

Led Cube to Assist Dyslexic Child by Measuring Speech Frequency

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Abstract:- As reported by international dyslexia association “the phrase dysphonetic dyslexia denotes a learning complication which usually found in child which is neurological in root and distinguished by arduous in precise and coherent word recall and poor decrypt and logography skills”. Generally as a result of linguistic deviation of the language portion which is often effective compared to other analytic skills. Being educated in the classroom this may include difficulty in reading and it may impede the growth of lexicon due to poor reading. This may require a specific learning or teaching services to overcome. There are two component skills in which scrutinize comprehension is conceptualized like decoding which involves rapidly retrieving words from memory. If an individual able to decode words but not the meaning then they will not able to comprehend a text. In other case the individual able to identify the meaning but not able to decode the word and comprehend a text because many dyslexic children having difficulties with decoding and comprehending the text this does not mean that reading is a simple action. Embedded systems are used to make the dyslexic child interest in reading to improve their education.

Keywords:- Dyslexia, Linguistics, Phonemic Segment, Speech Frequency, Diaphragm, Technology -Based Learning, Learning Cube, Pedagogy, Allography.

I. INTRODUCTION

Based on studies, decreased education have many negative impacts on children such as reduced self esteem and it can eventually affect the child’s job chances. Ascribable to decreased linguistic awareness the child has difficulty recognizing the phonemic segment or tone structure of a language. This severely affects the studying ability. Dyslexic child have these struggles because there is a loss in phonemic segment of dialect. An intercession program that mainly focuses on phonological apprehension is advocated for children with reading disability and reduced literacy skills. Studies show that children with dyslexia show increased interest in game-based learning programs. The purpose of this paper is to develop an LED cube to support the learning process of dyslexic children and substantially improve their education. Rather than the traditional method of training the child with personal speech therapist, learning using our project is by the child itself.

II. BLOCK DIAGRAM

Components Used – Arduino Atmega 2560, Bluetooth HC05, MIC Sensor, LCD, LED, Resistor, Power Supply

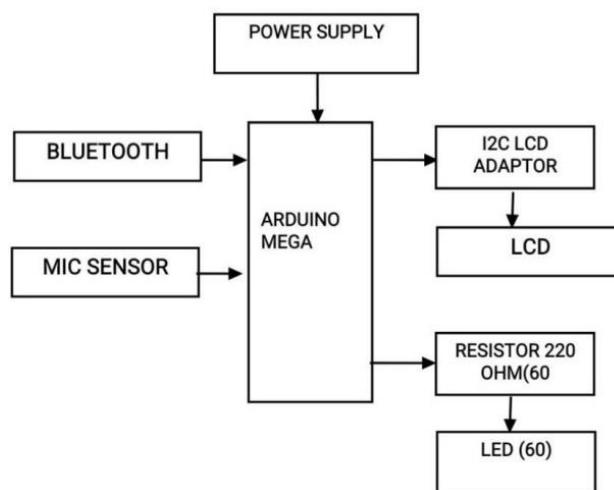


Fig 1 Block Diagram

III. DESCRIPTION

➤ ARDUINO

In our project, the microcontroller we are using is Arduino Mega 2560. This Arduino is interfaced with power source, LED and is connected to the parents or caretaker’s mobile phone via Bluetooth. It receives the input i.e. the alphabet to be pronounced from the child, from the parent and processes the information and instructs the LED cube to light up the alphabet. The LED is coupled to digital pin 13. This microcontroller is the brain of our system and it is user friendly and cost efficient. This Arduino Mega 2560 is programmed using Arduino Software IDE without the use of external hardware programmer. It has a polyfuse that can be reset and protects the device from over current and getting short circuited.

➤ MIC SENSOR

IC555 amplifier is used in this system. Based on Bluetooth data will show to the child once the data receive child will pronounce the letter, mic sensor will detect the child’s frequency once the frequency is matched automatically the alphabet will change. LCD will show the status. Here it is similar to the human hearing mechanism, in this mechanism it changes the vibrations of human hearing into signals, whereas the sensor converts the vibrations into current or voltage. In this sensor, the magnets are twisted onto the diaphragm. When the

vibrations touch the diaphragm it converts the vibrations into the current continuously.

➤ **BLUETOOTH**

It is used here to pair the mobile phone to Arduino mega and to send and encounter instructions from the origin who are the parents and caretakers of the Arduino 2560 controller inside the LED cube target. This is used to set the letters or numbers for a child which is coupled to Arduino mega controller. The type of Bluetooth used here is HC05.

➤ **LCD**

It is coupled to Arduino mega controller. The main purpose of the LCD is to check the letters or numbers displayed in the led are correctly displayed or not. LCD is also coupled with an I2C LCD adapter. The adapter used here is PCF8574. This converts the data from the Arduino into LCD data.

➤ **LED**

Once the alphabet receives from the parent the letter will be displayed through a 5*3 led cube. It has 5 horizontal rows and 3 vertical columns. The cube used here consists of 4 sides. The cube is made up of LED lights on all sides. Each side is made of 15 LED lights. So that it is entirely made up of 60 LED lights. The cube setup has four sides of led layers top and bottom empty for wired connection.

➤ **RESISTOR**

To resist the current over the circuit, a resistor of 220 ohms is used here. The voltage drop can be achieved by using the resisting element. In the element, copper wires are wounded onto the metallic rod and cowling paint is shrouded on the crust layer of the resisting element.

IV. WORKING PRINCIPLE

Here, we have used ARDUINO MEGA microcontroller which plays a major role in our system; hence the whole system program is stored in it. Initially 12V power supply is provided and the bridge rectifier is used to convert AC to DC Voltage. Bluetooth is used in this concept for voice interfaced with Arduino mic sensor used detect frequency whether child pronunciation is properly matched by the normal child voice sound frequency. Resistors are connected with each led. In case of high voltage it may damage the LEDs, So in order to avoid such damages we use resistors here. The resistor with the capacity of 220ohm is used. LCD used to update information. Visual assist device for Dyslexic Child consists of 5*3 LED cube. This cube is made up of 27 LEDs which is set out in 3 horizontally stacked surfaces with each layer comprises of 9 LED.

The Embedded C code is used for blinking the LED connected with microcontroller. The component used to descry sound is the sound sensor. This component is typically used to descry the sound intensity. This module's foremost applications include security, monitoring and switching. The adjustment of the sensor can be made ease for better accuracy.

A microphone is used in this sensor to provide input to amplifier, peak detector, and buffer. This sensor descry sound and transmits an o/p voltage signal to a microcontroller. Ensuing that, it implements the needful processing. This sensor can descry noise levels within DBs (decibels) at frequencies ranging from 3 to 6 kHz, roughly where the human ear is sensitive. An Android app called decibel meter is used to detect the sound levels. This sensor's operation is similar to that of human ear mechanism. Because the human ear restrain a diaphragm, the primary function of this diaphragm is to convert vibrations into signals.

In contrast, this sensor makes use of a microphone. The purpose of this is to convert vibrations into voltage or current. In general, it comprises a diaphragm incorporates magnets that are twisted with metal wire. When sound signals strike the diaphragm, magnets within the sensor vibrate, and current can be stimulated from the coils at the same time

V. CONCLUSION

As a neurobiological based learning difficulty, dyslexia is distinguished by arduous reading, writing and pronunciation of words. The LED cube is designed for the child to increase their interest in learning and get them to pronounce the alphabets quickly. Child between the age of 5 to 7 are mostly affected with dyslexia and by using the LED cube, the child response to the light and pronounces the alphabet. The speech frequency sensor is used to measure the frequency of the each alphabet that is said by the child and if the frequency matches the programmed frequency, it moves to the next alphabet. Hence by using the cube, the child can learn the alphabets easily.

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