which we presents the following figure which shows the flow of our system. Raspberry pi acts as a medium through which the input can given. There is no communication which is understood more appropriately than voice. This system too uses the voice commands and gives the required information in the form of voice. This paper will develop using JAVA technology using PHP Programming language. SQL server will be use storing the information as well as the keywords to be provided to the user. Raspberry Pi will detect the voice from the user and uses the speech control to deliver the voice output. Raspberry Pi would help converting the speech into the   text   format.
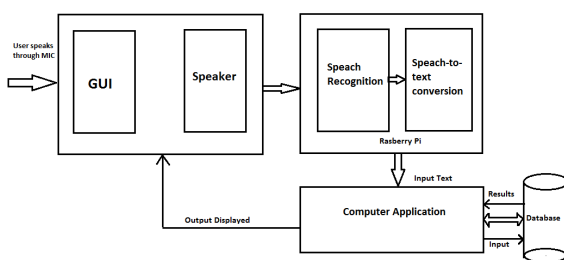

Fig No.: 01 – System Architecture

The above diagram shows the flow of information in the system. Raspberry Pi does the STT conversion and gives the output to the application to run it through the database. The final output is display on the screen. Here we gets the input from the user as a voice. Then the speech recognition system detects the voice and its language and according to it converts that voice into text. The computer application then read that text after that the same text goes to the database to check the default keyword and if the voice keyword is matched with the keyword stored in the database then the

result is display in the display panel attached to the raspberry pi.

System Modules

1. Raspberry Pi.
2. Voice Recognition.
3. Microphone.
4. Speaker.
5. Database.

Fig No.: 02 – RASPBERRY PI

Raspberry Pi:

The Raspberry Pi is nothing but a portable pc or mini pc

which includes a ARM1 processor, Video Core GPU and RAM. It has a level 1 cache of 16 KB and a Level 2 cache of 128 KB. The Level 2 cache is used by the GPU. It contains usb ports for attaching keyboard and mouse. Also contains hdmi port for lan access and different drivers. Display, headphones also can be attached to the Raspberry pi. It is widely become popular mini computer.

**Fig No.: 03 – Conversion of Voice Recognition**

Voice Recognition:

To convert speech to on-screen text or a computer command, a computer has to go through several complex steps. When you speak, you create vibrations in the air. The analog-to-digital converter (ADC) translates this analog wave into digital data that the computer can understand. To do this, it samples, or digitizes, the sound by taking precise measurements of the wave at frequent intervals. The system filters the digitized sound to remove unwanted noise, and sometimes to separate it into different bands of frequency (frequency is the wavelength of the sound waves, heard by humans as differences in pitch). It also normalizes the sound, or adjusts it to a constant volume level. It may also have to be temporally aligned. People don't always speak at the same speed, so the sound must be adjusted to match the speed of the template sound samples already stored in the system's memory.

Microphone:

Microphones are used in many applications such as telephones, hearing aids, public address systems for concert halls and public events, motion picture production, live and recorded audio engineering, sound recording, two-way radios, megaphones, radio and television broadcasting, and in computers for recording voice, speech recognition, VoIP, and for non-acoustic purposes such as ultrasonic sensors or knock sensors. Several different types of microphone are in use, which employ different methods to convert the air pressure variations of a sound wave to an electrical signal. The most common are the dynamic microphone, which uses a coil of wire suspended in a magnetic field; the condenser microphone, which uses the vibrating diaphragm as a capacitor plate, and the piezoelectric microphone, which uses a crystal of piezoelectric material. Microphones typically need to be connected to a pre-amplifier before the signal can be recorded or reproduced.

Fig No.: 04 – Microphone
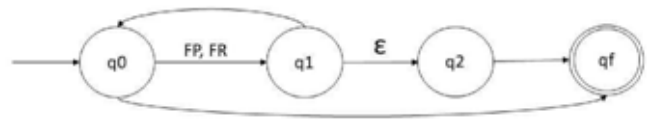
Speaker:

A device that converts analog audio signals into the equivalent air vibrations in order to make audible sound. When CRT monitors were the norm, speakers designed

for computers were shielded to avoid magnetic interference with the CRT's magnetic coil. Getting Smaller All the Time. They receive audio input from the computer's sound card and produce audio output in the form of sound waves. Most computer speakers are active speakers, meaning they have an internal amplifier which allows you to increase the volume, or amplitude, of the sound.

Fig No.: 05 – Speaker

Database:

A database is a collection of information that is organized so that it can be easily accessed, managed and updated. Data is organized into rows, columns and tables, and it is indexed to make it easier to find relevant information. Data gets updated, expanded and deleted as new information is added. Databases process workloads to create and update themselves, querying the data they contain and running applications against it.

IV. ALGORITHMS

Quick Sort Algorithm – It can sort item of any type in less than relation.

Heap Sort Algorithm - Array element reorder to satisfied the heap property.

Selection Sort Algorithm - This making only one exchange for every pass.

Gnome Sort Algorithm - To finds first place where two adjacent element are in the wrong order and swap them.

Counting Sort Algorithm - It is an integer sorting algorithm.

Big-o Notation Algorithm - This is use for in_array() is O(n). For large array of String.

Google Voice Search Algorithm –

Index Search Algorithm -

V. RESULTS

This is the Admin Panel Dashboard which shows how the system works and details of regarding system. Here Admin will manage the record of student, employee and expenses related details.
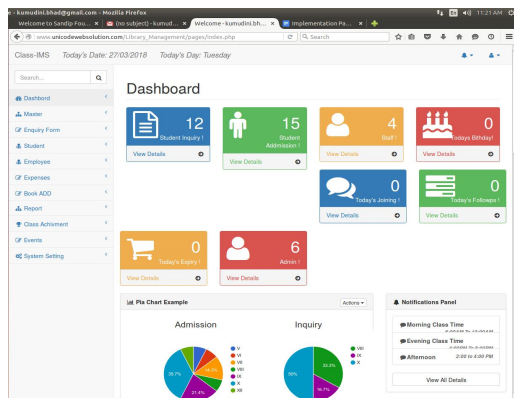

It will View the inquiry of the student who enrolled their name in Library using voice based inquiry system. It will show the details of student to the admin like name, email, mobile number, etc.
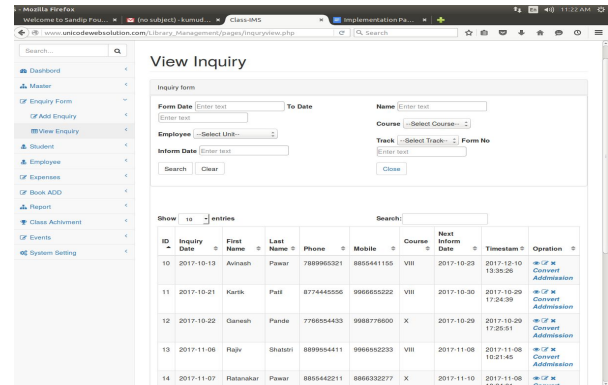
This is Student Panel Dashboard in that student have there account and they will search the book regarding their field. It will display the notification bar, class events and achievements, etc.
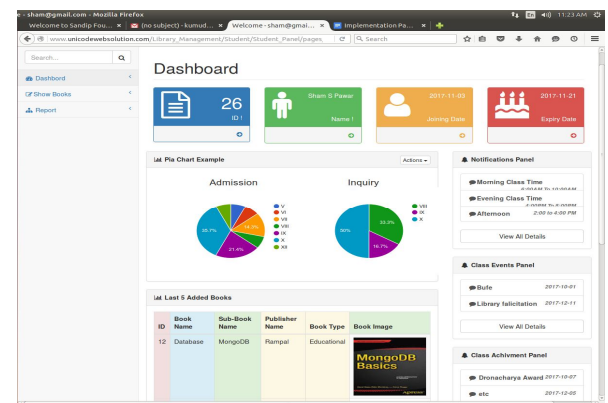
This will show the records of book which are available in library. By adding book publisher name, book name, book type it will easy to find the required book to the student.
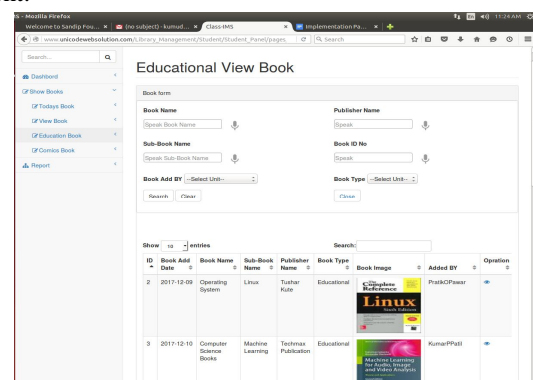
It will show the actual working of Raspberry Pi in voice based enquiry system. It has a microphone as a input and voice is a output.

VI. CONCLUSION

This was an effort to develop a simple Library system which may be useful in a Library to store, handle information about books, magazines etc. The speech to text conversion may seem effective and efficient to its users if it produces natural speech and by making several modification. Automatic speech recognition also gives implementation of speech to text conversion based on Raspberry pi. This system is useful for deaf and dumb people to interact since no interaction would be there with the human beings and there won't be any barrier for them to communicate and find the information they want. Speech synthesis has long been a vital assisting technology tool and its application in this area is significant and widespread. This project report gathers important references to literature related to the endogenous variations of the speech signal and their importance in automatic speech recognition also it gives implementation of speech to text conversion based on Raspberry pi.

REFERENCES

[1] S. Suresh, Y. Sindhuja Rao, "Modelling of Secured Voice Recognition Base Automatic Control System", IJETCSE, March 2015.

[2] Shubhasini Sugumaran, Mr.V.R.Prakash, "PSoC Based Speech Recognition System", International Refereed Journal of Engineering and Science (IRJES) ISSN (Online) 2319-183X, (Print) 2319-1821 Volume 4, Issue 3 (March 2015).

[3] DR. Sunita Rana, "The Process Of Speech Recognition, Perception, Speech Signals And Speech Production in Human Being", International Journal of Advanced Research in Computer Engineering and Technology (IJARCET) Volume 1, Issue 9, November 2012.

[4] W. Xiong, L. Wu, F. Alleva, J. Droppo, X. Huang, A. Stolcke, "The Microsoft 2017 Conversational Speech Recognition System", Microsoft AI and Research Technical Report MSR-TR-2017-39, August 2017.

[5] Anuraj Khare, "ARM Processor Based Multiple Languages E-Dictionary for Blind People", International Journal of Engineering Research and Technology, (IJERT) ISSN: 2278-0181, Vol. 2, Issue 8, August 2013.

[6] Ms. Sneha K. Upadhyay, Mr. Vijay N. Chavda, "Intelligent System Based On Speech Recognition With Capability of Self Learning, International Journal For Technological Research In Engineering ISSN (Online): 2347 - 4718 Volume 1, Issue 9, May-2014.

[7] Devarsh Bharambe, S. P. Kodgire, "Speech Recognition System For Voice Controlled Devices , International Journal Of Latest Trends in Engineering and Technology, Jan 2016.

[8] Prachi Khilari, Prof. Bhope V. P., Implementation of Speech to Text Conversion, IJIRSET, July 2015.

[9] Vishakha Karpe, Shilpa Kabadi, Asmita Mutgekar, Manisha Pokharkar, "Controlling Device through Speech Recognition System", International Journal of Advanced Research in Computer Science and Software Engineering, Volume 4, Issue 2, February 2014.

[10] Mohan Dholvan Dr. Anitha Sheela Kancharla, "Speech Enabled Interactive Voice Response Systems -Review", IJCEA,Oct 2015.

[11] Kaladharan N, "A Study of Speech Recognition", International Journal of Innovative Research in Computer and Communication Engineering,Vol. 3, Issue 9, September 2015.

[12] Swati Atame.et.al, "A Survey On: Continuous Voice Recognition techniques", International Journal of Emerging Trends and Technology in Computer Science (IJETTCS),Volume 4, Issue 3, May-June 2015.

[13] Saroj B. Jadhav.et.al, "Speech Recognition in Marathi Language on Android O.S.", International Journal of Research in Computer and Communication Technology, Vol 3, Issue 8, August 2014.

[14] Mayur R Gamit. et.al, "Classification Techniques for Speech Recognition: A Review", International Journal of Emerging Technology and Advanced Engineering, Volume 5, Issue 2, February 2015.

[15] Cheah Wai Zhao, Jayanand Jegatheesan, Son Chee Loon, "Exploring IOT Application Using Raspberry Pi", International Journal of Computer Network and Applications, Volume 2, Issue 1, January - February (2015).