Enhanced Security to Smart Doors by Speech Recognition through Mobile Application with Minimal Cost

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Abstract- *Communication can be done in many ways, speech is a form of it. To have an effective communication between humans, speech is an important aspect. The technology have come up such that to recognize this speech and perform task based on it. The Speech recognition technology is continuously improving which is making way for innovative ideas to come up. This technology is widely used and implemented across various platforms. The communication between the human speech and the computer application which recognize the speech is only possible by interfacing. The interface can be done by lot of ways by using hardware devices which accepts speech as its input and provide the computer application in the form in which it can recognize. Using these kind of technology replacement of automation can be made instead of the manual process in the various fields.*

Keywords- Speech recognition,smart doors,control,APIs.

I. INTRODUCTION

In the recent times technology has become a major part in the human's life. It has a great influence in human's day-to-day activities. The activities may be in terms of transportation, communication, medical related or in terms of entertainment aspects. All the manual activities have been reducing day-by-day and its changing to automation where the can be done at ease.It may be of origin of the computers where the storing and retrieving of data made possible. Due to arrival of smart phones and the internet the sharing of the data such as music, video or any document became very easy. The communication among the people with the use of internet and smart phones made easier than the computer such that people began to use much of the technology where the work can be done faster and better. The technology could be even better if the human and computer could interact each other and work could be performed. By this the stress of the humans could reduce and the performance of the work will increase. Automation is trending in recent times, where it's a technique where the activity can be controlled by the electronic gadgets without the use of the human efforts. The automation can be applied in various fields may be in offices or in homes for the different types of needs. Many of the industries are into automation where the daily things which the people use can be automated such as TV, lights, AC, phones, computers and various other devices. The automation can be even used to provide security to the certain human activities such as recognizing human speech, finger prints, face recognition or may be eye tracking of the humans. The Speech Recognition Systems have been implemented in various fields and using different technology in its implementation. The technology used in its implementation must be powerful in its working, reliable in use and user-friendly. Such that it attracts the users in order use the technology based on their need. The automation work is quite expensive, while implementing this technology the expenses should be taken care such that it can be affordable.

II. RELATED WORK

The smart door is one of the major part of the home automation. Though it has been implemented it is not much effective in terms of its performance and cost. The majority of the automation is done using Raspberry pi board and other hardware systems [1].The need of the improvement is not met and the accuracy is less. The implementation of the technology using Siri enabled devices would be the effective way[2] but the affording the Siri enabled devices is one of the drawback. The security plays a major role in all of the technology and to the users. In terms of the smart doors the implementation of the security is the mandatory aspect [3]. The advancement of the security has to be used to be implemented such as to improve its performance. The sensors which detects the intruders and their motion, its prototype is not much effective and implementation of the same would cost more and not affordable [4]. The automation done using on a manual button click and its interface is web based to recognize the voice commands which is provided as its inputs[6]. Though it is being implemented using raspberry pi cloud

based model and its components gives seamless operating of such devices. Majority of the things have been achieved through this system there are many of the things to achieve such as implementing it in an offline working systems makes its more reliable in its use. The proposed system in [5] uses a mini-computer based security system with one of the advanced feature. It provides both speech and face recognition systems but the implementation cost is high. The alarm feature on the physical force and transferring the image of the same [7] one of the best feature. The major drawback is that it uses remote based lock feature and the threshold limit of the application is to be improved and the notification to the mobile devices needs some enhancement. The choosing of the Microcontroller [8] and the interfaces to the respective hardware is the major aspect. It summarizes the need of the protocols for notification purpose has to be chosen accordingly in an effective way. The wireless control system can be implemented based on the speech recognition technique using the MFCC algorithm which is used for the extraction [9]. The implementation of the same can be done using online and offline recognition tools in a better way by improving its features and using Wi-Fi enabled devices which the paper proposed to be working in a Bluetooth enabled devices. The lock and unlock capability for the smart doors have been implemented [10]. This system uses an android application on clicking of the buttons the lock and unlock functions are carried out with the help of the Arduino board. The drawback of the paper [9] have come up with a solution to the Wi-Fi to interact with the Arduino board in which the Wi-Fi has higher range as compared to Bluetooth. Yet the working is not much effective as its uses button based application for its feature and unable to locate the geo-location. Through this paper, the proposed system is to use the speech recognition technique for automating the doors usingandroid application which can be used an interface for detecting and notifying by the use of the APIs to build the application and use of the minimal hardware in an effective way.

III. PROPOSED SYSTEM

In this proposed system Raspberry pi is used as a hardware to recognize the speech. The input for the hardware is sent through mobile to the Raspberry pi system. It is then the speech is recognized and processed based on the result the door is to be locked or unlocked. The Fig. 1 represents the block diagram of the proposed system.

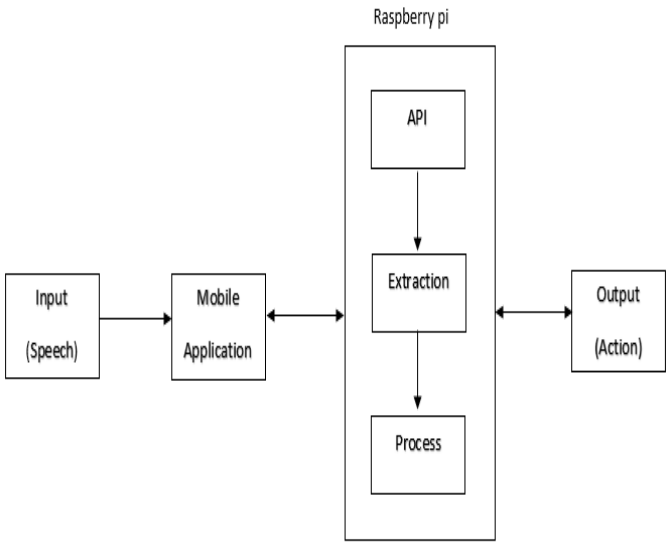

Figure 1. Block diagram of proposedrecognition system.

The proposed system has the following functionality.

1. Locks/Unlocks the door if comparison found to be true.
2. Notifies the user if comparison found to be false.

The components needed to build this system are as follows:

1. Mobile Phone: For accepting Speech input.
2. Hardware: Raspberry pi for communication between Android Application.
3. Electric door strike

The drawback of using USB microphone in [9] has been overcome by implementing the feature through mobile phone for smart lock/unlocking systems.

The speech recognition is done through using Google API by Oscar and Steven's system due to its precise and accurate results. The sample voice is stored in user's Google Drive for the comparison purpose. The users can change the voice code in their respective Google Drive in order to Lock/Unlock.

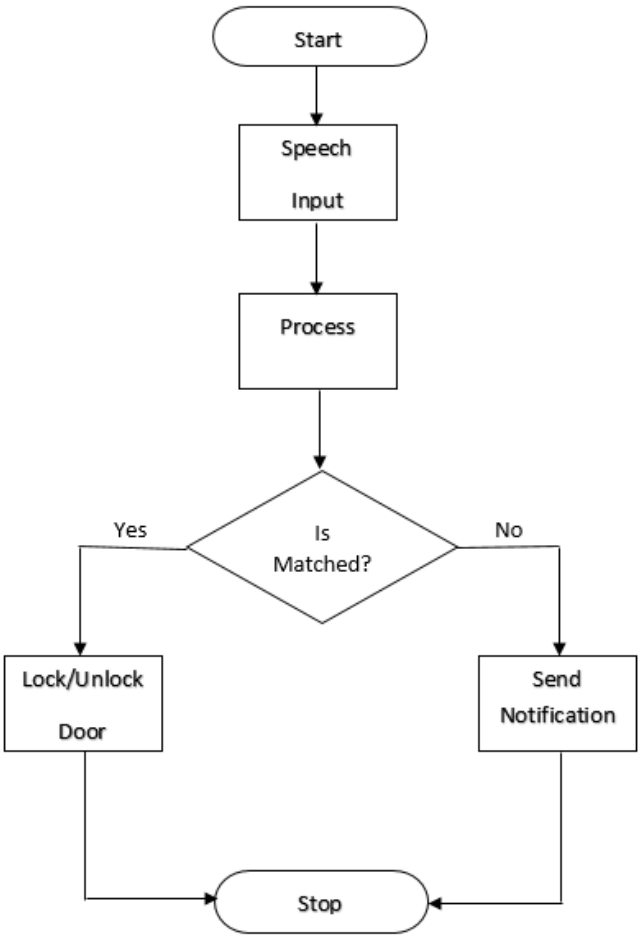

Figure 2. Flowchart of proposed recognition system.

The flowchart of the proposed system is shown in Fig 2. The Multi-level feature as on [11] which uses Security PIN with Arduino board to unlock doors will have risk in its security issue. In order to overcome security risk, the proposed system willreplace Speech Recognition as its feature for the locking/unlocking function. In this system it accepts the Speech input from the mobile, and then it is then extracted by Google API followed with the comparison with the existing voice filewhere the user has configured. If the comparison result is found to be true, the Raspberry pi provides the signal to door strike in order to lock/unlock. If the match is found to be false, the user will receive the automated SMS or the email with the respective timestamps for the failure attempts. The number of failure attempts, i.e.Threshold value is set to 3. If this attempts increase the notification will be generated and sent for the same. In about resetting or overwriting of files or the security is linked with the users respective email account in which the user has all the controls over it.

IV. POSSIBLE OUTCOMES AND FUTURE SCOPE

The implementation of proposed system is in progress. The intermediate results are not available.This can be implemented for household purposes for the advanced security. On a large scale it can be deployed in companies for the security in prevention of the intruders. In future to the advancement to this paper can be implemented in various other mobile platforms. The notification which is sent via email can be improved by adding image as an attachment. The comparison file which is stored in Google Drive which is used in this process can be implemented in various other cloud platforms.

V. CONCLUSION

The proposed system provides new way of locking/unlocking system through speechrecognition. The usage of hardware is minimal and implementation of this system is easy. Mobile application will be used as its input which brings added advantage to attract the users to implement as it's provides instant notifications via SMS or email.

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REFERENCES

[1] Prasanna G, and Ramadass N, "Low Cost Home Automation Using Offline Speech Regognition," International Journal of Signal Processing, vol. 2, No.2, Decemeber2014.

[2] Ana Marie. D Celebre,Alec Zandrae,Ian Benedict,Adrian Neil and Reggie, "Home automation using raspberry Pi through Siri enabledmobile devices" ,IEEE, January 2016.

[3] Burak Sarp and Tolga Karalar, "Real Time Smart Door System for Home Security," IJSRISE,vol. 1,issue 2, December 2015.

[4] Davinder Pal Sharma,Avatar Baldeo and Cassiel Phillip, "Raspberry pi based Smart home for Depolyment in the smart grid,",International Journal of Computer Apllication,vol. 119,no.4,June 2015.

[5] Pallavi V. Hajari and Ashwini G. Andurkar, "Review paper on System for Voice and Facial Recognition using Raspberry pi," International Journal of Advanced

Research in Computer and Communication Engineering,vol.4,issue 4,April 2015.

[6] Syarif Hidayat and Syahrial Farid Firmanda, "Scheduler and Voice Recognition on Home Automation Control System," 3rd International Conferenece onInformation and Communication Technology(ICoICT),2015.

[7] Ilkyu Ha, "Security and Usability Improvement on a Digital Door Lock System Based on Internet of Things,",International Journal of Security and its Applications,vol. 9,no. 8,2015,pp45-54.

[8] Vaishnavi S. Gunge,Pratibha S. Yalagi, "Smart Home Automation: A Literature Review,",International Journal of Computer Application,2016.

[9] Aishwarya Nilakhe and Dr. Sushma Shelke, "A Design for Wireless Music Control System using Speech Recognition,",IEEE,June2016.

[10] Anuradha R.S,Bharathi.R, Karthika.K and Kirithika.S, "Optimized Door Locking and Unlocking Using IOT for Physically Challenged People,", International Journal of Innovative Research in Computer and Communication engineering,vol. 4,issue 3,March 2016.

[11] Dr.Manish Kumar,Dr.M Hanumantappa,Dr.T V Suresh Kumar and Mr. Amit Kumar Ohja, "Android based Smart door Locking Systemwith Multi-user and Multi-level functionalities,",International Journal of Advanced Research in Computer and Communication Engineering,Vol 5,special issue 2, October 2016 .