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VOICELESS TO VOICE CONVERSION USING MACHINE LEARNING

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ABSTRACT- Communication is an integral part of life for us as human beings, because it helps us exchange and understand others ideas and opinions and share our own with them. But since our communication is heavily dependent on language, and its exchange with the help of sounds it becomes very difficult for a person to communicate without using it. Verbal communication adds up to a major part of our communication to the point that it becomes a necessity for communication. According to World Health Organization (WHO), about 466 million people across the world which is about 5% of the world's population is mute or deaf and cannot use verbal mode of communication. The people who belong to this community use sign languages for communication which is highly efficient in itself but the only problem with it is that it needs to be learned like any other language. Because of this most people cannot understand or even use sign languages in the general population which creates a major communication gap.

1. INTRODUCTION:-

In a world where the vast majority of people use verbal communication as their primary mode of communication, the gap between the ones who are and aren't able to use this as their method of communication is further increased. Though sign language solves most problems in this case, there are still flaws that remain due to the fact that it needs to be learned like any other language before one can use it and most people aren't trained to do. This project is based on the need of developing a system that converts the sign language to speech which can be understood by everyone and thus reducing the communication gap. The proposed system consists of a wearable pair of gloves which can be used by mute people for converting their hand gestures to voice signal output. This system uses a smart device using ADXL345 to produce the proposed system. So, this project would minimize the communication gap for the people belonging to the deaf and mute community by converting their gestures into voice output.

2. NEED OF PROJECT

In a world where the vast majority of people use verbal communication as their primary mode of communication, the gap between the ones who are and aren't able to use this as their method of communication is further increased. Though sign

language solves most problems in this case, there are still flaws that remain due to the fact that it needs to be learned like any other language before one can use it and most people aren't trained to do. So, this project would minimize the communication gap for the people belonging to the deaf and mute community by converting their gestures into voice output. The project aims to build an efficient, reliable and easy to use system for people belonging to the deaf and mute community.

3. EXISTING SYSTEMS

There are existing systems which serve this purpose of converting sign language to speech which uses sensory input to convert each letter from sign language to produce output. This is very easy to use for a person who knows sign language.

4. PROPOSED SYSTEM

The proposed system aims to do this process by using latest sensors along with a combination of machine learning to produce a system that can convert gestures into words.

5. OBJECTIVES

Communication becomes a very difficult task for the people belonging to the deaf and dumb community who are skilled in sign languages for communicating their ideas, the main objective would be to make this process a lot easier.

6. LITERARTURE SURVEY

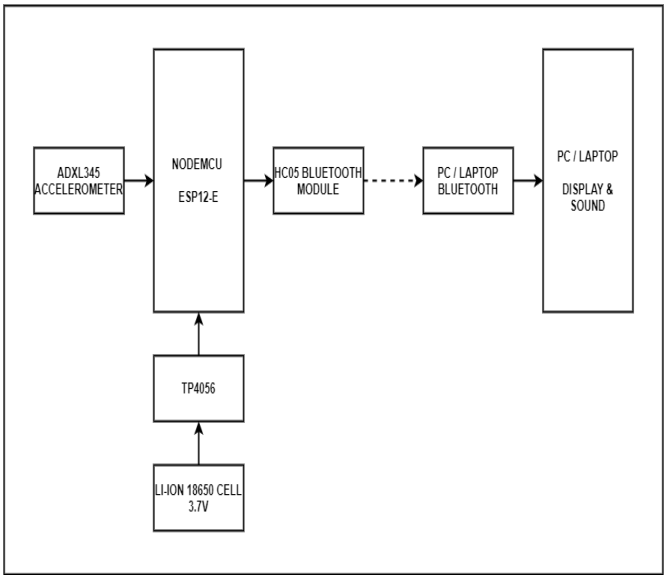
Glove-based sign language interpreter for deaf and aphonic peoples the paper discussed Sign language interpreter consisting of accelerometer sensor which helped to measure the movement of the three-axis direction (x, y and z). The accelerometer sensors were placed on the glove. The data from these sensors was sent to the microcontroller for further processing purpose. Once data was recognized at the microcontroller that was sent to the android phone via Bluetooth module. An android phone side, app is developed which was text to speech converter that helped to convert text signal to voice signal. LCD module was also used to display recognized data from the microcontroller. The proposed system used Renesas microcontroller, ADXL335 accelerometer sensor, HC-05 Bluetooth serial module. [1]

Microcontroller and Sensors Based Gesture Vocalizer this project included components like bend sensors which were made by using IC555 in astable mode along with these they included photo transistor. They used Microcontroller 89C51 as their main component and a speech synthesizer along with amplifier circuit and loudspeaker for getting the output in audio form. The bend sensors made up of IC555 senses the bending resistance and then its reading are provided to the 89C51 microcontroller where it then converts the received input into audio output using speech synthesizer and get the audio output through loudspeaker. [2]

Smart Glove for Hearing-Impaired this project was implemented using Arduino Nano flex sensors accelerometers. The person wearing the glove will make a gesture as per American Sign Language. They used a MIT app over which they get the text output. Along with it they connected a device via a Bluetooth link in which they used Text to speech application to get the text into audio as the output. [3]

Sign Language to speech conversion device this project too was made with help of flex sensors the microcontroller used is STM32 controller, the received input signals from the flex sensors which were fitted on glove are the analog signals which are converted to digital with the help of microcontroller they used the speech IC and sound for the audio output also this project included SD card module to store the threshold data. [4]

Smart Gloves for Mute People Using American Sign Language this project included the mostly used flex sensors which are attached to the glove. The main component they used is the Arduino UNO and the output provided was only the audio form which was provided through a earphone. The flex sensor output is provided to the microcontroller where it recognizes the values with the American Sign Language then the required output to get is converted to speech is



sent via a amplifier to the earphone to get the audio output.[5]

The proposed system has considered the different use cases and outputs provided by the above-mentioned papers and tried to overcome the errors and usability issues regarding the previous systems. The usage of latest sensors was made to ensure correctness in the input stage itself followed by fast transmission using NodeMCU. The processing and calculation errors will be avoided using machine learning algorithm which will be able to provide more accuracy in output and would also prove to be less time-consuming process compared to the output being given.

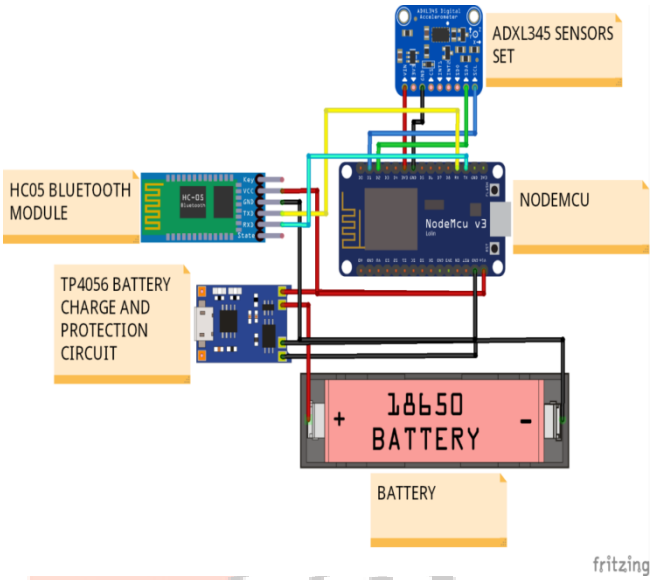
7. METHODOLOGY

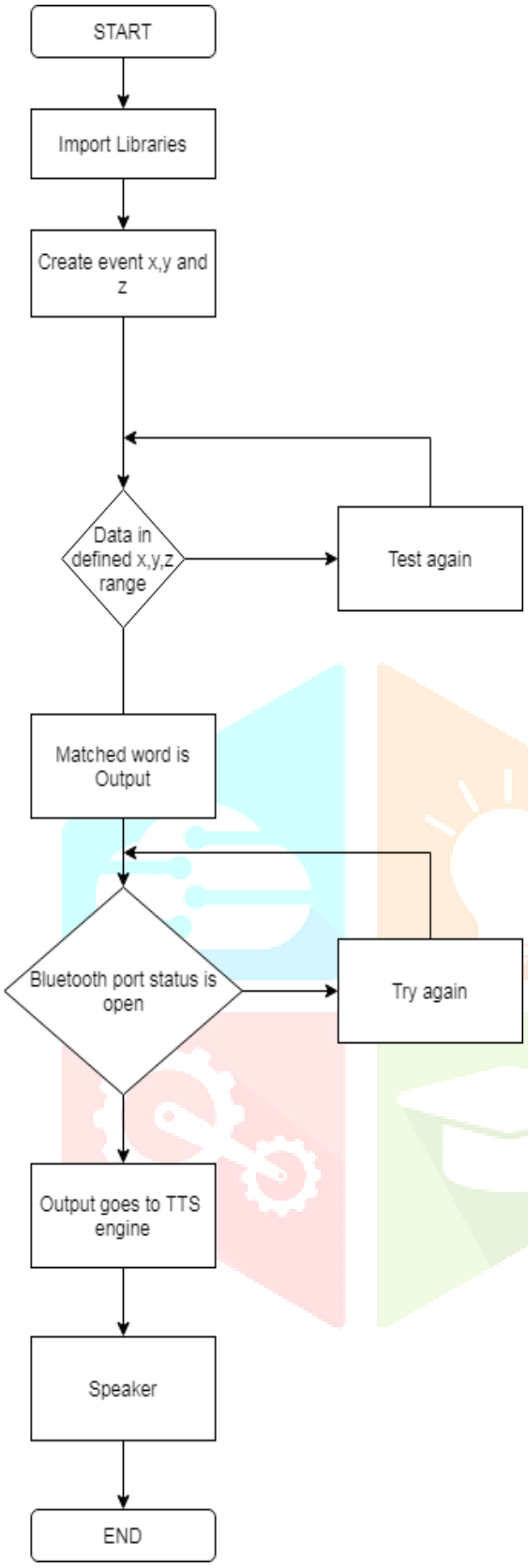
NodeMCU is used as the microcontroller in the following system. ADXL345 Accelerometer Sensor is used to detect the gestures created by user. This gestures when produced give set of values in terms of x y and z axis. These values are mapped to different words. A HC-05 Bluetooth module is connected to the NodeMCU to enable Bluetooth connectivity. Words produced by gestures are then transmitted to the PC over Bluetooth connectivity. The PC receives these words and then converts it into voice using TTS engine. Python based GUI is developed for PC to create software for the system. To make the system portable TP4056 along with Li Ion Battery is used. NodeMCU works on 3.3V which is provided by Li Ion Battery as it can provide up to 3.7V. TP4056 is a battery charging and protection module where user can attach a USB Charger to charge the battery.

8. SYSTEM ARCHITECTURE

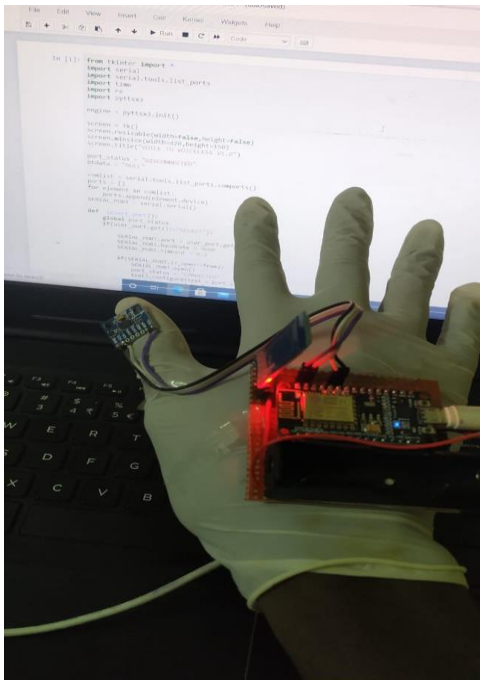
9. CIRCUIT DIAGRAM

10. FLOWCHART



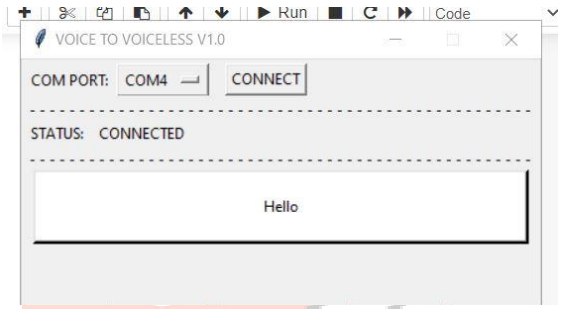


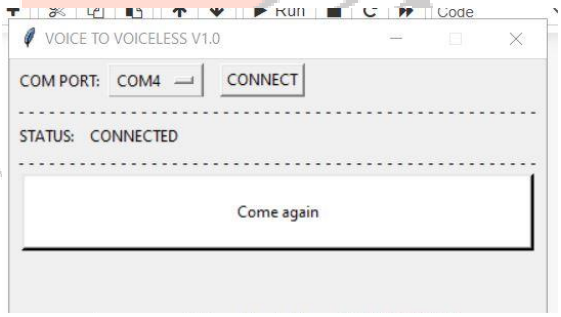
11. HARDWARE IMPLEMENATION

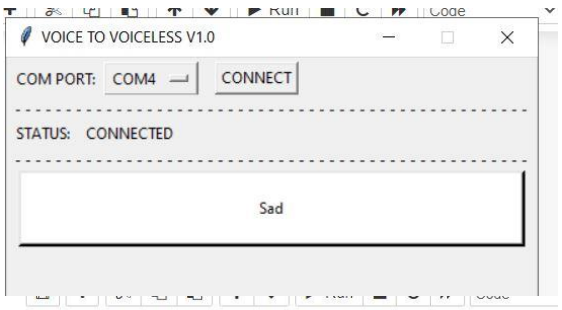


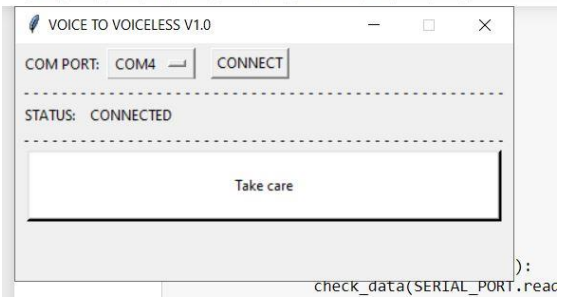
12. RESULTS

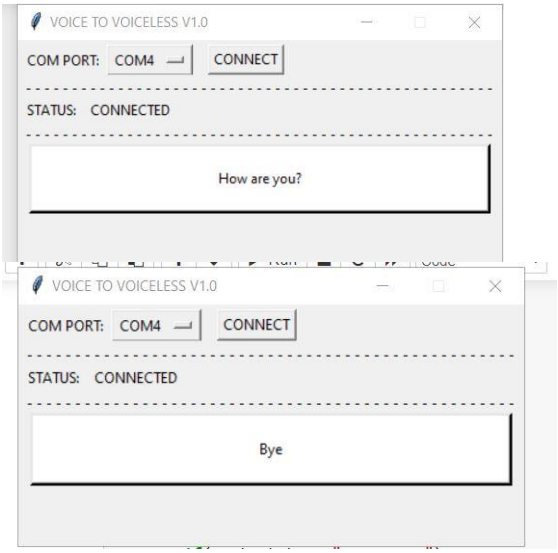
Detected words:











13. CONCLUSION

As we had to implement this topic which was a complete intersection between modern electronics and computer science, we had an opportunity to learn a lot of skills which are evolving right now and might become the future of technology. The concepts used in the project such as IoT and machine learning have been rapidly developing in the past few years and have quite a lot to promise for the future generations along with new iterations and upgrades launching with each passing year. This will eventually lead in development of more complex algorithms and intelligent computing which will be able to make this system more efficient and reliable.

14. REFERENCES:-

1) Glove based sign language interpreter for deaf and aphonic people S G R Meghana 1, Harshitha H S 2, L Shyla 3, Madan Kumar S M 4, 1-4U.G. Student, Dept. of Electronics and Communication Engineering, BMSIT&M Bangalore, Karnataka, India
2) ATA-UR-Rehman, Salman Afghani, Muhammad Akmal, RaheelYousaf, "Microcontroller and Sensors Based Gesture Vocalizer", Proceedings of the 7th WSEAS International Conference on signal processing, robotics and automation (ISPRA '08) ISSN: 1790-5117 8 2 ISBN: 978-9606766-44-2, University of Cambridge, UK
3) International Journal of Innovative Technology and Exploring Engineering (IJITEE) ISSN: 2278-3075, Volume-8, Issue- 6S4, April 2019 Smart Glove for Hearing-Impaired Abhilasha C Chougule, Sanjeev S Sannakki, Vijay S Rajpurohit
4) Sign Language to speech conversion device Miss.Shivani Kute 1 PG Student, Dept. of E&Tc, SPCOE, Otur (Junnar), Maharashtra, India. Prof. M.G.Chinchole 2 Principal, Dept. of E&Tc, SPCOE, Otur (Junnar),Maharashtra, India.
5) International Journal of Research in Engineering, Science and Management Volume-3, Issue-5, May-2020 www.ijresm.com | ISSN (Online): 2581-5792 Smart Gloves for Mute People Using American Sign Language Devangi K. Sonawala1* , Zil R. Vansiya , Vadoliya Dixita , Umang H. Patel , Arihantkumar M. Patel , Harshkumar K. Morker
6) International Journal of Advanced Research in Computer and Communication Engineering Vol. 4, Issue 2, February 2015 Copyright to IJARCCE DOI 10.17148/IJARCCE.2015.4258 264 Study of Sign Language Translation using Gesture Recognition Neha Poddar1 , Shrushti Rao2 , Shruti Sawant3 , Vrushali Somavanshi4 , Prof. Sumita Chandak5
7) Rohit Rastogi, Shashank Mittal and Sajan Agarwal, "A Novel Approach for Communication among Blind, Deaf and Dumb People", 2015 2nd International Conference on Computing for Sustainable Global Development (INDIA Com), 978-9-3805-4416-8/15/$31.00 ©2015 IEEE
8) Abhishek Tandon, Amit Saxena Keshav Mehrotra, Khushboo Kashyap, Harmeet Kaur, ―A Review Paper on Smart Glove – Converts Indian Sign Language (ISL) into Text and Speech‖, International Journal for Scientific Research & Development (IJSRD) Vol. 4, Issue 08, pp. 269- 272, 2016.
9) International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249 – 8958, Volume-8 Issue-6, August 2019 Gesture To Speech Conversion using Flex sensors, MPU6050 and Python Vaibhav Mehra, Aakash Choudhury, Rishu Ranjan Choubey
10) Smart gloves for hand gesture recognition using sign language to speech conversion system Albert Mayan J 1 ,Dr.B.Bharathi2 ,Challapalli Vishal3 ,Chidipothu Vishnu Vardhan Subrahmanyam4 1Assistant Professor, School of Computing, Sathyabama Institute of Science and Technology, Chennai. 2Professor, School of Computing, Sathyabama Institute of Science and Technology, Chennai. 3,4U.G Student, Department of Computer Science and Engineering,Sathyabama Institute of Science and Technology, Chennai