Automatic Writing Pen for Physically Challenged Peoples

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Abstract **- According to the recent reports from the United Nations Educational, Scientific and Cultural Organization (UNESCO), India is liable to give education for differently abled people as they have been facing many issues in writing examination. Nowadays education is mandatory for each human in the world, but physically challenged people have not been able to get into the common Education platform that others get. Our aim is to give an innovative automatic writing pen that writes without any physical support. Already available digital pens write recorded documents, but they are not capable of writing content lively. But this innovative automatic writing pen is a wholesome approach where the pen assures flawless and accurate writing according to the voice recognition and few extra features for blind and deaf peoples. In this System, The input voice will be given to System using Bluetooth module via the Bluetooth Voice Controller Mobile Application. The writing mechanism fully comprises with servo motor and stepper motor for the Movement of pen. The extra features were LCD display and the speaker for the blind people to know what the robot write. Finally, the output as pen writes according to the voice received by Bluetooth, Simultaneously LCD display and Speaker done their role Side by side. The proposed prototype can be a good thing for the physically challenged people like deaf, blind and handless to write their exams.**

Index Terms **- Automatic Writing Pen, ATmega328P, Stepper Motor, Writing Robot, Physically Challenged People.**

I.INTRODUCTION

Throughout history, countless inventors, Scientist, and thinkers have intensely looked for ways to Eventual development of technology provide an alternate for classrooms to assist differently abled students. Precisely writing by own and delivering their own thoughts is still an issue for those people. To overcome this difficulty, the auto writing machine is designed to sense their thinking using a voice Sensor. The proposed work will help the differently abled people like Deaf, Blindness People to write by their own through this innovation. For example, if a differently abled student must attend the exam, they need a person to write the exam for them and they may have the fear like what if the person writes the content wrongly. To avoid this situation, proposed work demonstrates an innovative writing pen that improves rehabilitation. It works by having a Bluetooth Voice: Arduino Voice controller App for storing all the voice command. The alphabet/ Numeric are coded by using angles using ATmega328P. Two Special Features as Speaker for Blindness People to know what the Write in Paper, LCD Display for deaf People to see the word going to write by the Automatic writing pen. Fig.1 shows the overall block diagram of the proposed work

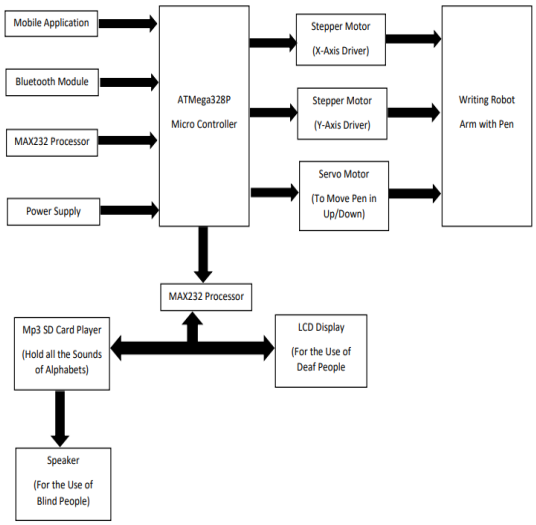

Fig.1 Block Diagram of the Proposed Work

II. RELATED WORK

Many researchers have developed automatic writing pen with different approach. Lambert Schomaker et.al

presents a theoretically founded approach for the use of a connected component contour codebook for the characterization of a writer of uppercase Western letters [1]. Vidiyala Sri Sai Sudheer Kumar et.al, [2] used a scanner, RF transmitter, receiver and hard disk for automatic pen writer with voice sensor command. Sindhuja R et.al, [3] proposed robotic writing system was capable to write what user pronounces. For betters results need more voice samples & large database to produce accuracy.

Milind Baviskar, Lakshman Korra [4] designed using Arduino Microcontroller with MATLAB speech recognition to draw the characters such as 1, 2 and I, L, etc. R.Balathangam et.al [5] developed a writing robot with visual basic software and achieved few characters. Need computer along with prototype it will be cost effective. Reshma Laxman Katkar [6] developed automatic writing pen using Gakken Auto writing machine, Hard disk and Voice Sensor.

In proposed work, Android Mobile, HC-05 Bluetooth Module, ATMega328P Micro Controller, MAX232, LCD Display, MP3 SD card, Speaker, Two Servo Motors for the movement of Pen and Other Servo Motor for the Writing of Pen and PCB Board are used in hardware part. The following flow chart in Fig. 2 shows the overall flowchart of the proposed work and procedures are discussed in the next section.

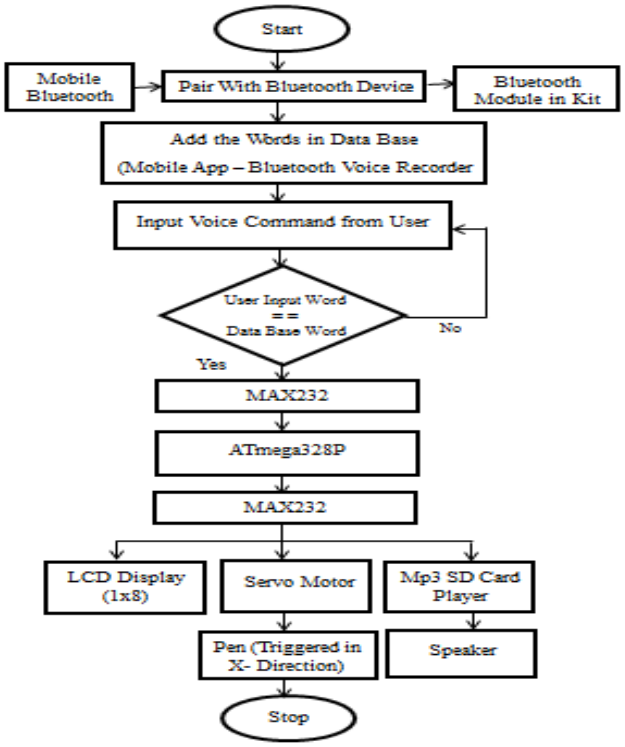

Fig.2 Flow Chart of the Proposed Work

III. RESULT AND DISCUSSION

The following are the steps of how proposed Automatic writing pen works with pictorial repesentations:

Step 1: Need to Install Bluetooth Voice: Arduino Voice Controller Mobile App in any Android device which is freely available in Google Playstore as shown in Fig.3. This app is supporting mobile as well as desktop users.

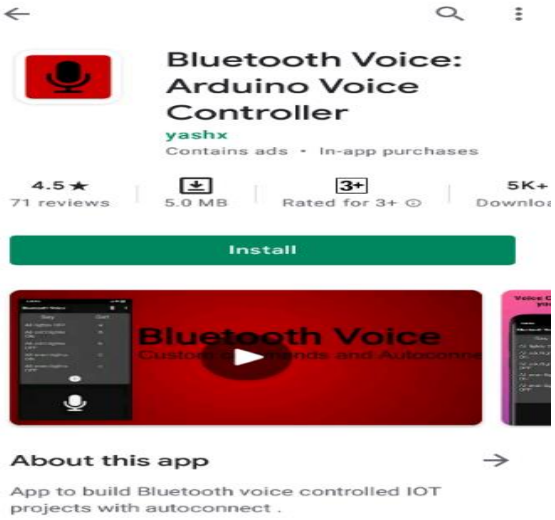

Fig.3 Bluetooth Mobile App

Step 2: Proposed system need to paired with Mobile App as shown in Fig.4(a) and Bluetooth icon in Mobile App will turns into Red colour which indicates both the devices are paired as shown in Fig.4(b).

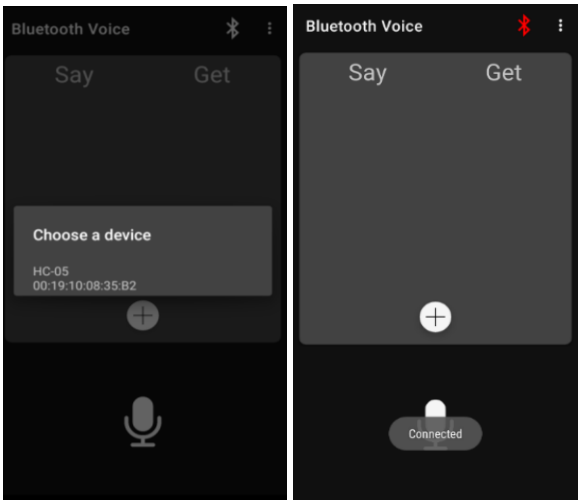

Fig.4 Pairing devices a) Pairing with Bluetooth Device b) Result of Bluetooth Connection

Step 3: Press ADD (+) icon as shown in Fig.5 (a). Two input field will be activated. SAY used enter the new voice command word and GET used to collect what to send to Arduino. Example: If the command word is hi as input for SAY and the GET has *hi# as shown in Fig.5 (b). It will be stored in Mobile APP like database.

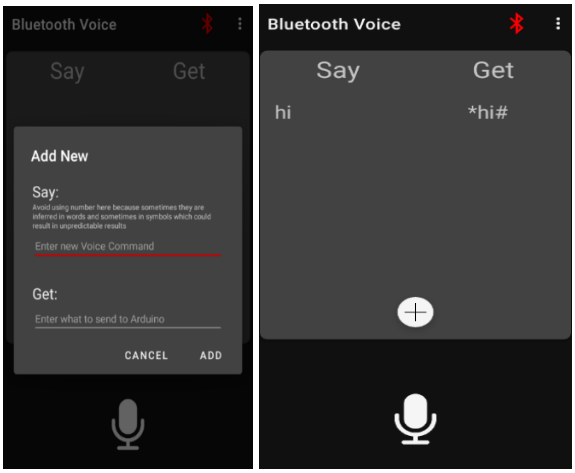

Fig.5 Command Word a) Adding New Commands b) Added Commands in Mobile App.

Step 4: Click the Microphone icon available in Mobile APP it will connect with Google Assisted voice recognition. Now the user can start the command one by one. It will be verified with data base based on step no 3. If match found it will proceed with step No.7 or else it will display as no match found in Mobile App as shown in Fig.6

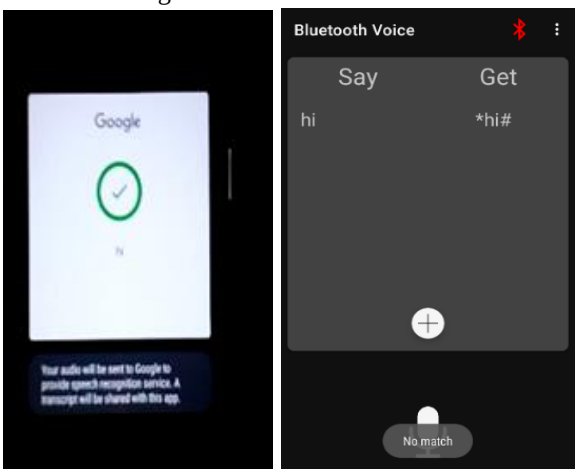

Fig.6 Result of Condition Matches

Step 5: If match found that word will send to paired Bluetooth device. HC-05 Bluetooth Module, MAX232 ATMega328 Microcontroller used in proposed work. The assembly of PCB board shown in Fig.7

Fig.7 PCB Board Arragements

Step 6: Once Bluetooth module receives the information, Microcontroller trigger the LCD Display, MP3 SD card with Speaker and Servomotor of the Pen.

Step 7: LCD Display will show the command word received as shown in Fig.8. It will be helpful to the deaf peoples to see what pen is going to write.

Fig:8 Result of LCD Display

Step 8: The MP3 SD Card player has all the alphabets which will pre coded already. Once the signals are received it will find that alphabet and send to the speakers which help to dictate the letters of that word. This will be helpful for blind peoples to hear what pen is going to write as shown in Fig.9.

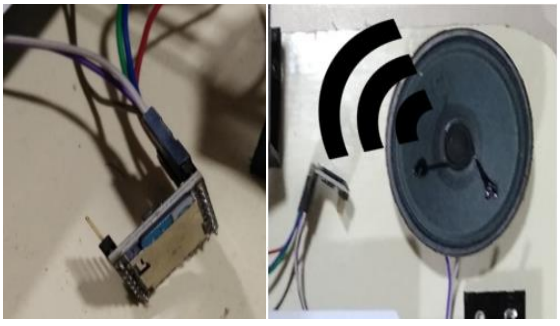

Fig.9 Result of Speaker

Step 9: Finally, the servo motors will be triggered and then Pen start to write the Word what we speak. Pen writes the letters one by one to complete that Commanded word by the user. The alphabets are coded by using angles for each and every 26 alphabets.

The Fig.10 shows the Result of writing pen and Fig.11 Shows Final Prototype of the proposed work.

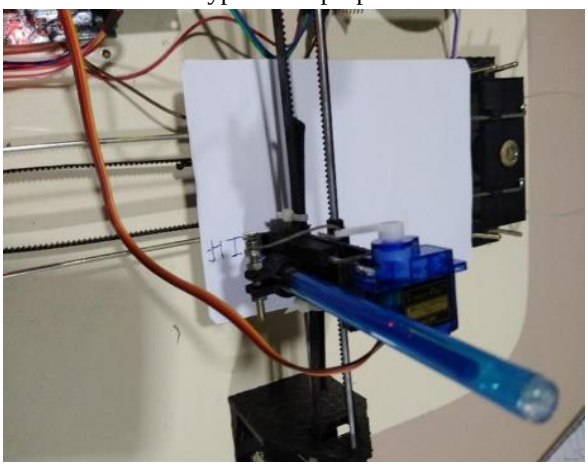

Fig.11 Result of Writing Robot

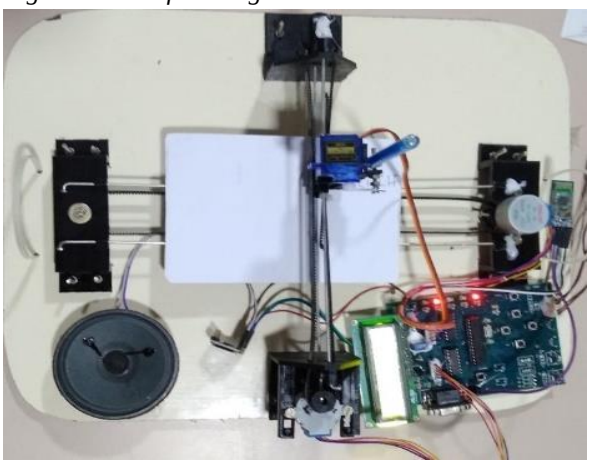

Fig.12 Final Prototype of Automatic Writing Pen

IV. CONCLUSION

This proposed work will helps the physically challenged peoples like deaf and blind People to write the exams on their own. By this process without any third person's support the physically challenged people can write their exams. This proposed system is used not only to physically challenged people; if any person got injured by Accident, they can also write their exam with the help of Automatic writing pen. The proposed work can write all the alphabets and numeric based on the voice comments. In future work, page-turner and Pelican will be added to turn the pages and erase the content if the Automatic Writing Pen writes wrongly. Writing speed can be increased with pen and paper consideration.

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