

Smart Online Examination System for Visually Impaired Persons

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Abstract: *This paper explains the Smart Glove, a smart online exam system for the blind that uses Arduino and Bluetooth. Our goal is to create an aid gadget for blind and visually impaired persons so that they can appear for exams and complete them effortlessly and comfortably, allowing them to become more independent. This concept includes a smart glove with a button on each finger that allows users to select their selections. On the one hand, we created an app that, after logging in and connecting through Bluetooth with the server, allows blind people to hear questions with options that they can choose from at their leisure. We connected four Bluetooth buttons to one Arduino Nano and developed a software that reads questions and options on the opposite side of the gloves. The procedure entails connecting via Bluetooth and handing over headphones to a blind individual so that they can hear questions and options and solve the exam accordingly. The Bluetooth module will be utilised for wireless communication and application-to-hardware interfacing in this fashion. Additional features of this proposed paper include a Bluetooth transmitter and receiver, which are used to recognise the user's response using smart glove. The major goal of this methodology is to create a smart glove that will be extremely useful for persons who are visually impaired and frequently require assistance.*

Keywords: Micro-controller Arduino, Bluetooth module, Sensors.

I. INTRODUCTION

This proposed methodology intends to equip visually impaired people with an efficient online exam system. Physical development is tough for visually impaired people since it is difficult for them to recognize obstacles in their path. and they are not prepared to grow up in a competitive world with new technologies. Their family provide them with mobility, guidance, and support. Their adaptability prevents them from associating with others and social activities. In order to complete the assessment, the blind individual needed assistance. There could be a communication barrier between these individuals.

It is an urgent need to solve this problem and make examination system convenient for visually disabled. To achieve this objective the proposed system has android / windows based application along with hearing aids connect to the server/cloud. Arduino Nano, sensors, Bluetooth module, and SDK are used in the proposed system. This concept includes a smart glove with a button on each finger that allows users to select their selections. On the one hand, we created an app that, after logging in and connecting through Bluetooth with the server, allows blind people to hear questions with options that they can choose from at their leisure. The goal of this system is to give blind individuals confidence and make their jobs easier. It works as accurate, tailored guides for persons who are blind or partially sighted. In these gloves, we connected four Bluetooth buttons, one Arduino Nano, and developed an app that reads exam and paper pattern questions and options, as well as all instructions. The procedure is simple: link the application to the Bluetooth module HC05, then give over the system to a blind person with headphones so they can hear the questions and options and solve the exam accordingly. After handing over the server to the blind person, the system prompts the user for authentication; if the entered information is accurate, the user is successfully logged into the exam and can begin the quiz; otherwise, it prompts the user to re-login. When the exam begins, read all instructions that are related to the exam and paper format, as well as how to operate the hardware (Glove). Question one with A,B,C,D options requires the user to click first, second, third, or fourth finger as appropriate. The Bluetooth model receives the signal and stores it, allowing the user to change the screen and read the following question.

If one of the selected options is correct, one mark is awarded; if one of the selected options is incorrect, no marks are awarded. This process will continue until the quiz is completed, after which it will be saved in a Google Sheet with the User ID and candidate information. The score card will then be generated.

This programme can be used for a variety of things, such as government testing, games, and so on. We're trying to educate blind individuals about smart technology.

II. LITERATURE SURVEY

A visually impaired person can wear a wearable device that detects colour and Through a linked headset, screams out the color's name in Bengali and English. The suggested solution can be used with Bluetooth or cable headphones, as well as speakers. The suggested device will detect colour and turn the name of the colour into sound, making it understandable to visually challenged people. A microcontroller, colour sensor, amplifier, and cable or Bluetooth-connected headphone will be used to build and develop it. The gadget will make use of the Arduino Nano microcontroller platform, as well as the HC-05 Bluetooth module, TCS 3200 colour sensor, and LM 386 power amplifier with SD card module. The device will employ a camera to take images of objects in the blind person's environment. Convert images to audio signals and accurately recognise any object within a preset distance. Image categorization and the Raspberry Pi[3]Eye Guide is a smartphone application that intends to assist visually impaired persons in their daily activities by allowing them to take use of the most recent breakthroughs in mobile application development. Face recognition, optical character recognition, object identification, and speech output are among the application's primary capabilities, which will make life easier for these people. It also takes use of the talkback feature, which makes interaction between the visually impaired individual and the application much easier. Eye Guide can also be activated by shaking the device, making it instantly accessible.[4] To access machine learning algorithms, the necessary data input is acquired using an image categorization methodology. Photographs are taken of objects in the surroundings where blind people are present. It can detect every object within a set distance with pinpoint accuracy. The visual data is then converted into an audio signal that can be utilised to assist blind people. As a result, a user-friendly adaptive steering system for blind people has been created. [5]The prototype device improves a blind person's mobility by alerting them to nearby barriers and supporting them with daily tasks. The instructions will be supplied via voice commands through the headset and will be based on real-world scenarios in both indoor and outdoor settings[6]. For systems that use speech-to-text to maintain system flow, the student voice will be required as input. When numerous visually challenged students take the exam at the same time, the other students are subjected to a great deal of noise and disruption. With the support of our endeavour, such disruptions would be minimised to the best extent possible. By integrating the keys, this system may travel/navigate through the questions stack and submit the answer with ease, maintaining simplicity and secrecy. The visually impaired student can re-listen to the question, make any necessary changes to the answers, and even double-check all of the provided answers before submitting them using the designated keys. By permitting simpler key usage for browsing through the question paper and sending the answers, the programme surpassed previous methods for visually challenged people. [7].

III. COMPONENTS

- The following are the components that will be used in this proposed project:
- Arduino nano
- Bluetooth module HC-05
- Sensors
- Connecting Wires
- Gloves
- Power bank
- PCB

IV. HARDWARE DISCRPTION

A. Arduino Nano

Arduino.cc created the Arduino Nano microcontroller board. The Arduino Nano uses the Atmega328 CPU, which is also utilised in the Arduino UNO. Due to its tiny size and flexibility, it is a popular microcontroller board with a wide range of applications. The Arduino Nano may be a breadboard-compatible microcontroller board that uses the ATmega328 (Arduino Nano 3.x) or ATmega168 microprocessors (Arduino Nano 2.x). It offers similar features to the Arduino Duemilanove, but is packaged differently. It just features a DC power jack and a Mini-B USB cable rather than a regular one. The Arduino Nano is powered through USB Mini-B, 6-20V unregulated external power supply (pin 30), or 5V regulated external power supply (pin 27). the very best voltage source is automatically picked because the power supply.

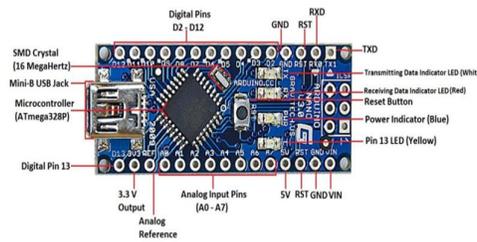


Fig 1. Arduino Nano

B. Bluetooth Module

HC-05 The HC05 module **could be** a simple Bluetooth SPP (Serial Port Protocol) module that permits for **the development** of a transparent wireless serial connection. The HC-05 Bluetooth Module is used as a Master or Slave, making it a wonderful wireless communication solution. This Bluetooth V2.0+EDR (Enhanced Data Rate)3Mbps Modulation interface bluetooth module comes with a whole 2.4GHz radio transceiver and baseband. it's equipped with a CSR Bluecore 04External single chip Bluetooth system with CMOS technology and AFH (Adaptive Frequency Hopping Feature). HC-05 Bluetooth Module (Fig. 4.2) Bluetooth may be a wireless communication technology. It's intended to require the place of cable connections. It communicates with devices using serial communication. It uses a port to attach with the microcontroller (USART). it always uses a short-range wireless connection to attach tiny devices like phones, PDAs, and televisions to exchange documents. It operates on the two.45GHz band. A point-to-point or multi-point reference to a maximum range of 10 metres is feasible. the information is transferred at a rate of 1Mbps.

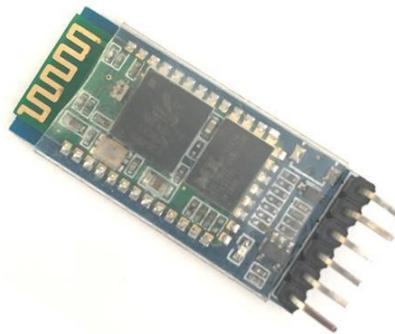


Fig.2. Bluetooth module

V. SOFTWARE DISCRPTION

A. MIT APP INVENTER

MIT App Inventor a open source block programming it is an intuitive, visual programming environment that allows everyone – even children – to create fully functional apps for Android phones, iPhones, and Android/iOS tablets. Those unaccustomed MIT App Inventor can have a straightforward first app up and running in but half-hour. And what's



more, our blocks-based tool facilitates the creation of complex, high-impact apps in significantly less time than traditional programming environments. The MIT App Inventor project seeks to democratize software development by empowering all people, especially tykes, to maneuver from technology consumption to technology creation.



VI. PROPOSED METHODOLOGY

The main objective of our system is to gives independency in exam to visually impaired .The syatem consist of Bluetooth, Arduino Nanao and android application. the smart glove with push button and interfaing of arduino nano whit bluetooth, this werable device is hand over to examinor . First system ask for authentication after that they have to listen instruction regarding exam . Just after finnisng the instruction they will listen question number along with all four option A,B,C and D.Then they choose the option by pressing the button on finger , this data will transfer from arduino to bluetooth afr that Bluetooth will transfer to android applicatin .In android application they comapir and do their allocated task . This process going on upto last question , in betwween if examinorwant to skip any question they do by pressing the button which is on glove. They heard exam confirmation message . At the last score card will generate with name and score of examinor.

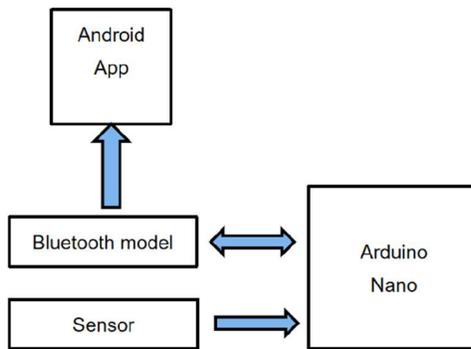


Fig. 3. Block Diagram of the proposed methodology

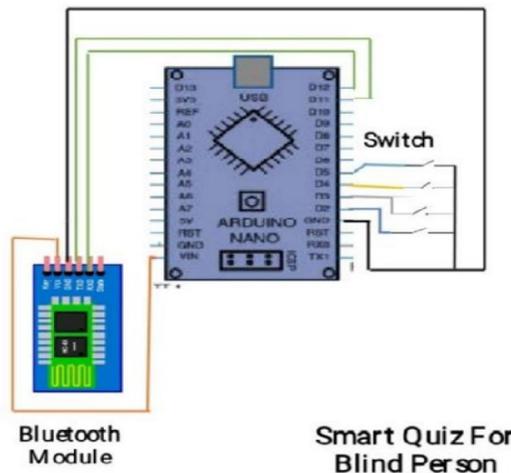


Fig. 4. circuit diagram of smart quiz



Fig. 6 Interfacing of Arduino and Bluetooth module

Bluetooth Module Interfacing - Bluetooth technologies are safe, low-cost, and use radio waves to connect and exchange data between devices without the use of wires or cables [12]. HC-05 is the name of the Bluetooth module that can be used with the suggested system. RX and TX are the Bluetooth module's primary functioning pins. The Rx and Tx can be used to receive and transmit data between linked devices. The Bluetooth component's RX is connected to the Arduino Nano's TX, which is usually digital pin 1, and then the Bluetooth component's TX is connected to the Arduino Nano's Rx, which is usually digital pin 2.

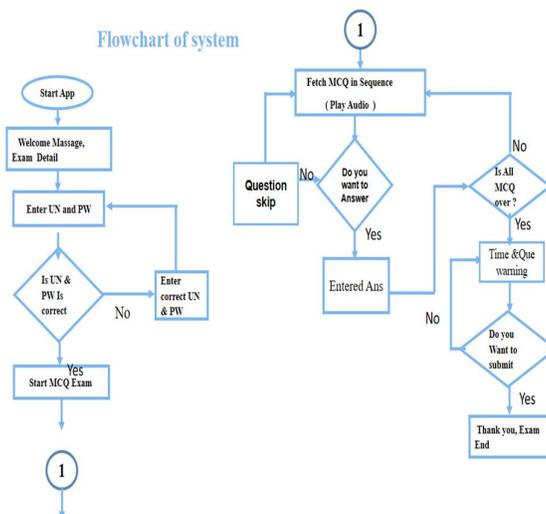


Fig. 5 flowchart of proposed system.

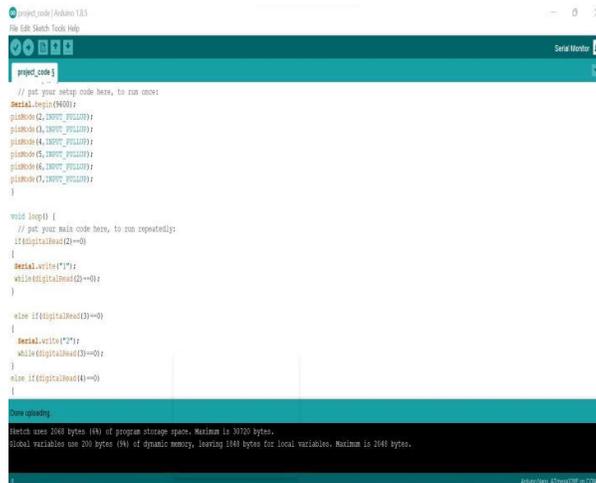
VII. RESULTS AND DISCUSSIONS

The main aim of this paper is to provide effective real time solutio to visually blind person they can appear effectively and Independently for MCQ exam. they can get more familiar with technology. As the wireless make easy operatio, due to wireless communication data rate is faster,one more advatage of the system is that it is miniature in size.The major goal of the system is to advise or assist visually impaired people throughout the exam, which may lead to employment.

```
when Button18 Click
do
  if PasswordTextBox1.Text == "12345"
  then
    set Instruction.Visible to false
    set Authentication.Visible to false
    set Q1.Visible to true
    call TextToSpeech1.Speak
    message join
    TextBox7.Text
    TextBox8.Text
    TextBox9.Text
    TextBox10.Text
    TextBox11.Text
    TextBox12.Text
    TextBox13.Text
    "Question number one"
    TextBox1.Text
    "A"
    Button2.Text
    "B"
    ans1.Text
    "C"
    Button4.Text
    "D"
    Button5.Text
  else if PasswordTextBox1.Text != "12345"
  then
    call TextToSpeech1.Speak
    message "Try Again"
    set Q1.Visible to false
    set Instruction.Visible to false
    set Authentication.Visible to true
```



Fig. 6 Interfacing of push button



```

// put your setup code here, to run once:
Serial.begin(9600);
pinMode(2, OUTPUT);
pinMode(3, OUTPUT);
pinMode(4, OUTPUT);
pinMode(5, OUTPUT);
pinMode(6, OUTPUT);
pinMode(7, OUTPUT);
}

void loop() {
// put your main code here, to run repeatedly:
if(digitalRead(2)==0)
{
Serial.write("0");
while(digitalRead(2)==0);
}

else if(digitalRead(3)==0)
{
Serial.write("1");
while(digitalRead(3)==0);
}

else if(digitalRead(4)==0)
{
Serial.write("2");
while(digitalRead(4)==0);
}

else if(digitalRead(5)==0)
{
}
}

```

Fig. 8 Coding of arduino.

The above fig. 8 shows the coding of arduino software. When the convenient option is selected by the user the logic will be displayed on the serial monitor in the form of numbers.

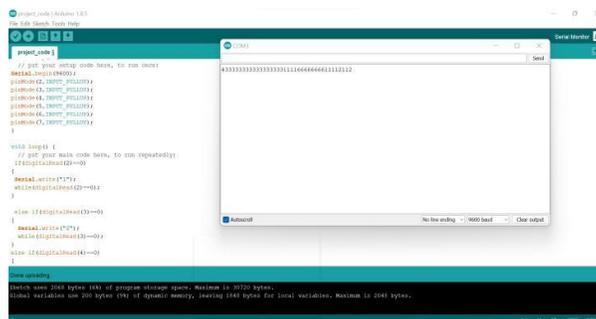


Fig. 9 Serial output of the system.

The above fig. 9 shows the serial monitor reading of the received logic. When the user click the buttons received logic will be shown on the serial monitor.

VIII. FUTURE SCOPE

The proposed system's future scope is that blind people will be able to appear for MCQ exams effectively and independently, without having to rely on others. The proposed solution will assist visually impaired individuals in becoming more comfortable with technology. It has a cheap manufacturing cost. If any changes are needed, the microcontroller can be reprogrammed. Wireless communication speeds up data transmission and, more importantly, makes wireless operation simple. This approach will be utilised in competitive exams such as JEE, GATE, and other similar tests. By using IOT technology we can make this Smart quiz more smarter than that.

IX. CONCLUSION

The major goal of this methodology is to create a Smart Online Examination System that will be extremely advantageous for those who are visually impaired and frequently require assistance. It is expected to address the challenges that visually impaired people face in their daily lives. In addition, the framework takes steps to ensure their comfort. The proposed system technique is to create a smart MCQ-based Examination system that will be extremely beneficial to persons who are visually impaired and frequently require assistance. The major goal of the system is to advise or assist visually impaired people throughout the exam, which may lead to employment.

X. REFERENCES

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