

SMART HOME BY VOICE CONTROL

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***Abstract-** Control engineering and automation become a wide applicable sector of modern engineering. It helps to ease of our life. Home automation is the ability to control specific events within a house without direct manual intervention. Voice is used in this project for the controlling switches. Reason for choosing voice is because it is easily being reproduced by human. Besides that, usage of voice gives a control system that can be effective and convenient to be used. The application of this system involve modifying the switching system from the traditional way which is physical contact with the switch to a safer way where the usage of voice to replace all the physical contact. This project involve a simple microphone as a sensor and The PIC16F73 microcontroller to build up the system. Software will be developed with the help of Microsoft visual studio by using speech SDK. This project able to recognition the command trained by the user and successfully to execute the correct output. This project is a small scale design which consists of several commands that will used to control three different units. The command is able to individually switch on and off each of the switch.*

***Keywords:** Microcontroller, Microsoft visual studio, Micro c compiler, Stepper Motor etc.*

1. INTRODUCTION:

A good definition of a smart home comes from the TU Berlin:

"A Smart Home is the integration of technologies and services in the domestic environment in order to improve quality of life, security and communication Possibilities with the external world."

According to this definition, all different technologies which are currently used in the domestic environment must cooperate with each other. The integration is a crucial factor that improves the control and quality of life at home. It is possible to control, from just one control device, all the appliances. A classical example can be setting mood to romantic in a mood control service. As a consequence, all the lights in a room are dimmed, blinds are lowered, a suitable music is played and a TV set displays appropriate scenery. Without an integrated smart home solution, all those actions would have to be done manually

2. PROBLEM STATEMENTS:

In this lesson, I want to introduce a real world problem of managing the system in a home from a distance. My project is to control the several unit

Internet, F.M. module, telephone, scheduler, GSM base communication

2.1 Door Control:

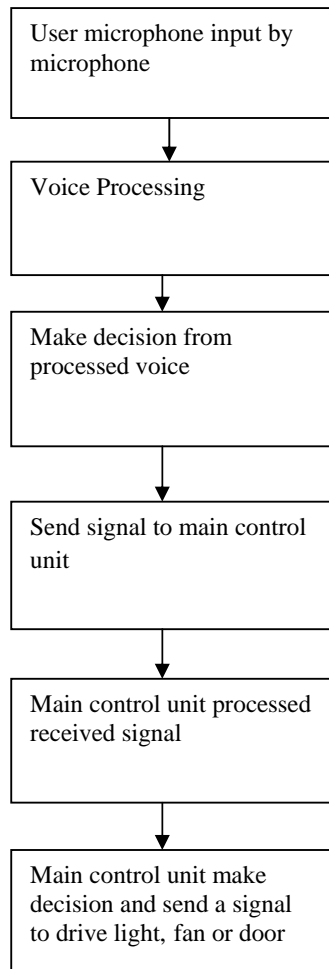
Door open or close by voice command. Basically control door by a stepper motor. Motor shaft is attached with a pinion and it is connected with control circuit and pc. For door control I first Designed a sliding door, which is slide by rack and pinion system via stepper motor and control signal. but actually the door will be design on requirement in practical field. When a motor get pulse of required current which is from pc then it is energized and pinion move over the rack when the door move. So at first I have to know how a stepper motor work and how it is related with control circuit i.e. control system.

2.2 Light/Fan Control:

Whether I am building a dream home, a quality lighting control system should be included in the design. Lighting can add a new dimension to our home creating certain moods, highlight specific features or add a level of protection convenience. With a lighting control system one can turn all the lights on or off by commanding a voice. Automatically light stairwells as owner approach

3. METHODOLOGIES

3.1 block diagram:



From the block diagram, the controlling input is from the voice command given by the user. This voice is then processed by software which is developed by Microsoft visual studio by using speech SDK. In microcontroller, it receives the signal from the pc. From this signal, an output signal will be sent out through serial port communication RS232 to the correspondent electrical appliance to activate it. Main controller unit program developed by MIKRO c compiler. At last main controller unit make decision and send a signal to drive light, fan or door.

4. VOICE RECOGNITION CONCEPTS:

This concept is more alike a comparison of between the source and the data stored in memory (the voice that stored during the training process). The way of this concept function is when a user speaks out some command, with then the voice is captured through microphone as the input

devices. Once the voice is captured, the usage of a decoding system that will convert the analog (voice) to digital (binary signal). Later, the input voice is compared with the data stored in the memory early before the testing. The output of the comparison is the voice matched with any of the command trained and certain signal is produce as the input for the controlling system.

4. EXPERIMENTAL SETUP:

4.1 Circuit Diagram in Micro c Window:

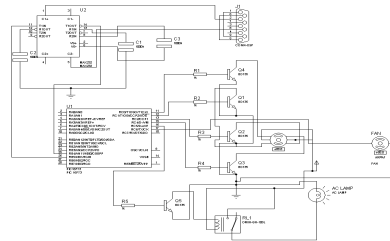
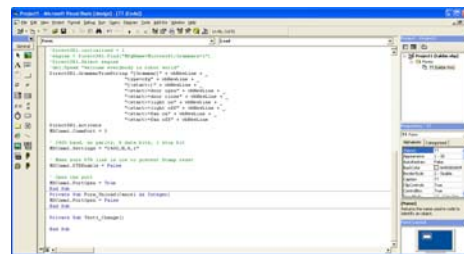


Fig: 4.1 Circuit diagram in micro c window

4.2 Program in Microsoft Visual basic studio:



4.3 Driven circuit:

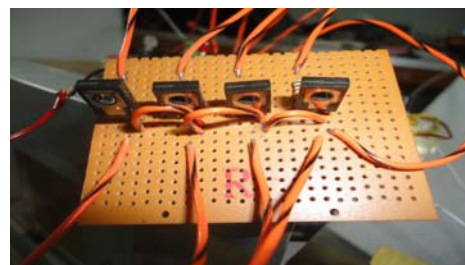


Fig: 4.3 Driven circuit

5. PERFORMANCE ANALYSIS:

These topics will discuss on the results and findings of this project. Besides that, in this chapter the insight of the system is discussed thoroughly especially on the way to use the system.

5.1 Overview of the System:

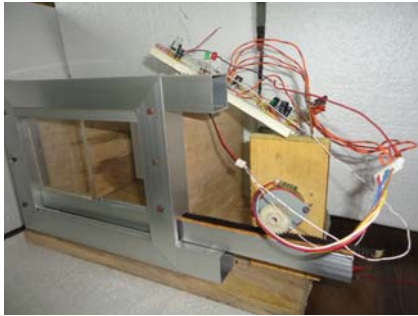


Fig 5.1: Overview of the system

5.2 The Voice Recognition System:

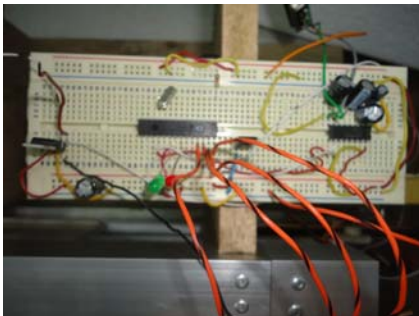


Fig 5.2: The Voice Recognition Circuit

1. First voice or speech is received through the microphone.
2. The voice or speech will be converted into a digital signal which will be passed to the memory data bus. Software is developed by Microsoft Visual Basic. In the Visual Basic, a curve is plotted when executing a program. So when the memory bus gets a signal through the serial port, another curve is plotted and compared with the saved curve.
3. Followed by a comparison process which will cross-check with the word stored before.
4. If the words are matched, then serial data is transferred to the MAX232 before the PIC.

6. CONCLUSION & FUTURE WORK:

This project discussed the development of the voice recognition home automation system which can be used to replace the old and conventional way to switch on the power of an electrical device. This system consists of a voice recognition circuit that is built up using the MAX232 and a microcontroller circuit that uses PIC16F73.

The voice recognition home automation system has been successfully developed and through this project I have gained much experience especially in the field of applying the technique of troubleshooting an electrical circuit and also in programming the microcontroller. This project is a very simple project compared to any of those who are already in the industry and commercialized but yet I hope that this project can be researched further to create a better design that can be applied to a larger scale of controlling. Besides that, I also hope that this project can be a jumping stone for the application as one of the smart home necessities.

Besides the achieving of the main objective, by using this system, it can help reduce any occurrence of getting shock due to the failure of the switch and it offers a more safety way to turn on the switch. Moreover, if this system is fully equipped in a house, it can reduce the addition of the wall switch and what is left is only the plug point for users to plug in their devices only.

6.1 FUTURE WORK:

- Research on the way to collecting the command such as using an additional system that can capture the voice command clearly to create a more stable controlling system.
- In my project, I have used a microphone which is disabling to reduce noise. In that case, a bone-conductive microphone is able to reduce such type of noise.
- Sometimes pronunciation is a factor. But it can be eliminated using repeated training.

7. REFERENCES:

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