

Writing Robot Using Speech Processing For Blind Peoples

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Abstract- The paper presents an approach to design rapid and fluid movements of a universal robot to perform robot writing mimicking the doctor prescription writing when signing and the trajectory. Reading a doctor's handwritten prescription is a challenge that most patients and some pharmacists face; an issue that, in some cases, lead to negative consequences due to wrong deciphering of the prescription. Part of the reason why doctor's prescriptions are so difficult to decipher is that doctors make use of Latin abbreviations and medical terminology that most people don't understand. To perform the task, on-line human signing standards are created first. Robot writing task is performed using these standards after that and robot signatures are acquired as a result. Finally, recommendations of robot motion improvement are given.

A number of developing countries continue to provide educational services with disabilities in segregated schools. Also, all students, regardless of their personal circumstances have a right of access to and participation in the education system, according to their potential and ability. However, with the rapidly growing population and increasing number of people with blindness along with other disabilities, need for use of technology in the field of education has become imminent Thus the application will help in creating an environment that provides equal opportunities for all the students in taking up competitive exams. This will also improve the current educational systems for blind career.

Keywords- Landmine detection robot, Metal detector, Multiple sensors, Raspberrypi-3, IoT.

I. INTRODUCTION

Blindness is one of the most, misunderstood type of disability. The general masses have their own pre-conceived notions about the blind people that they firmly believe to be true without even getting in touch with a blind person. Most of the members of the non-blind community believe that the blind people cannot do their work or live a normal life. Blind people do lead a normal life with their own style of doing things. But they definitely face troubles due to inaccessible infrastructure and social challenges. Let us have an empathetic look at some of the daily life problems faced by the blind

people. Main problem is when the blind person cannot be able to write their ideas on paper, with help of other or parents the blind person can write their ideas etc. The biggest challenge for a blind person, especially the one with the complete loss of vision, is to navigate around places. Obviously, blind people roam easily around their house without any help because they know the position of everything in the house. People living with and visiting blind people must make sure not to move things around without informing or asking the blind person. Commercial places can be made easily accessible for the blinds with tactile tiles. But unfortunately, this is not done in most of the places. This creates a big problem for blind people who might want to visit the place. Blind people have a tough time finding good reading materials in accessible formats. Millions of people in India are blind but we do not have even the proper textbooks in braille, leave alone the novels and other leisure reading materials. Internet, the treasure trove of information and reading materials, too is mostly inaccessible for the blind people. Even though a blind person can use screen reading software but it does not make the surfing experience very smooth if the sites are not designed accordingly. Blind person depends on the image description for understanding whatever is represented through pictures.

II. LITERATURE SURVEY

[1] Voice based online examination for physically challenge: The growth of the Internet, and in particular the World Wide Web, is already influencing the way science is taught and will undoubtedly do so to greater extent in the future. In areas of education it offers a medium that has the potential to be more responsive to students. To encourage greater participation in their own learning, and to give greater access to different sources of information than traditional methods offers. In the future blind peoples also can do online exam like a normal human if our project is delivered in real time.

[2] Nowadays more and more individuals are turning to robots to do their work because robots are more versatile, accurate, reliable and also reduce human efforts. Robotic arms are programmed robot with similar function of a human arm. Aim of our project is to develop font style writing using voice as

input. Aim of our project is to develop font style writing using voice as input. This can be helpful for various applications such as people with dysgraphia, which is writing disability can use this machine to create trajectory moments with the voice as input. Physically challenged people can also use this machine for scribina purpose.

[4] Universal robot employment to mimic human writing: The paper presents an approach to design rapid and fluid movements of an universal robot to perform robot writing mimicking both the human kinematics when signing and the trajectory. To perform the task, on-line human signing standards are created first. Robot writing task is performed using these standards after that and robot signatures are acquired as a result. Next, both human and robot signatures are analyzed and compared, and the degree of signatures correlation is defined. Finally, recommendations of robot motion improvement are given. In this paper, we present a method to design rapid and fluid movements of a universal robot to perform robot writing mimicking the kinematics and trajectory of human handwritten signatures. The handwriting specimen acquisition, writing specimen processing, robot writing and comparison of on-line human and robot signatures are the phases of the experimental research performed. The phases are the steps of the presented method implementation.

[5] Voice based writing machine using speech recognition: The people who are not able to write are losing the opportunities in this competitive society. This proposed system is developed for the physically disabled and differently abled people who do not have the ability to write, due to absence of arm, which may limit the quality of creative expressions. This proposed system is helpful for physically challenged person who does not have ability to write due to absence of arm. The lack of writing arm may limit the quality of creative expressions. But same person can speak and that vocal words sensed by the microphone, processed by the Arduino Uno which actuate the robotic arm assembly. The Mechanical arrangement with the pen made such that it moves on Axial co-ordinates and capable of writing words on the paper. The fastest processing speed of Arduino Uno has utilized to achieve high speed of writing operation.

[6] Boosting neuro evolutionary techniques for speech recognition: In this work we experimented on the most challenging part of the speech recognition task, identifying the optimal network architecture with a promising set of hyper parameters and explored the automated improvement techniques around the set. To this end it has been identified that the candidate network parameters can be efficiently tuned.

[7] Design and detection of writing robot using speech processing: This paper aims to help the students who are having difficulties in writing the examination and effectively replaces the existing system of using a third- party scribe using speech to text and text to writing using robot.

III. EXISTING METHOD

We present a method to design rapid and fluid movements of a universal robot to perform robot writing mimicking the kinematics and trajectory of human handwritten signatures. The handwriting specimen acquisition, writing specimen processing, robot writing and comparison of on-line human and robot signatures are the phases of the experimental research performed. The phases are the steps of the presented method implementation. In the given paper, more attention was paid to the technology of written specimens' processing, experimental robotic set-up description as well as the control process of UR5 while performing writing task. Obtained human and robot writing specimens were processed. Acquired human and robot writing trajectory and speed profiles were compared and evaluated. Quality of the obtained robot trajectory profile is high. The increasing of the quality of robot speed profile by the reduction of inertia of robot arm parts in parallel with optimal task placement in robot workspace was defined as the future direction of the presented research.

DRAWBACK

- It only exploits the writing specimen processing.
- A process of UR5 is difficult to understand.
- No real time implementation.

IV. PROPOSED SYSTEM

The writing robot makes the person's exam paper with the help of wireless communication. The movement Code file created by the help of Inkscape software then the processing software is used to send the G-Code file to the microcontroller. Then the CNC shield drive sends the controlling signals to the stepper motors and servo motor. Now the XY axis which operates as follows by the instructions given to the controller unit. The corresponding code is send the data to controller block is interfaced with motor driver unit along the DAC provides the pulse width signal to motor unit where it is being processed and final output is written and displayed on the paper from the output unit.

ADVANTAGES

- Help blind people to write the exam on their own.
- Increases confidence of blind people.
- Accuracy
- Optimized character axis.
- Less delay
- Low cost

V. METHODOLOGY

This project is used for reducing traffic to 50 percentages in tollgates. So, here we will be analysis the number plate as well as vehicles which and whichever vehicle is taking return ticket For them the gate will be automatically opened for the particular vehicle when it comes back. Initially the first step in this model generation will be collection of dataset. We will be collecting different types of dataset from the internet and various resources of different vehicles and its number plate such that it can be trained by which our system can analysis the different vehicles and its number plate then the data set will separated into two parts, training as well as testing. Training dataset will be used for training the model completely whereas the testing dataset will be kept separately which will be used for testing in the last when the model is completely generated.

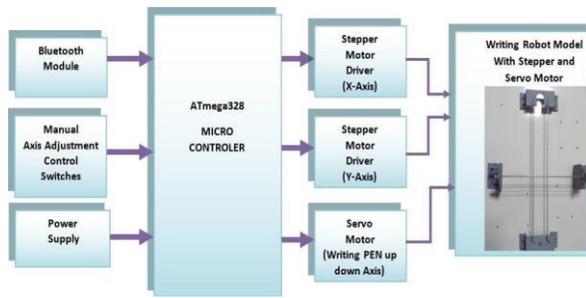
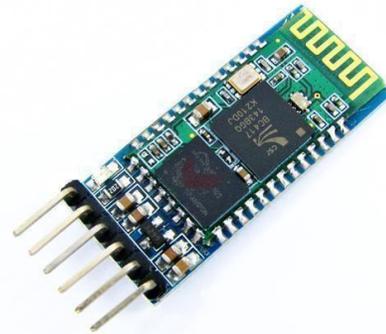


Fig 1. System architecture

V. HARDWARD REQUIREMENT

A. BLUETOOTH MODULE

It is used for many applications like wireless headset, game controllers, wireless mouse, wireless keyboard and many more consumer applications. It has range up to <100m which depends upon transmitter and receiver, atmosphere, geographic & urban conditions. It is IEEE 802.15.1 standardized protocol, through which one can build wireless Personal Area Network (PAN). It uses frequency-hopping spread spectrum (FHSS) radio technology to send data over air. It uses serial communication to communicate with devices. It communicates with microcontroller using serial port (USART).



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Fig 2. HC-05 Bluetooth

A.POWER SUPPLY MODULE

The power supply circuit consists of step-down transformer which is 230v step down to 12v. In this circuit 4 diodes are used to form bridge rectifier which delivers pulsating dc voltage & then fed to capacitor filter the output voltage from rectifier is fed to filter to eliminate any ac components present even after rectification. The filtered DC voltage is given to regulator to produce 12v constant DC voltage. 230V AC power is converted into 12V AC (12V RMS value wherein the peak value is around 17V), but the required power is 5V DC; for this purpose, 17V AC power must be primarily converted into DC power then it can be stepped down to the 5V DC. AC power can be converted into DC using one of the power electronic converters called as Rectifier. There are different types of rectifiers, such as half-wave rectifier, full-wave rectifier and bridge rectifier.

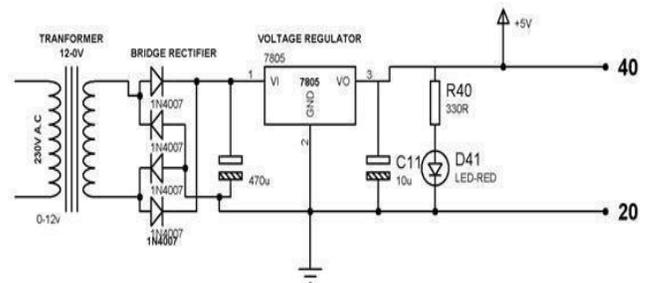


Fig 3. Power supply

B. PIN DESCRIPTION



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Fig 4. Pin description

C.SERVO MOTOR

A servo motor is an electrical device which can push or rotate an object with great precision. If you want to rotate an object at some specific angles or distance, then you use servo motor. It is just made up of simple motor which run through servo mechanism. If motor is used is DC powered then it is called DC servo motor, and if it is AC powered motor then it is called AC servo motor. We can get a very high torque servo motor in a small and light weight packages. Due to these features they are being used in many applications like toy car, RC helicopters and planes, Robotics, Machine etc.



Fig 5. Servo motor

D.STEPPER MOTOR

A stepper motor is an electromechanical device it converts electrical power into mechanical power. Also it is a brushless, synchronous electric motor that can divide a full rotation into an expansive number of steps. The motor’s position can be controlled accurately without any feedback mechanism, as long as the motor is carefully sized to the application. Stepper motors are similar to switched reluctance motors. The stepper motor uses the theory of operation for magnets to make the motor shaft turn a precise distance when a pulse of electricity is provided. The stator has eight poles, and the rotor has six poles. The rotor will require 24 pulses of electricity to move the 24 steps to make one complete revolution. Another way to say this is that the rotor will move precisely 15° for each pulse of electricity that the motor receives.



Fig 6. Stepper motor

E. AVR MICROCONTROLLER:

AVR Microcontroller is used as processing module and it is used as send data to LCD Screen and Gate way module. AVR is a family of microcontrollers developed by Atmel beginning in 1996. These are modified Harvard architecture 8- bit RISC single-chip microcontrollers. AVR was one of the first microcontroller families to use on-chip flash memory for program storage, as opposed to one-time programmable ROM, EPROM, or EEPROM used by other microcontrollers at the time. The AVR architecture was conceived by two students at the Norwegian Institute of Technology (NTH), Alf-Egil Bogen and Vegard Wollan.

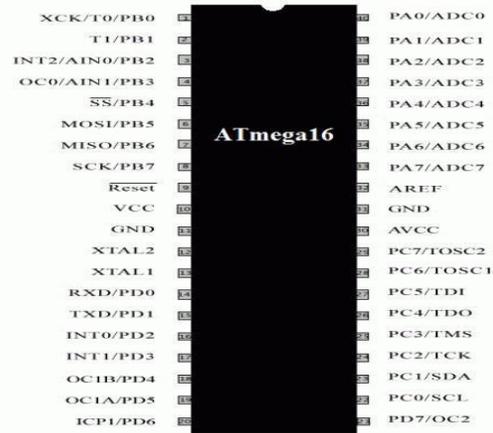


Fig 7. Pin diagram

VI. SOFTWARE REQUIREMENT

A. ARDUINO SOFTWARE:

The Arduino Integrated Development Environment or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them. Programs written using Arduino Software (IDE) are called sketches. These sketches are written in the text editor and are saved with the file extension .ino. The editor has features for cutting/pasting and for searching/replacing text. The message area gives feedback while saving and exporting and also displays errors. The console displays text output by the Arduino Software (IDE), including complete 49 error messages and other information. The bottom righthand corner of the window displays the configured board and serial port.

B.TABS, MULTIPLE, FLIES AND COMPILATION:

Allows you to manage sketches with more than one file (each of which appears in its own tab). These can be

normal Arduino code files (no visible extension), C files (.c extension), C++ files (.cpp), or header files (.h). Before uploading your sketch, you need to select the correct items from the Tools > Board and Tools > Port menus. On Windows, it's probably COM1 or COM2 (for a serial board) or COM4, COM5, COM7, or higher (for a USB board) - to find out, you look for USB serial device in the ports section of the Windows Device Manager. On Linux, it should be /dev/ttyACMx , /dev/ttyUSBx or similar. Once you've selected the correct serial port and board, press the upload button in the toolbar or select the Upload item from the Sketch menu. Current Arduino boards will reset automatically and begin the upload. With older boards (preDiecimila) that lack auto-reset.

C. LIBRARIES

Libraries provide extra functionality for use in sketches, e.g. working with hardware or manipulating data. To use a library in a sketch, select it from the Sketch > Import Library menu. This will insert one or more #include statements at the top of the sketch and compile the library with your sketch. Because libraries are uploaded to the board with your sketch, they increase the amount of space it takes up. If a sketch no longer needs a library, simply delete its #include statements from the top of your code. There is a list of libraries in the reference. Some libraries are included with the Arduino software. Others can be downloaded from a variety of sources or through the Library Manager. Starting with version 1.0.5 of the IDE, you do can import a library from a zip file and use it in an open sketch. See these instructions for installing a third-party library.

D. THIRD PARTY HARDWARE

Support for third-party hardware can be added to the hardware directory of your sketchbook directory. Platforms installed there may include board definitions (which appear in the board menu), core libraries, bootloaders, and programmer definitions. To install, create the hardware directory, then unzip the third-party platform into its own sub-directory. (Don't use "arduino" as the sub-directory name or you'll override the built-in Arduino platform.) To uninstall, simply delete its directory.

E. SERIAL MONITOR

This displays serial sent from the Arduino or Genuino board over USB or serial connector. To send data to the board, enter text and click on the "send" button or press enter. Choose the baud rate from the drop-down menu that matches the rate passed to Serial.begin in your sketch. Note that on Windows, Mac or Linux the board will reset (it will

rerun your sketch) when you connect with the serial monitor. Please note that the Serial Monitor does not process control characters; if your sketch needs a complete management of the serial communication with control characters, you can use an external terminal program and connect it to the COM port assigned to your Arduino board.

F. BOARDS

The board selection has two effects: it sets the parameters (e.g. CPU speed and baud rate) used when compiling and uploading sketches; and sets the file and fuse settings used by the burn bootloader command. Some of the board definitions differ only in the latter, so even if you've been uploading successfully with a particular selection you'll want to check it before burning the bootloader. You can find a comparison table between the various boards here. Arduino Software (IDE) includes the built in support for the boards in the following list, all based on the AVR Core. The Boards Manager included in the standard installation allows to add support for the growing number of new boards based on different cores like Arduino due, Arduino zero, Edison and Galileo and so on.

ADVANTAGES

- Easily Customizable
- Low power consumption
- Low cost
- Enhanced performance

DISADVANTAGES

- High development effort
- Larger time to market

VII. RESULT

The prime idea of our project is to convert human speech into textual matter without any difficulty and hassles. The major advantage is that it can write down the spoken contents on a paper . The word or speech we speak is first converted into G-code by using google translation mechanism . This specific G-code is then transferred to the writing machine is by using a Wi-Fi module attached to it. After receiving the G-code the plotter recognize and identifies the co-ordinates of each character and write the alphabet. This will helps the blind and handicapped to write based on their voice commands without errors.

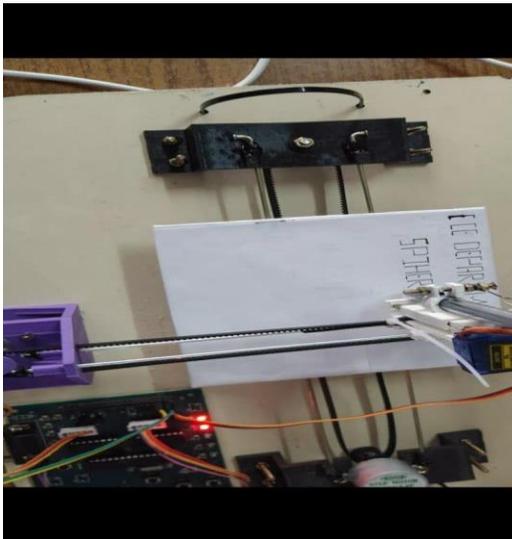


Fig 8. Output

VIII. CONCLUSION

In conclusion, developing a writing robot using speech processing technology can greatly benefit individuals who may face challenges with traditional writing methods. This technology can provide a more accessible and convenient way for people with disabilities or those who prefer to use speech as their primary mode of communication to write and express themselves. With advancements in speech recognition and natural language processing, writing robots can accurately transcribe speech into text and perform tasks such as proofreading and formatting. This technology has the potential to enhance the independence and productivity of individuals and can be applied in various fields such as education, healthcare, and business. This project helps handicapped people, medical doctors, and blind people. Blind people and handicapped people to write the exams on their own. By following this process, we can avoid a lack of scribes due to heavy paperwork and also maintain their independence.

IX. FUTURE WORK

In the coming future, we review the application of writing robot for blind people in the education field and it can promote for many purposes of robot with more features for blind people compared to this project. In this field there have more chance to develop or convert this project in many ways. This provides next step of education for blind people.

- Improving accuracy: While speech recognition technology has come a long way, there is still room for improvement in terms of accuracy. Future work could focus on developing more sophisticated

algorithms that can better understand different accents and speech patterns.

- Expanding language support: Currently, most speech recognition software supports only a limited number of languages. Future work could focus on expanding language support to make this technology more accessible to people around the world.

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