

# Hi-Tech Aid for Autistic Care

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**Abstract:- Autism is a mental condition, characterized by great difficulty in communicating and conveying messages with other people. The autistic children's communication will be cannot understandable by the normal peoples .autism affects information processing in the brain by alternating connections and organization of nerve cells and their synapse. Therefore in this project we are intended to aid autistic people in communication. The project mainly consists of an arduino uno micro controller. There is a PECS that will convert the standard picture used for the training of autistic child to sound output.laptop has been used for the processing of voice recognition module and speech recognition module. There is also a receiver transmission system incorporated. This system is a two way communication interface. Through this it is possible to send information about the selected picture to the connected device. And through a mobile app information can also send back to the display section. Through this autistic child can effectively communicate with a third person and vice versa.autistic child can express their emotions through this project.**

**Key Words: Arduino UNO R3, Laptop, Picture exchange communication system Keypad, LCD display**

## 1. INTRODUCTION

Communication is the act of conveying meanings from one entity or group to another through the use of mutually understood signs, symbols and semiotic rules. Communication is one of the primary characteristics of autism spectrum disorders (ASDs).

The ability of children with ASD to communicate and use language depends on their intellectual and social development. Some children with ASD may not be able to communicate using speech or language, and some may have very limited speaking skills. Others may have rich vocabularies and be able to talk about specific subjects in great detail. Many have problems with the meaning and rhythm of words and sentences. They also may be unable to understand body language and the meanings of different vocal tones. Taken together, these difficulties affect the ability of children with ASD to interact with others, especially people their own age. Studies suggest that many people eventually may be detected by the age of 1 year. The appearance of any of the warning indications of ASD is reason to have a kid observed by a professional specializing in these disorder.

In this project we are intended to provide the better communication between the autistic person and the normal

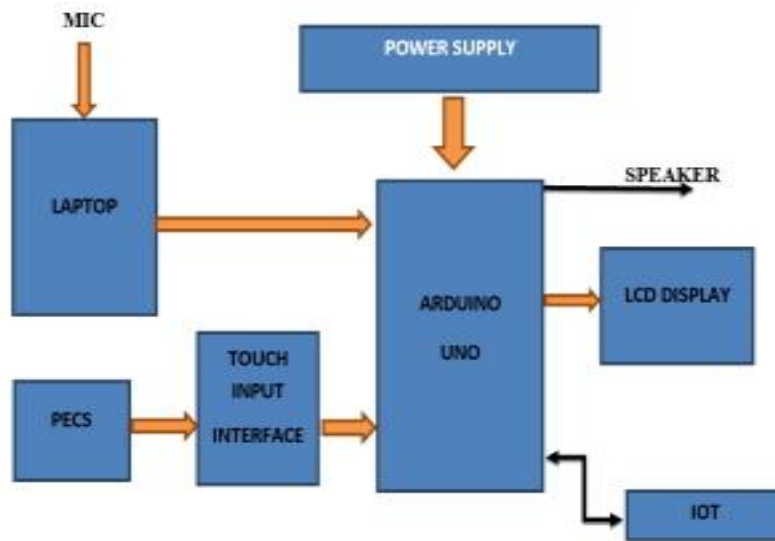
person.laptop has been used to provide the processing of unclear speech converter.Arduino UNO will be taken as the micro controller which was one of the major building block of this project.The needs of an autistic person can be expressed by this project in the way that it will be understandable by the normal person.

## 2 . LITERATURE SURVEY

At present there is no effective system in converting the unclear speech of autistic children to an interpretable output. There is only speech therapy available. This also doesn't make any sense because it will not teach the child about the mode variations and pitch variations. Most autism behavioral intensive therapy programs include speech-language therapy. With a variety of techniques, speech-language therapy addresses a range of challenges often faced by persons with autism. Speech-language therapy is designed to coordinate the mechanics of speech with the meaning and social use of language. Such a program begins with an individual evaluation by a speech-language pathologist to assess an individual's verbal aptitudes and challenges. From this evaluation, the pathologist sets goals that may include mastering spoken language and/or learning nonverbal communication skills such as signs or gestures. In each case, the goal is to help the person communicate in more useful and functional ways.

## 3. DESIGN AND DEVELOPMENT

Picture Exchange Communication System (PECS). This will function as a alerting system. Here a Wi-Fi module is also incorporated. By using the Wi-Fi module two way communications is also possible. A user confined design is implemented here.High speed transmission of the data has been occurred through wifi module.transmission and receiving of the data will be over the range of bluetooth module. The software part includes Embedded C and a blynk software. Embedded C is mainly used for the variable initialization and the blynk software is used for the wifi app installed in an android platform.



The Arduino Uno is a microcontroller board based on the AT mega328P It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

5. METHODOLOGY

Autism Spectral Disorder (ASD) will form difficulties in the communication with the real time environment. The communication between the autistic persons can be understandable by themselves but when a third person enters there will be a communication gap. In order to understand the needs of an autistic person it will be difficult for a third person, but the needs of an autistic person need to be known. 'Hi-tech aid for autistic care' mainly consists of the Arduino UNO microcontroller. A laptop has been used as the unclear speech converter and a Picture Exchange Communication System (PECS) has been used for more effective communication. Each autistic child is unique from each other. So each autistic child will produce different sound signals for the same need. So the former part is a customized part. The software and hardware were developed according to the interactive design and the data collected from a subject. It consists of an Arduino UNO microcontroller (16 MHz, 5V, Flash memory 32 kB), a laptop, a keypad, an LCD display, and also a microphone to feed the input signal and a loudspeaker to amplify the output signal to the user.

The software part mainly consists of two programming languages: Embedded C and advanced Python. Embedded C is mainly used to initialize the variables. The former part of the unclear speech converter here used a laptop, uses both Python for the processing of information. By this process the unclear speech will be converted to its corresponding ASCII format and this is

being fed as the input to the Arduino microcontroller. From this the microcontroller will generate a corresponding signal by matching the reference signal. When up to this step is completed, the laptop will convert the incoming ASCII code of the information to a corresponding voice output. Voice output will be a recorded one.

5. RESULT AND DISCUSSIONS

Our project mainly consists of two modules. One is an unclear speech converting system and the other is a Picture Exchange Communication System (PECS). Each autistic child is unique from each other. So each autistic child will produce different sound signals for the same need. So the former part is a customized part. The software and hardware were developed according to the interactive design and the data collected from a subject. It consists of an Arduino UNO microcontroller (16 MHz, 5V, Flash memory 32 kB), a laptop performs both the function of speech recognition and voice recognition module with a microphone to feed the input signal and a loudspeaker to amplify the output signal to the user.

The software part mainly consists of three programming languages: Embedded C, and Python. Embedded C is mainly used to initialize the variables. The former part of the unclear speech converter that is unclear speech to text converter uses both Python and MATLAB for the processing of information. By this process the unclear speech will be converted to its corresponding ASCII format and this is being fed as the input to the Arduino microcontroller. From this the microcontroller will generate a corresponding signal by matching the reference signal. When up to this step is completed then comes the part of Text to Speech converter. Text to Speech converter will convert the incoming ASCII code of the information to a corresponding voice output. Voice output will be a recorded one.

## 6. FUTURE ASPECTS

- This device can be used by each autistic child for better communication to make their life easier.
- This system, if manufactured commercially, is very economic and thus can be made available for autistic patients.
- As autism is a disorder that has to be given a lot of support and help, we hope our product could help the wanted people.
- We are including a Bluetooth module, so that two way communications are possible.
- So by that the autistic child can get the proper care and attention as required.

## 7. CONCLUSION

Through this project we hope to help people facing problems due to autism. For a person having Autism Spectral Disorder (ASD) this might be quiet difficult. Mainly an ASD affected child will produce an unclear sound signal which will be difficult to interpret. There will be a conflict in interpretation and communication between the ideas and gestures that an autistic child delivered and the interpreted idea by the third person. By using the unclear speech converter technology there will not be any collision of idea between the autistic child and the third person.

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