Recognition of Voice and Text Using Hand Gesture

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ABSTRACT

"Speech" and "gestures" are the expressions, which are mostly used in communication between human beings. Learning of their use begins with the first years of life. In human communication, the use of speech and gestures is completely coordinated. Machine gesture and sign language recognition is about recognition of gestures and sign language using gloves. A number of hardware techniques are used for gathering information about body positioning; typically either image-based (using cameras, moving lights etc) or device-based (using instrumented gloves, position trackers etc.), although hybrids are beginning to come about. However, getting the data is only the first step. The second step, that of recognizing the sign or gesture once it has been captured is much more challenging, especially in a continuous stream. In fact currently, this is the focus of the research. A text and speech conversion was successfully developed and implemented using microcontroller. The results were found out and observed. An extended version of the project can be developed by including more and more functions and commands in the code. Thus we can make a real time text and speech conversion with many functions and varied modifications.

Keywords: *Speech, Dump People, Gesture Recognition, communication, Vision.*

I.INTRODUCTION

Speech and Gesture are the expression, which are mostly used in communication between human beings. We are healthy persons but what about blind, deaf and dam people? Human can ignore the vision but we can not ignore the voice or sound. Data glove is used in this project. Gesture recognition has been a research area which received much attention from many research communities such as human computer interaction and image processing. The increase in human-machine interactions in our daily lives has made user interface technology progressively more important. Physical gestures as intuitive expressions will greatly ease the interaction process and enable humans to more naturally command computers or machines. Gesture recognition can be seen as a way for computers to begin to understand human body language, thus building a richer bridge between machines and humans than primitive text user interfaces or even graphical user interfaces, which still limit the majority of input to keyboard and mouse. Gesture recognition enables humans to interface with the machine and interact naturally without any mechanical devices. Using the concept of gesture recognition, it is possible to point finger at the computer screen.so that the cursor will move accordingly. This could potentially make Conventional input devices such as mouse, key boards and even touch-screens redundant.
A gesture may be defined as a movement, usually of hand or face that expresses an idea, sentiment or emotions e.g. rising of eyebrows, shrugging of shoulders are some of the gestures we use in our day to day life. Sign language is a more organized and defined way of communication in which every word or alphabet is assigned some gesture. In American Sign Language each alphabet of English vocabulary, A-Z, is assigned a unique gesture. Sign language is mostly used by the deaf, dumb or people with any other kind of disabilities.

II.BLOCK DIAGRAM

Description of Block Diagram

In our project we use IC ATMEGA 16, which has four ports. Port A, port B, port C, and port D. In microcontroller IC we connect Data Glove is fitted with Flex Sensors, Voice Recorder Kit, and Graphical LCD. Flex Sensor gives the signal to the microcontroller. Microcontrollers output goes to voice recorder kit and graphical LCD

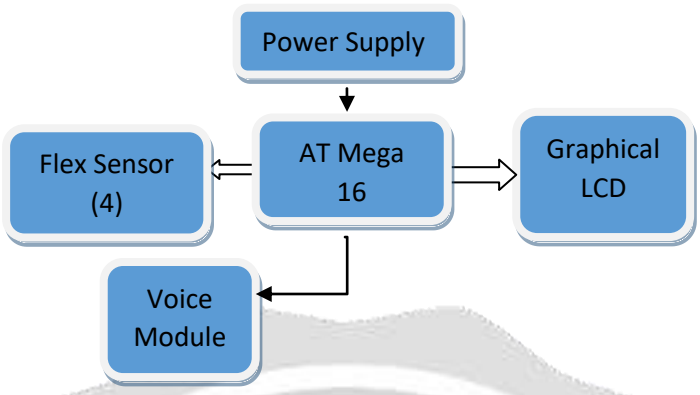


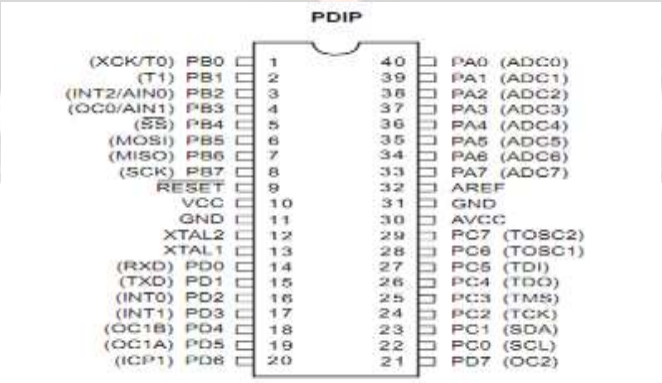
Fig 1: Block Diagram Of proposed system

III.OTHER EQUIPMENTS USED ADC:

An ADC is defined by its bandwidth and its signal to noise ratio. The bandwidth of an ADC is characterise by primarily by its sampling rates. The dynamic range of ADC is influence by many factors, Including the resolution, linearity, resolution and accuracy.
ADC perform the reverse operation of DAC, it convert the digital data to analog data. The conversion involves quantzation of the input. So it necessarily introduced a small amount of error.

Microcontroller:
IC ATMEGA16

A microcontroller is a small computer on single integrated circuit containing a processor core, memory, and programmable input/output device peripheral .Microcontroller are used in automatically controlled products and devices, such as automobile engine control system.



It has 40 pin IC. It has 16 KB flash memory. it has 4 ports i.e. port A,B,C,D. It has inbuilt ADC i.e. Analog to Digital Converter. This IC has alternating pins which work as address pin as well as ADC. Pin no. 10 and 30 are the power supply pins. Pin no. 11 and 31 are ground pins.

Graphical LCD:

LCD is liquid crystal display. This is used to display output of any system. A liquid crystal display is a flat panel display or other electronic visual display that uses the light modulating properties.
LCD is used in wide range of applications including computer monitors, television, instrument panel, aircraft cockpit display, and indoor and outdoor signage.

Fig 2:- Graphical LCD

FLEX SENSOR:

It is actually a variable resister which has 2 terminals. We adjust the third terminal and convert it into sensor.We connect the flex sensor at input stage.We have use only 4 flex sensor. Flex sensors are resistive carbon parts. When bent, the device develops a resistance output correlative to the bend radius. The variation in resistance is just about 10kΩ to 30kΩ. A global organization flexed device has 10kΩ resistance and once bent the resistance will increase to 30kΩ at 90^{o} .The device incorporates within the device employing a potential divider network. The potential divider is employed to line the output voltage across 2 resistors connected nonparallel as shown in Figure 2. The electrical device and flex forms a potential divider that divides the input voltage by a quantitative relation determined by the variable and glued resistors.

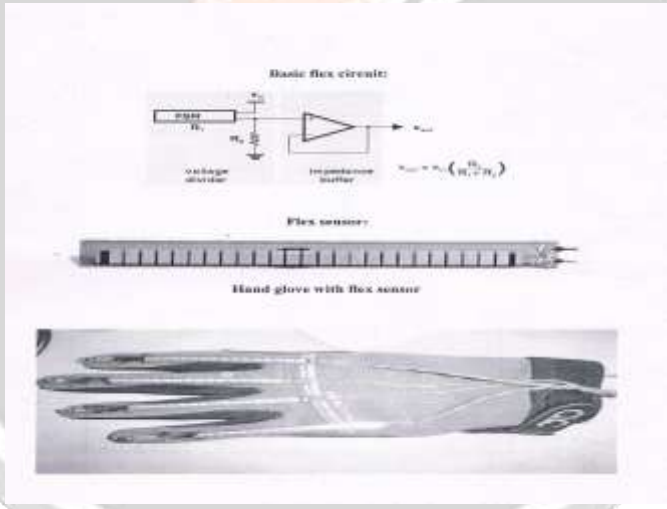


Fig 3:- Flex Sensors

VOICE RECORDER KIT :-

Fig 4:- Voice Recorder Kit

It is a single chip, high quality voice recording and playback solution. It has 8 channel audio recording and playback. We can record the command till 11 minute. It has Dynamic Recording and playback recording buttons.
We can record voice with the help of on-board microphone.

IV. DATA GLOVES

Data glove consists of 2 detectors; flex sensors and measuring device sensor. The output of the measuring device sensors is detected by the lean detection module, whereas the output of the flex sensors and therefore the overall gesture of the hand square measure detected by the gesture detection module. The gesture detection module provides associate degree 8-bit address for speech synthesis module; 8-bit address is completely different for every gesture. Speech Synthesis module speaks the message severally to deal with received by it.

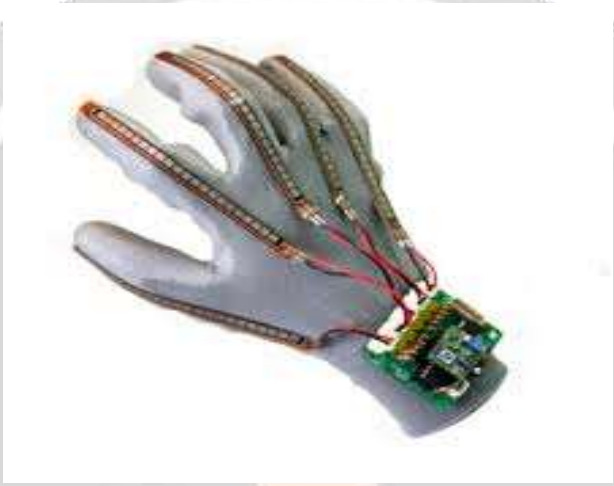


Fig 5:- Data Gloves

V. FLOW CHART:-

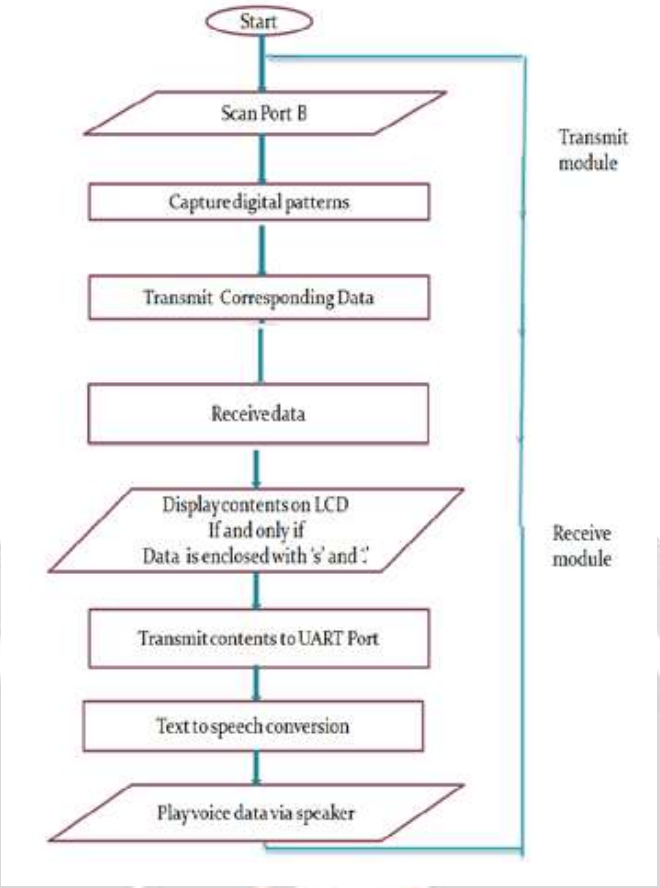


Fig 6: Flow Chart of Proposed System

VI. EQUIVALENT CIRCUIT :-

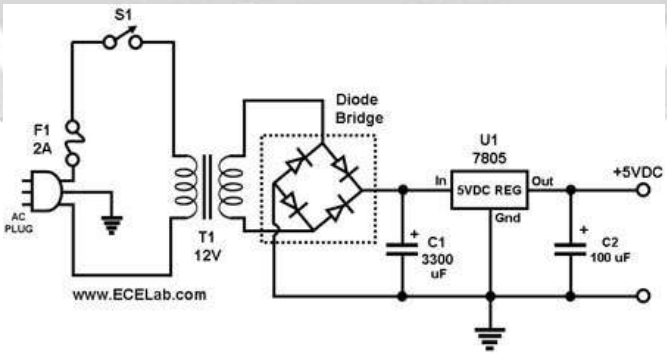
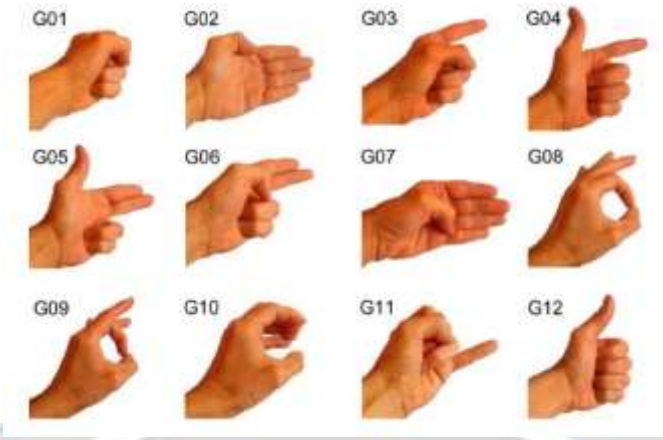


Fig 7: Equivalent Circuit

A Full wave rectifier is a circuit arrangement which makes use of both half cycles of input alternating current (AC) and convert them to direct current (DC). In our tutorial on , we have seen that a half wave rectifier makes use of only one half cycle of the input alternating current. Thus a full wave rectifier is much more efficient (double+) than a half wave rectifier. This process of converting both half cycles of the input supply (alternating current) to direct current (DC) is termed full wave rectification.

Full wave rectifier can be constructed in 2 ways. The first method makes use of a center tapped transformer and 2 diodes. This arrangement is known as center tapped full wave rectifier. The second method uses a normal transformer with 4 diodes arranged as a bridge. This arrangement is known as a Bridge Rectifier.

VII. GESTURE SIGNS:



This gesture signs indicates that the person who is not able to say anything about what he wants or where he want to go, this is helpful for them. With every hand movement or figure movement there is one message is fixed. With that set up movement they can easily adjust with the normal persons.

VIII. ADVANTAGES :-

- Gestural is quick and convenient to use.
- It express emotions and message including hands, face or other body parts to convey.
- Gestural control can allow the user to feel as through they are controlling world around them.
- Gestural control gives you to ability to control all yours devices from a distance without having to touch a thing.
- It is Very Low cost, less circuit complexity, small Size, fast response.

IX. APPLICATIONS :-

- It is used in Hospital .
- It is used in Railway Station, Bus stop, Airport.

X. FUTURE SCOPE :-

- It can be used for wireless message transfer.
- Home appliances.

XI. CONCLUSION :-

Sign language is one of the useful tools to ease the communication between the deaf and mute communities and normal society. Though sign language can be implemented to communicate, the target person must have an idea of the sign language which is not possible always. Hence our project lowers such barriers This project was meant to be a prototype to check the feasibility of recognizing sign language. With this project, deaf or dumb communities can use the gloves to form gestures according to sign language and the gestures will be converted to speech.

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