



A SUPPORT SYSTEM FOR ACOUSTIC CHILDRENS USING IOT TECHNOLOGY

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ABSTRACT: *Focusing and addressing the problems faced by the differently abled people such as visually, audibly and vocally challenged, through a single device is a tough job. A lot of research has been done on each problem and solutions have been proposed separately. But not all of them are addressed together. The aim of the project is to create a single device solution in such a way that is simple, fast, accurate and cost-effective. The main purpose of the device is to make the differently abled people, feel independent confident by seeing, hearing and talking for them. The proposed device enables visually challenged people to read by taking an image. Further Most of the socially assistive research to date is focused on autism spectrum disorder (ASD). Autism is a neurological disorder that affects the ability to communicate and interact socially. One way to cope with this problem is using assistive technologies (ATs) and finding ways how to benefit from the use of technology to help these children. Individuals with cognitive disabilities and developmental and social disorders constitute another growing population that may benefit from assistive applications in the contexts of special education, therapy, and training. The cause of the increasing number of children with autism is not yet known. However, early intervention is critical to enabling a positive long-term outcome, and even with early intervention, many individuals will need high levels of support and care throughout their lives.*

Keywords – Autism spectrum disorder (ASD), EEG probes, IOT module with GSM

I. INTRODUCTION

Autism spectrum disorder (ASD) is a neurological disorder that develops in a children within the age of 2 or 3 years. This disorder affects the communication and behaviour of a person. The autistic children have difficulty with communication, difficulty with social interactions, obsessive interests and repetitive behaviours. They also face mental health challenges such as

anxiety, depression and attention issues. According to the CDC the number of autistic children has been increased from 1 in 92 in the 2016 report to 1 in 71 in the 2018 report. There are no cures for ASD but therapies and other treatment considerations can help people feel better and can ease their symptoms. Behavioral therapy, play therapy, occupational therapy, physical therapy, speech therapy are some of the treatment methods. This paper makes use of the EEG sensors to sense their brain signals which comes under the IOT domain. IOT is a collection of reticulated computing devices, digital and mechanical machines, objects, animals or people that are provided with unique identifiers (UIDs) and capability to transfer data over a network without requiring human-to-human or human-to-computer interaction. The IOT has countless applications in promoting the health of the patients, from remote monitoring to smart sensors and medical device integration. It has the potential to keep patients safe and hale. Healthcare IoT can also boost patient engagement and satisfaction by allowing patients to spend more time interacting with their doctors. The application developed will certainly promote the lifestyle of the autistic children. This application will not only improve the lifestyle of the autistic children but also help the parents to keep an eye on the child and can monitor their behavior. It also help the therapist so that the treatment can be varied according to the mental health level.



II. RELATED WORKS

Facial, Visual and hand movement response data were used to identify the behavior of the children in different situations and it was also used to detect their moods. Brisking facial muscle, eye-contacts, and hand movement yielded a variety of nonverbal expressions intended for communication and social engagement. It conveyed about 80% of the cues in social communications. Spontaneous facial expression in children with ASD were measured by making use of the EMG (Electromyography) sensors. It also measured the subtle facial movements which were indiscernable to human eyes. The electrophysiological sensors were placed on their fingers, chest, shoulders to record their movements. Placing of number of sensors on their sensors disturbed their mental health and the ASD children were more nervous and at an high peak of anxiety. Facial action coding system (FACS) illustrated the different emotional and non-emotional phases of the face. For example: Dimple in the facial was considered to be a sign of depression, lips apart represented a surprised emotions. The children were taught with functional life skills by making use of smart box devices.

III. PROPOSED WORK

About 1 percent of world population are affected by Autism Spectrum Disorder. After a tedious experiment researchers and scientists have proved that autism is a lifelong condition (i.e.) autistic children become autistic adults. This paper brings out a one-sided solution to the affected children. Even though this system doesn't give a complete cure to the autistic children it works as a guidance and control the level of autism in children. Both the system process and the medical treatments should go one on one to get complete results. This system

consist of EEG sensors – to sense the brain waves , microcontroller- to convert the analog signals to decimal values , an IOT cloud - to store the reading that are sensed from the brain and an application – to view the readings and to control the affected child. It keeps a track of the brain signals and gets stored so that the physician of the respective child can keep a note of it and in case of any emergency the physician can directly contact the guardian and notify them about his/her changes in the health. The daily tracking system creates comfort zone so that there is no need of any hard copies of the medical report that has to be carried, the readings are stored in the cloud with the help of this they can access and check the previous record of action that happened in the specific course of time .The working starts with the EEG sensors , the EEG probes that are attached to the children senses the brain waves which are in analog format. The output from the EEG sensors are sent as input to the microcontroller . It converts the analog waves to readable decimal format. An amplifier is used to amplify the signals – the signals are in micro volts it is amplified to volts.

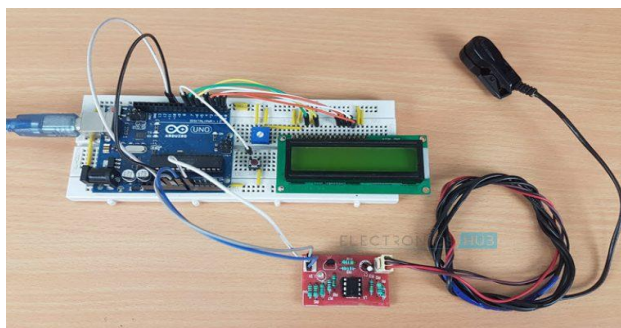
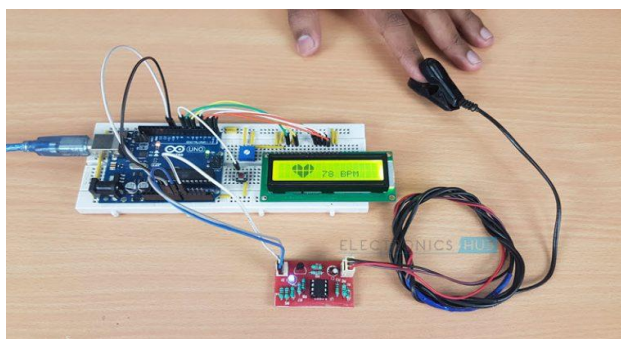
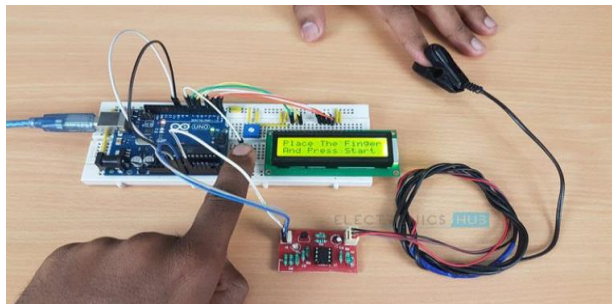
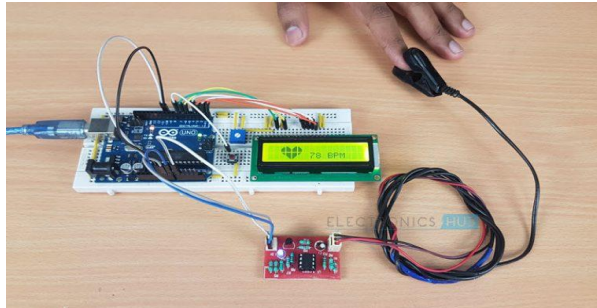
Circuit Design of Interfacing Heartbeat Sensor with Arduino

The circuit design of Arduino based Heart rate monitor system using Heart beat Sensor is very simple. First, in order to display the heartbeat readings in bpm, we have to connect a 16×2 LCD Display to the Arduino UNO.

The 4 data pins of the LCD Module (D4, D5, D6 and D7) are connected to Pins 1, 1, 1 and 1 of the Arduino UNO. Also, a 10KΩ Potentiometer is connected to Pin 3 of LCD (contrast adjust pin). The RS and E (Pins 3

and 5) of the LCD are connected to Pins 1 and 1 of the Arduino UNO.

Next, connect the output of the Heartbeat Sensor Module to the Analog Input Pin (Pin 1) of Arduino.



Working of the Circuit

Upload the code to Arduino UNO and Power on the system. The Arduino asks us to place our finger in the sensor and press the switch.

Place any finger (except the Thumb) in the sensor clip and push the switch (button). Based on the data from the sensor, Arduino calculates the heart rate and displays the heartbeat in bpm.

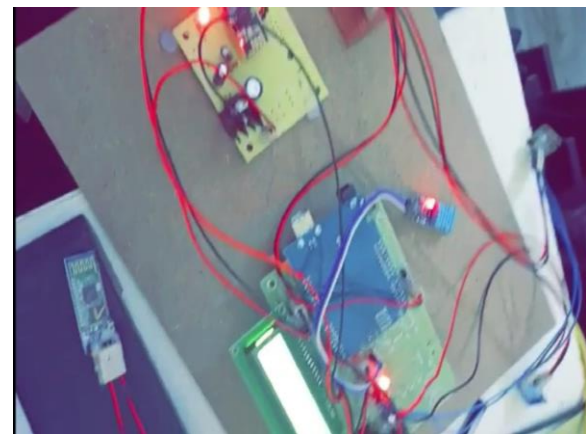
While the sensor is collecting the data, sit down and relax and do not shake the wire as it might result in a faulty values.

After the result is displayed on the LCD, if you want to perform another test, just push the reset button on the Arduino and start the procedure once again.

Applications of Heart Rate Monitor using Arduino

- A simple project involving Arduino UNO, 16x2 LCD and Heartbeat Sensor Module is designed here which can calculate the heart rate of a person.
- This project can be used as an inexpensive alternative to Smart Watches and other expensive Heart Rate Monitors.

IV. RESULT:



Through this project, an unprecedented prototype has been created to aid the visually, vocally and audibly disabled. This



project not just focuses on empowering and facilitating the differently abled, it is also compact and resource saver. The overall cost has been cut down by eliminating braille books and the energy spent in understanding them. It is a less costly solution, as all the components used in the device are cost effective and efficient. The latest and most trending technology makes this device portable, adaptable and convenient. The device proposed in this paper can be a major help in solving a few of the many challenges faced by the differently abled. To further extend the project, the device can be made more compact and wearable to make it easy for the user to use.

V. CONCLUSION

A support system which helps in promoting the lives of autistic children or adults suffering from autism. This is development is a milestone for the children suffering from autism. It doesn't create any issues with the surroundings and for the children using it. It creates a comfort zone for the guardian to keep a record and track their children even in their absence. This system helps in giving recognition to the children and to make them be socially comfortable. It also strives in improving the vocabulary skills of the children. Rather than creating a social bond it acts as a helping hand and give them confidence to face the society with courage.

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