Voice Controlled Digit Writer for Handicapped People

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Abstract - In this new era, today the main aim all around is to reduce the human efforts to maximum. This can be achieved by making India full of robots, so that they will do all the mechanical work which is to be done by humans. Humans are fortunate enough to manage their household daily chores, so they are titled as "Gifted Humans". But what about physically disabled people? Here is our small effort taken for those kind of people. "VOICE CONTROLLED DIGIT WRITER FOR HANDICAPPED PEOPLE", this is the small handy robot which is made by us for them. Obviously its beneficial economically, has more efficiency and many more advantages. The project is has been divided into two main parts: 1. Electronic/ Hardware part, 2. Software part. The voice commands which are given by us are internally are taken by controller into low level machine language so that it can be understood by it and it will take an appropriate action accordingly. Basically the natural language of humans is recorded and converted into machine language for its execution. Voice operated device actually proves to be the valuable device for reducing many human efforts. Physically disabled people can get any kind of work done very easily and in fast way by giving simple voice commands. Many industrial applications can also make use of this robot.

Index Terms: Atmega328P; Handicapped people; MFCC algorithm; Voice Recognition; Voice Controlled Digit Writer.

1. INTRODUCTION

A robot whose actions or motions are controlled by giving simple voice commands is named as VOICE CONTROLLED ROBOT. Basically it is going to be used by physically disabled people so we have designed it for handicapped people. Voice recognition plays major role in working of this robot. It will be having various kind of applications.

1.1 System description
1.1.1 Voice Control
The first thing that comes into mind after seeing voice control is that how will the human voice be recorded and converted into machine language. So speech recognition is the main thing to be studied.

1.1.2 Use of Building Robot
After programming, robots they work more accurately and more efficiently. It then surpasses the most experienced human operator. Robots are designed for doing only a specific task, not as that of humans who can do all kind of tasks assigned to it. Robots are in the infancy stage of their evolution. Robots can work in any condition or any environment with the same rate of accuracy and efficiency.

The first paper which we referred consists of new architecture that is Deep Convolution and Recurrent Writer (DCRW) for photo generationby adapting attentive writer. It is an auto encoder, sequential, vibrational mechanism for any photo generation

There is basic difference between DRAW AND DCRW that is in DCRW we replace RNN encoder with CNN encoder and vice versa takes place in DRAW. CNN is motivated from visual ARM cortex which is also the state of art in image processing for deep learning[1].

The second paper we referred is actually it is an approach to offline text writer identification on the basis of probabilistic model of handwritten digits. Parameters are separately written and learned for each writer and it is identifies by Bayes Decision Rule [2].

Third paper is majorly consisting a novel framework having Ensemble Projection(EP) for writer identification. It is a feature transformation method which can be added with variety of classifiers for unsupervised and semi supervised conditions. EP learning can be increased by speech recognition for both the conditions [3].

Fourth paper is only for Hindi digits. It is an online system for recognizing the digits which are written by users. They are highlighted based on alignment algorithm. There are at most 50 writers using a touch screen laptop having 50 samples of each and every digit. Accuracy rate of this system was 96% averagely. There are various stages taking place in this system. But there are some disadvantages in this system [4].

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1.2. Algorithm Used

In this system we are using MFCC(Mel Frequency Cepstum Coefficient) algorithm for features extraction. In audio processing, mel frequency ceptrum coefficient represents the short term power spectrum of sound, based on linear cosine transform of a log power spectrum on nonlinear scale of frequency.
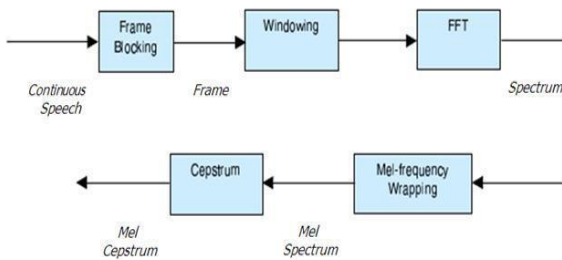

Fig.1. MFCC Algorithm

2. PROPOSED METHODOLOGY

Block Diagram
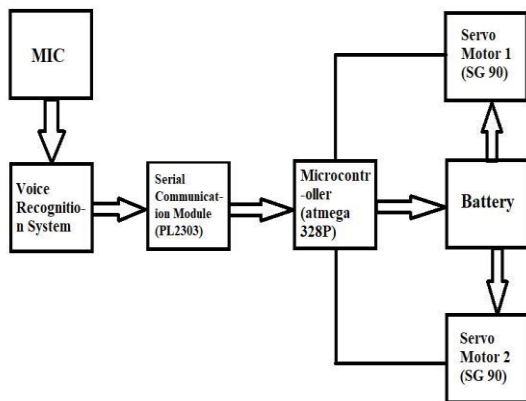
1.1 *Elements of Block Diagram*

Fig.2. Block Diagram

• **MIC:**
To convert sound signal into electrical signal this transducer is used. In telephone, hearing aid, concert halls and public events, motion picture production, live and recording audio signal we use microphone

• **Voice Recognition Module:**
The voice recognition module is small and easy to control audio signals. This module is completely depending on speakers. It supports up to 80 voice commands, from that 7 commands work at a time.

• **Microcontroller(Atmega328P):**
The Atmega328P is 8 bit microcontroller which belongs to the mega AVR family. It has a Harvard architecture with RISC processor core. It's maximum operating frequency is 20 Mhz.

• **Servo Motors:**
For precise control of angular or linear position, velocity and acceleration servo motors are used by people. For position feedback motors are coupled with the sensors. A servo motor is a rotary actuator or linear actuator.

• **Battery and charger:**
Batteries work on principle ofelectrochemical reactions and electromotive force. It is a device composed of multiple cells. Battery has two terminals, one is positive and one is negative. To charge the batteries we required chargers.
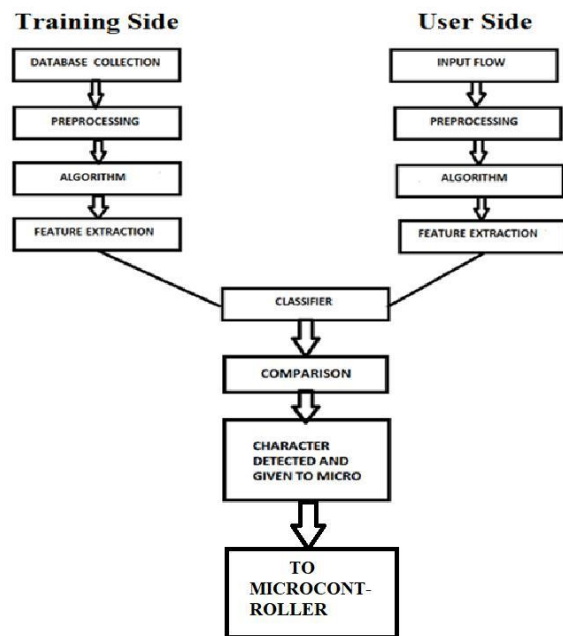
3. FLOW CHART

Fig.3. Flow Chart

3.1 Training side:
On training side user has to collect all the input data. Then this data is stored and collected at certain location which will be processed further by using certain methodologies and technologies. At this stage, the pre-processing of data is done. Then the algorithm is applied on it. All the required features are extracted after proper execution of algorithm. It is time consuming process but has to be done. It is necessary to go through all the steps and get all the features.

3.2 Testing side:
All the above things done are then kept for testing procedure where everything is tested stepwise and
we can get the required output. After getting the input then all the data is then pre-processed. This stage is the second which is done after input stage. Again the same

468

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algorithm is executed stepwise which will go through all the basic steps properly for getting the required output. Last stage features are tested and verified then combining all the steps that is training as well as testing side it is given to classifier stage.

3.3 Combination of training and testing side:

All the features extracted are then sent to a classifier stage where it is classified according to certain rules and regulations. It is then classified and stored at certain location which can be referred later. After that they are compared with certain database stored. Comparison is also done on the basis of certain rules and regulations. Finally the digit is detected and given to microcontroller for further process. Then the controller will take specific action for the output.
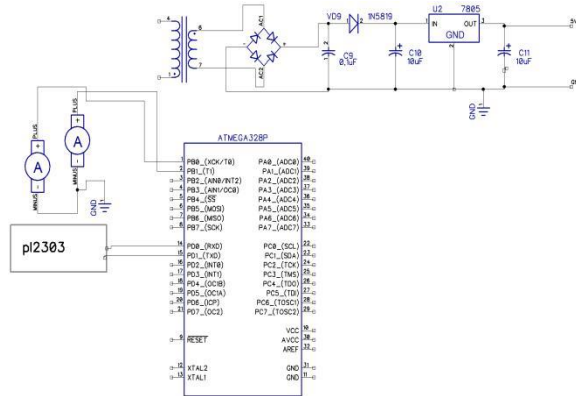
4. CIRCUIT DIAGRAM

Fig.4. Circuit Diagram

5. SOFTWARE IMPLEMENTATION
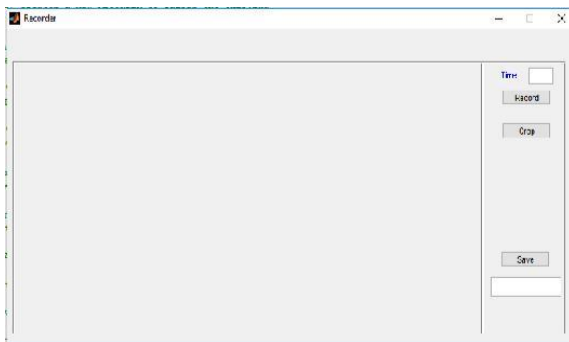
5.1 Interfacing of GUI

Fig.5. Interfacing of GUI

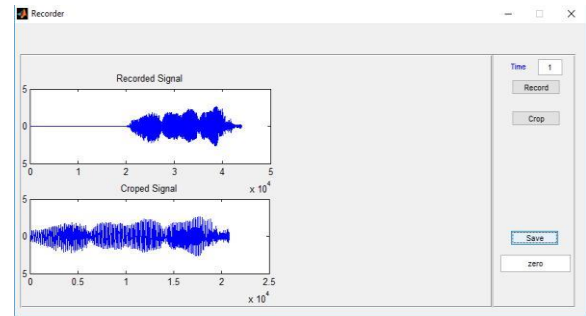### 5.2 Recording of voice for creation of database

Fig.6. Database Creation

6. CONCLUSION

The proposed system will be having an accuracy around 75% in correctly identifying an audio command. There will be significant effect on accuracy due to noise coming from motors. The accuracy of word recognition reduces in face of the noise. Obviously as the name suggests the proposed system will be very helpful for the disabled people. Also it is a cost efficient system. The system can be easily carried anywhere due to its light weight and small size. But the system is highly sensitive to surrounding noises.

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