AUTOMATIC IMPRINTATION BY VOICE RECOGNITION USING ARDUINO MICROCONTROLLER

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Abstract: **The main aim of this project is to reduce the work of the typist. With the help of their voice the keyboard or typewriter is going to automatically type the letter or words or numbers etc. This is possible with the help of Arduino microcontroller, solenoid, stepper motor and voice recognition software. During any speech, the voice recognition recognizes the voice and sends input to the Arduino microcontroller. Based on the input the microcontroller send command to the stepper motor and solenoid to click the letter or words or numbers etc**.

Keywords: Arduino, stepper motor, voice recognition, solenoid

I.   INTRODUCTION

In previous years the main problem in typing the letters is through hands in typewriter or keyboards. This leads to many mistakes during any distraction and also takes duration for typing when they are exhausted. The human may subjected to distraction and get exhausted after sometime but machine never. Surely this concept digitalize the typing sector .Automatic imprintation proposes an intelligent implementation of electronic devices and other components used in it through voice recognition[1]. Voice control method offers a more user interactive approach in delivering control commands. By applying the speech recognition system we can control device remotely and wirelessly. There are two types of speech recognition system .They are speaker dependent and speaker independent system. Speaker dependent system is designed for specific speaker that works by learning single person's voice characteristics. This is designed for security purpose. Speaker independent system on the other hand is desirable to many applications. In this project speaker dependent system is used for the security purpose so that it can only recognize the particular voice of particular tone. In this paper, voice control method is used to control the stepper motor for key position and solenoid for pressing the key at that position. Arduino UNO[3] is a multi-purpose microcontroller board based on ATmega328P. It has 14 digital I/O pins and 6 analog pins. It can be power up via USB connection or through external power supply. It can communicate with the computer or with other Arduino board. Its software serial library allows serial communication on any of the UNO's digital pins. In the journal "Implementation of speech recognition home control system using Arduino" speech recognition system is proposed to build the security purpose, Arduino also plays a major role in it. ZigBee based home Automation has been introduced in journal "ZigBee based voice controlled wireless Smart home system". ZigBee means the wireless language that is used to connect the devices to one another. ZigBee[2] network receives voice command as input to an ARM9 controller which converts the date that is voice in to require format to be used in the micro-controller. Finally the micro controller generates some control signals to stepper motor and solenoid for the typing of letters. Therefore this concept is the combination of machines and electronics.

II.   PROPOSED SYSTEM

In this concept the words or numbers or special character are typed automatically through speech recognition Human interference is not needed thereby multiple task can be simultaneously performed by an individual at the same time. The components used in the project is

- Electret condenser microphone
- Speech Recognition system
- Arduino UNO R3
- ZigBee modules
- LCD display
- Stepper motor
- Motor driver L293D
- Solenoid

The electret condenser microphone senses the voice of the person at particular vocal level and gives Input to the speech recognition system. The speech recognition system processes it and provides codes for the Arduino understandable form. These codes are transmitted and received by ZigBee T-x, R-x module respectively. The received codes are processed by the Arduino and convert it into pulse train. These pulses are used to control the stepper motors through for the movement of the solenoid to the desired key position and the Arduino controls the solenoid to type the letters.

A)Electret condenser microphone
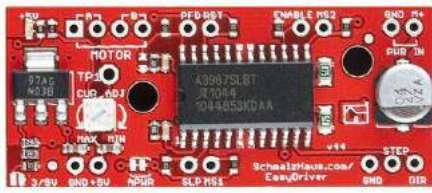

B)   Arduino UNO R3

C) Voice recognition system

D) Zigbee transceiver module

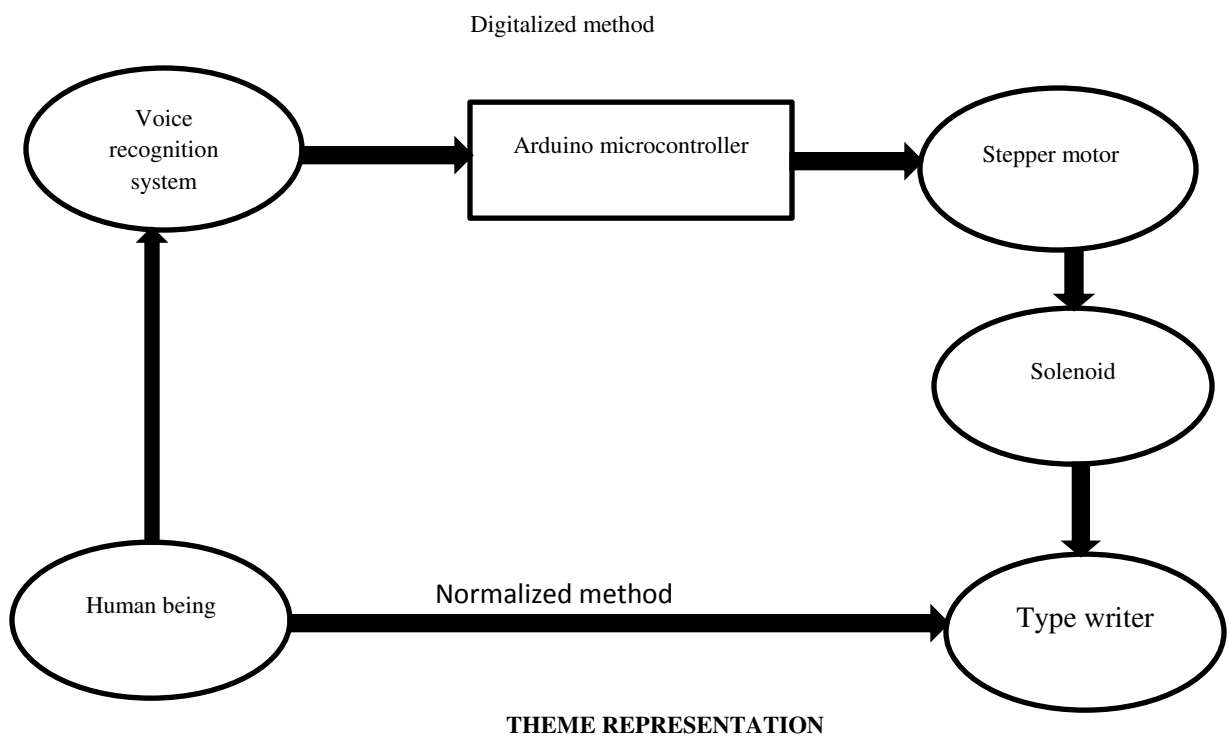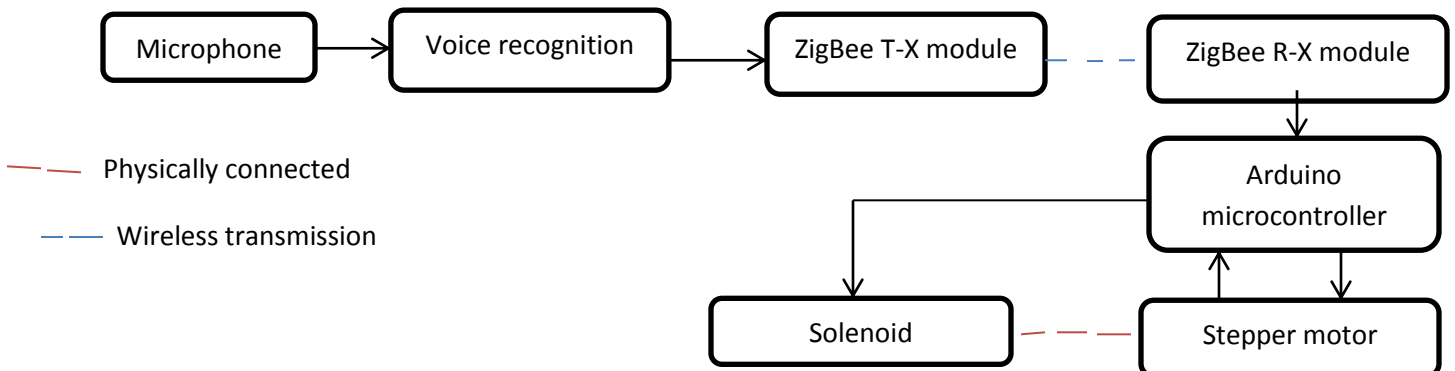E) Stepper motor

F) LCD display

G) Stepper motor driver

H) Linear Push- Pull solenoid

Digitalized method

THEME REPRESENTATION

OVERALL CIRUIT DIAGRAM

III.   OPERATING PRINCIPLE

A) Electret condenser microphone:

It takes the analog voice commands and sends it to voice recognition chip (HM 2007) in the form of electrical signal. The human ear has an auditory range from 10 to 15,000 Hz. Sound can be picked up easily using a microphone and amplifier. Microphones are transducers which detect sound signals and produce a voltage or a current which is proportional to the sound signal.

B) Voice Recognition Chip: It is the heart of the entire system. HM2007 is a voice recognition chip with on-chip analog front end, voice analysis, recognition process and system control functions. The input voice command is analyzed, processed, recognized and then obtained at one of its output port which is then decoded , amplified and given to stepper motor and solenoid for key clicking.

Features
 1. Single-chip voice-recognition CMOS LSI.
 2. Speaker-dependent
 3. External RAM support
 4. Maximum of 40-word recognition
5. Maximum word length of 1.92 s
 6. Microphone support
 7. Manual and CPU modes available
8. Response time less than 300 milliseconds (ms)
 9. 5 volt (5V) power supply

C) ZigBee Transceiver module:

 The processed voice command is transmitted through ZigBee transmitter module and received by ZigBee receiver module and give command to the Arduino microcontroller. The modulation used for transmitting is PWM. This project can type the letters even when speaker is 100 meters or more away. This is possible with the help of the ZigBee module. ZigBee is highly reliable wireless module which is also main part of this project.

D) Arduino UNO R3:

The Arduino is the hardware and software company which is used to produce micro controller kits to control the objects of the physical world. Arduino manufactures many kits in that Arduino UNO R3 microcontroller is used. The transmitted processed voice command is decoded by the Arduino microcontroller and it is given to the LCD display for checking of the pronounced word. After that it produces corresponding pulse train and given to the stepper motor through motor driver .There are two types of modes
- Number mode
- Character mode

In number mode the voice recognition recognizes voice in number format Ex: If we say one means it will take as 1.In character mode the voice recognition recognize voice in character format Ex: If we say character it will type as character. These are going to be displayed on LCD display.

E) LCD Display:

This is used for cross checking of the pronounced word or numbers which are going to be typed. Here 2*16 LCD display is used.

F) Motor Driver L293D:

In this project stepper motor are used. In this project motor driver serves two purposes

- Amplification of signal
- Interfacing with Arduino

The signal from the Arduino is not enough to drive the stepper motor. Hence the motor driver amplifies the signal. The stepper motor draws much current to rotate this heavy current may damage the Arduino microcontroller hence motor driver is used. It is a dual H-bridge motor driver in which we can interface the two motors but here we use single motor to drive. In H-bridge motor driver the motor can be driven in clock-wise and anticlockwise direction because the current flow through two directions according to the microcontroller command.

G) Stepper motor:

The stepper motor used in the project are bipolar motor,4-wire system, multistack for micro stepping of fine resolution because a Type writer or Keyboard has key at the critical position . The Stepper motor can move to the desired key position based on the training of the micro controller   through voice recognizer.

H) Push -Pull Solenoid:

When the stepper motor moved to the desired key position the motor driver communicates to the Arduino that the desired position has been reached. According to it the Arduino give control signal to the solenoid to type the letter. The working voltage is in the range of 6-12 volts. These processes are in synchronization to achieve the better speed.

IV.   CONCLUSION

Therefore the Letters are typed without any errors and it reduces the time duration for typing the letter by the above mentioned concept. I will tell that these concepts will surely digitalize the typing as per the Narendra modi's Digital India. This reduces the work of the typist. In future we expand this project for the dumb using Gesture recognition.

V.   REFERENCES

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