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A Voice Operating System Designed by the Combination of VB6 and SAPI Software

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Abstract—This paper presents a technique for recognition of voice command (say) by analyzing and matching word with a number of words stored in the computer. Such a technique of recognition of a word is useful in the execution of a voice command in the process control, robot system or for any other industrial operations. Here the word given as input for execution of command. By using Speech Application Programming Interface (SAPI) the input commands are matched with the stored words to obtain a perfect match between the applied command and the stored command. Once such matching is accomplished, the particular matched word is converted into electrical signal through the computer port to operate a system by interfacing the computer with hardware device. For software implementation programming language VB6 is used here.

Index Terms—SAPI, VB6, Voice recognition.

1 INTRODUCTION

VOICE recognition is the technique by which sound, word or phrases uttered by human being are converted into electrical signals and then these signals are transformed into coded patterns for necessary digital operations. Human voice differs from person to person, from male to female or from child to young or old to young. With such a varied range of voice having different pitch, tones and amplitude if a system can recognize a particular word correctly, then the recognition of the word may be termed as reliable and accurate. In this paper, such a system has been designed and realized to drive a motor according to the voice command. This process is important to virtual reality because it provides a fairly natural and intuitive way of controlling the simulation while allowing the user's hands to remain free.

Control of a system or a process by voice command is not only easy from the operation point of view, but also reduces many interfacing complicated circuits that are required for controlling the process. Robotics now-a-days is a common subject where voice command is used for operation of a robot. Many people in different countries have their interest on robotics. People through research on robotics, try to implement new features. The main theme of this paper is to operate a robot or an industrial process through voice command. Here a hardware circuit interfaced with the computer port has been used to drive a dc motor according to the command applied through voice.

The most common voice commands used were: “come”, “go”, “back”, “stop” etc. The dc motor faithfully followed the command applied from different voice spectrum i.e. male, female, child etc. Voice operated system such as dc motor drive.

2 ANALYSIS

Voice recognition is the technology by which sounds, words or phrases spoken by humans are converted into electrical signals and these signals are transformed into coding patterns. While the concept could more generally be called "sound recognition", we focus here on the human voice because we naturally use our voices to communicate our ideas to others in our immediate surroundings. Generally, speaker dependent systems are designed around a specific speaker. They generally are more accurate for the correct speaker, but much less accurate for other speakers. They assume the speaker will speak in a consistent voice and tempo. But this is a Speaker independent systems are designed for a variety of speakers.

For input voice command we used The Speech Application Programming Interface or SAPI, which is an API developed by Microsoft to allow the use of speech recognition and speech synthesis within Windows applications. In addition, it is possible for a 3rd-party company to produce their own Speech Recognition and Text-To-Speech engines or adapt existing engines to work with SAPI. In principle, as long as these engines conform to the defined interfaces they can be used instead of the Microsoft-supplied engines.

We choose SAPI for it’s the efficiency, the reliability, and security. In our project we used SAPI 5.3 software, which is the member of SAPI 5 API family.

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We have integrated SAPI and VB because visual basic has some functions to operate SAPI easily. In this technique we use SPEECH TO TEXT (STT) procedure. VB program takes a voice command as an input using SAPI and print that command in a message box. Then the program retrieves the text in the message box and matches with previously stored command. When it matches with the stored command then it gives a voltage in the parallel port. Our interfacing circuit is connected with the parallel port and it operates by the command.

For interfacing by parallel port, inpout32.dll is needed for all the windows versions. It works without any modification in user code or the DLL itself. The flow chart [4] of the program is given below:

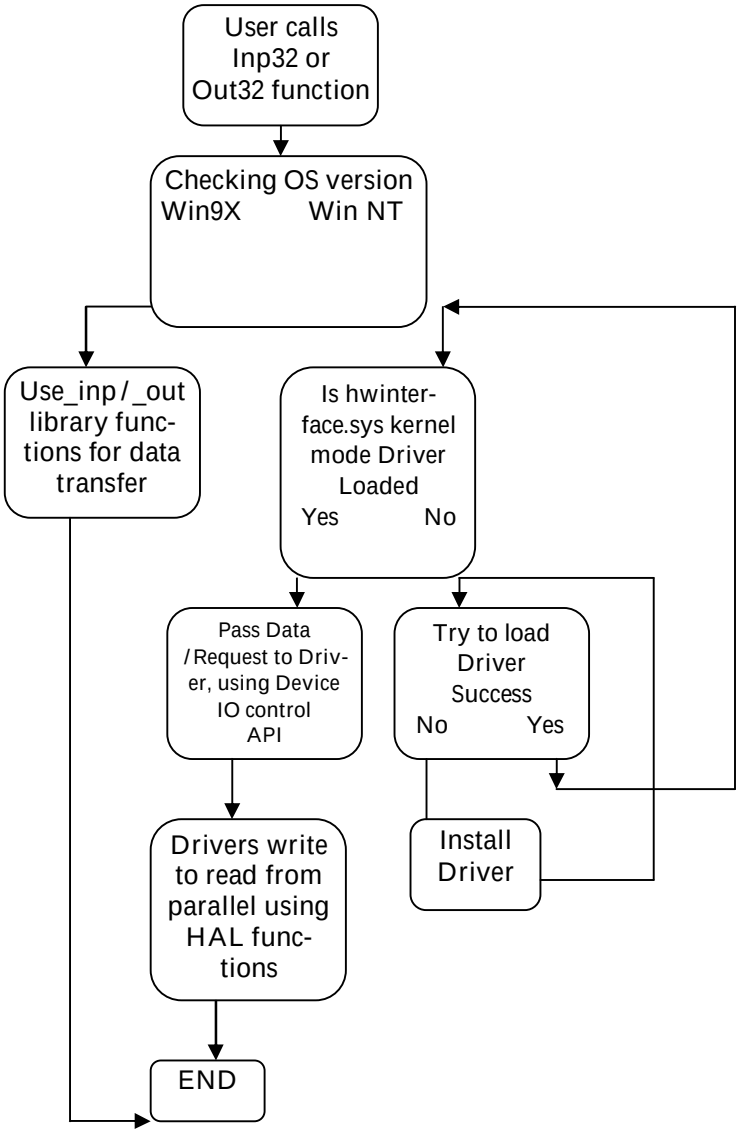

Fig. 1: Flow chart of inpout32.dll program

The two important building blocks of this program are:

1) A kernel mode device driver embedded in the DLL in binary form
2) The DLL itself

In the experiment such a voice recognition technique is used to drive a dc motor. The flow chart of the total system is shown in Fig.2.

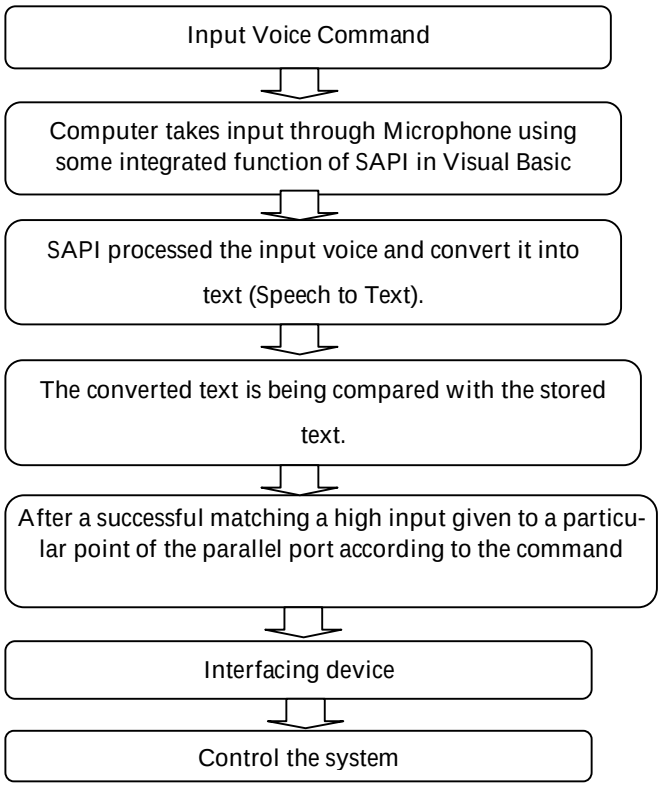

Fig.2: Flow chart of the voice operated system

3 RESULTS

In the circuit implementation, for motor drive we used MOSFET as interfacing device. MOSFETs are suitable for interfacing with PC to drive a heavy load. The gate current of MOSFETs are extremely low and thus have the advantage of not overloading the parallel data port.

We have used total six MOSFETs. Here, T1 and T6 MOSFETs are used as a switch. When T1 or T6 gets a low voltage then the drain of these MOSFETs produce a high voltage and the gates connected with these drain will be conducting.

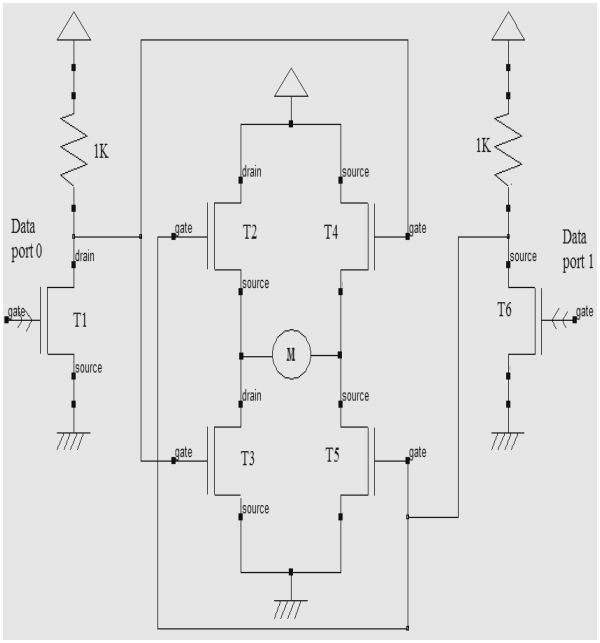

Fig.3. Circuit diagram of the interfacing circuit

The total operation to rotate the motor right has described below with Fig. 4.a.

When T6 gets a low pulse from the parallel port (provided that T1 gets a high voltage) we get a high voltage in the drain of T6. So the gates of T2 and T5 get a high voltage. So the current will flow through Source, T2, Motor, T5 and ground. In this combination the motor will rotate in clockwise direction. At this stage T1 must be 1. If T1 get 0 from parallel port then the circuit will not work properly. The direction of current is shown with arrow symbol.

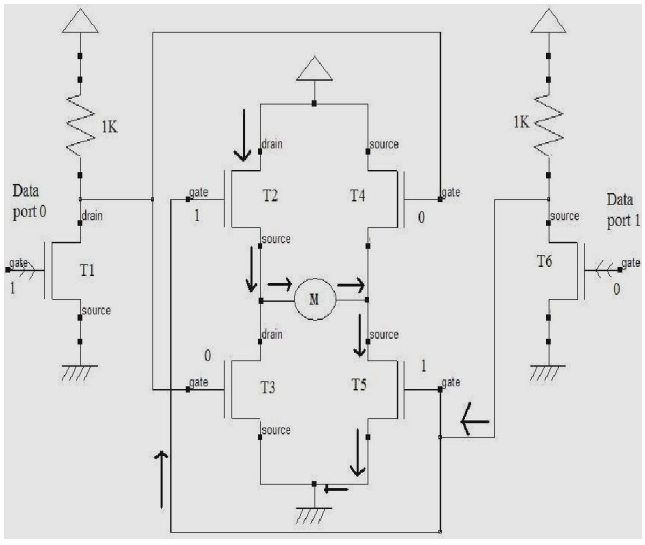

Fig. 4.a. Circuit diagram to rotate the motor right

The total operation to rotate the motor left has described below with Fig. 4.b.

When T1 gets a low pulse from the parallel port (provided that T6 gets a high voltage) we get a high voltage in the drain of T1. So the gates of T4 and T3 get a high voltage and they are ON. So the current will flow through Source, T4, Motor, T3 and ground. In this combination the motor will rotate in counter-clockwise direction. At this stage T6 must be 1. If T6 get 0 from parallel port then the circuit will not work properly. The direction of current is shown with arrow symbol.

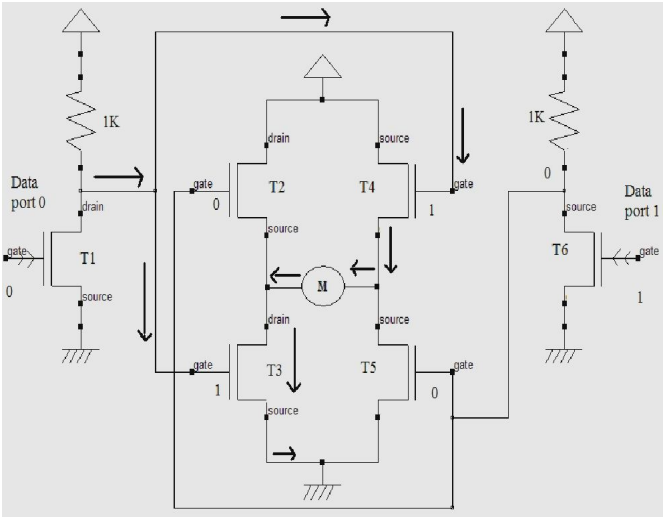

Fig. 4.b. Circuit diagram to rotate the motor left

In the experimental circuit we used DC motor (M). Because, the D.C. motor, by its very nature, has a high torque vs. falling speed characteristic and this enables it to deal with high starting torques and to absorb sudden rises in load easily. The speed of the motor adjusts to the load. Note that, the D.C. motor is an effective way of achieving the miniaturization designers are constantly seeking because the efficiency it gives is high compared with other designs.

7 CONCLUSION

In this paper, it has been shown that a simple voice matching technique may be applied to execute a command for a motor drive. To validate a practical circuit has been implemented by interfacing the circuit with a pc. 256 different commands can be applied using data port in the implemented system. This is because, in data port there are 8 pins so the total combination is (2^8) = 256. DEMUX can be used to increase the command number.

However any experiment on interclass voice recognition system has not been done. Further work on the interclass voice recognition is being suggested at this stage to take into considerations of all the possible conditions for designing a perfect voice recognition system. Also, practically it is really difficult to get a noise free environment. That's why;

a level of noise was mixed up with our sampled voices. So, it is clear that in our experiment noisy environment was also considered and the results show that presence of noise did not affect the voice recognition technique adopted here. For highly noisy environment, application of filtering technique would yield a better result.

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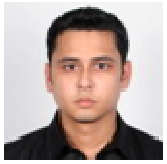

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