

SMART TALK

GROUP 1

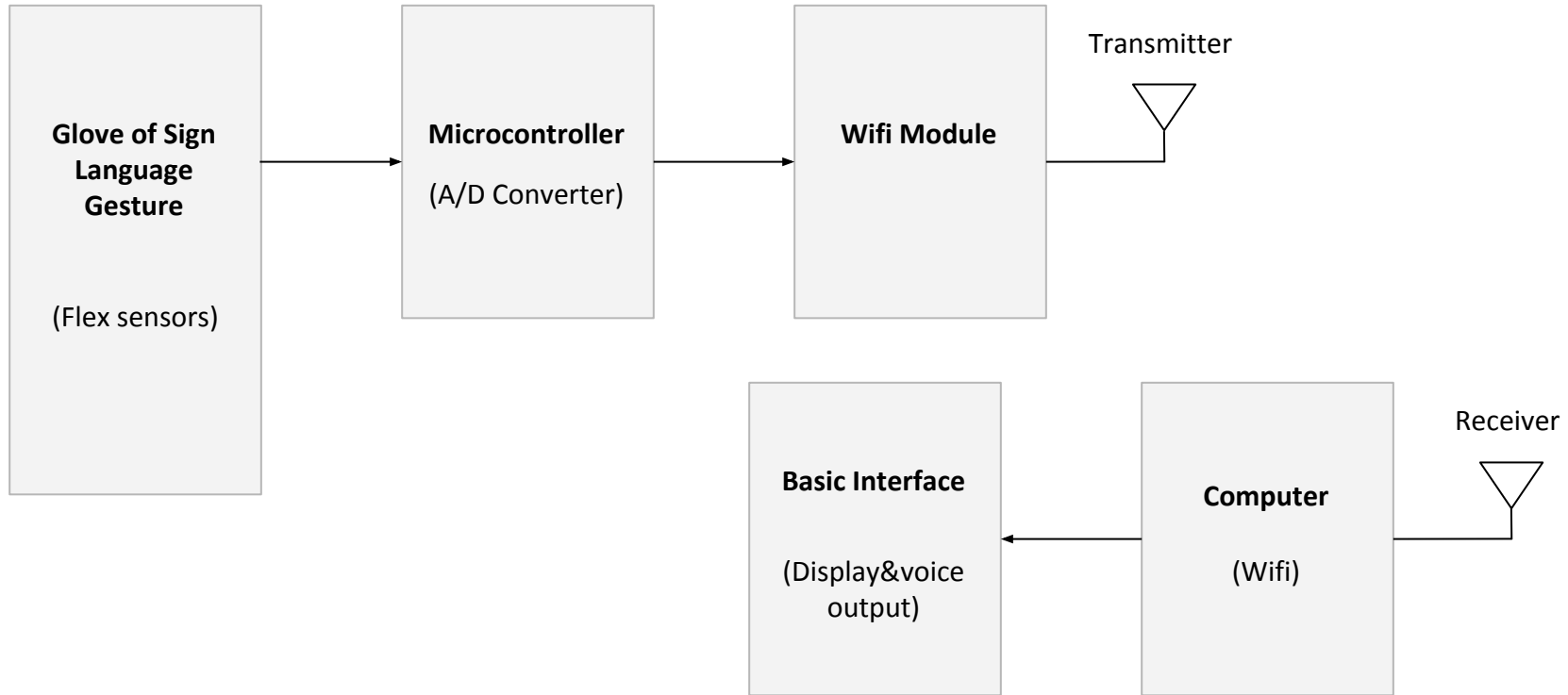
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- Nitha Backer , 17
- Parvathy Venugopalan , 18
- Paul Sabu , 19

INTRODUCTION

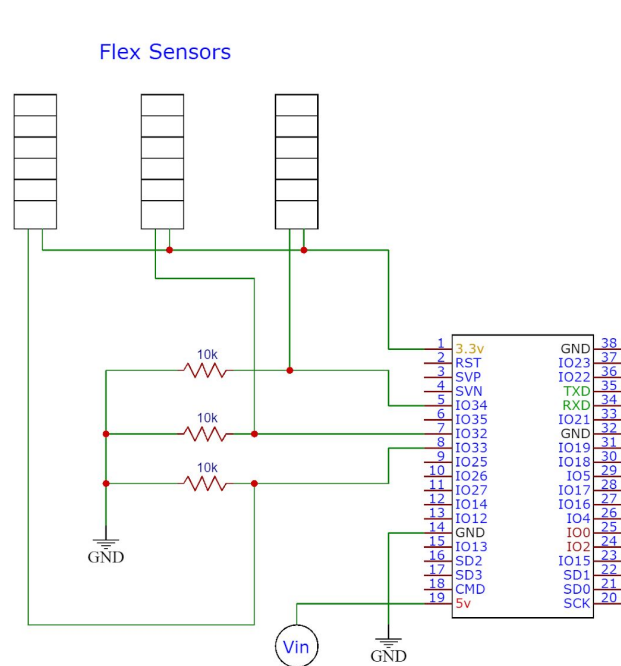


- Smart Talk for Sign language Translation is a work that aims to present an easy way of communication for speech-impaired and hearing-impaired people.
- Work consists of a glove equipped with sensors that sense different sign language gestures.
- This data is fed to ESP32 which is then transferred to a smartphone/laptop via Wi-Fi, and the data is further processed.

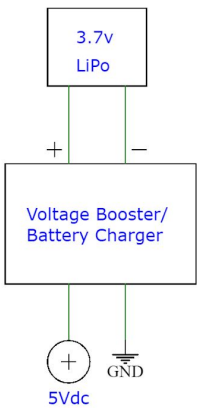
BLOCK DIAGRAM



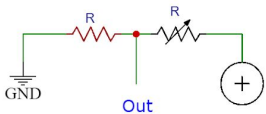
CIRCUIT DIAGRAM



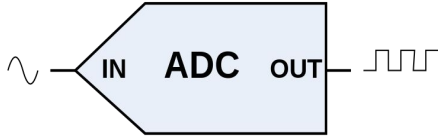
Vin For ESP32



Flex Sensor Act as Variable Resistor



EXPLANATION



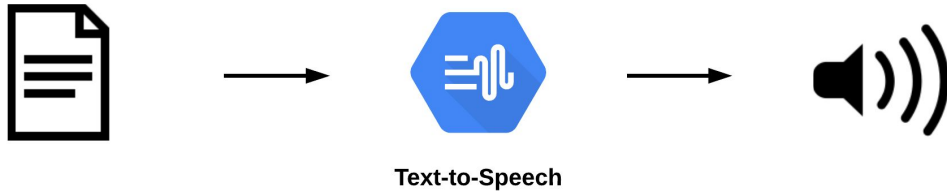
- SmartTalk Gloves consist of 3 flex sensor (Analog Sensors) that is used to measure the bending of fingers, it is connected to the microcontroller unit as a voltage divider circuit with 10k resistor.
- The output of the three voltage divider circuit with the 10k resistor and flex sensor is connected to GPIO-32, GPIO-33, and GPIO-34 of microcontroller unit ESP32 to read analog values from flex sensors.



EXPLANATION



- ESP 32 is programmed in VS Code to work as an access point (maximum 4 devices can be connected) and wifi client, the sensor values are converted into webpage data and they are pushed to the webpage.

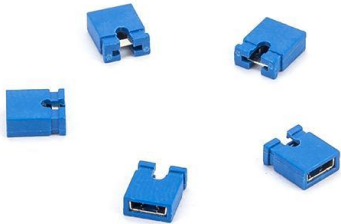
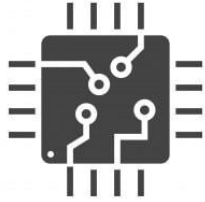


EXPLANATION



- An Android app is designed in MIT app inventor and implemented to read data from the webpage, displayed as text and text is converted to speech in the interactive app.
- User can connect to SmartTalk gloves via wifi in mobile phone and can see text in any web-browser with web Url (<http://192.168.4.1>) or Android users can use the SmartTalk app to view text and hear text content.

REQUIREMENTS



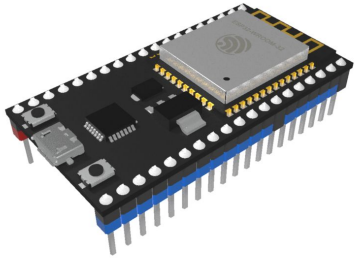
HARDWARE

- ESP32
- Flex sensor
- Power bank module
- Battery
- Wires
- Gloves
- Zero pcb
- Berg pin - male , female
- Jumper Cap
- Resistor -10k

SOFTWARE

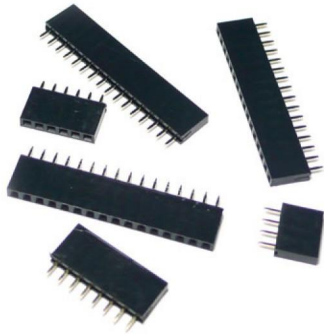
- VS Code
- MIT App Inventor

ESP32



- ESP32 is a series of a low-cost, low-power systems on a chip microcontroller with integrated Wi-Fi and dual-mode Bluetooth.
- The ESP32 series employs a Tensilica Xtensa LX6 microprocessor in both dual-core and single-core variations and includes built-in antenna switches, RF balun, power amplifier, low-noise receive amplifier, filters, and power management modules.

ESP32



Tensilica Xtensa 32-bit LX6 microprocessor with 2 cores

Power supply: 2.3V – 3.6V

Operating temperature range: -40°C – 125°C

External flash memory: up to 16 MB is supported

Interfaces

UART/SDIO/SPI/I2C/I2S/IR Remote Control

36 programmable I/O pins max 20mA

2 analog input 0V to 1V with 12 bit resolution

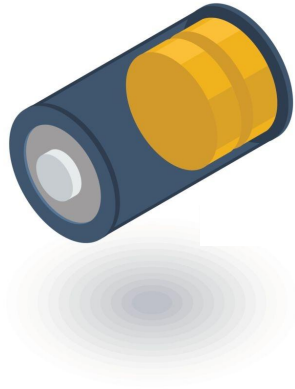
All inputs tolerate maximum 3.6V

FLEX SENSORS



- A flex sensor or bend sensor is a sensor that measures the amount of deflection or bending. Usually, the sensor is stuck to the surface, and the resistance of the sensor element is varied by bending the surface.
- Since the resistance is directly proportional to the amount of bend it is used as a goniometer, and often called a flexible potentiometer.
- Flex sensors are usually available in two sizes. One is 2.2 inches and another is 4.5 inches.

POWERBANK MODULE



- The power bank module comes with a protection function: overcharge protection, over-discharge protection, overcurrent protection.
- These intelligent output devices after charging full, automatically stop charging, to prevent overcharge.
- They also have temperature control and over-temperature protection.USB Output: 5V/1A.



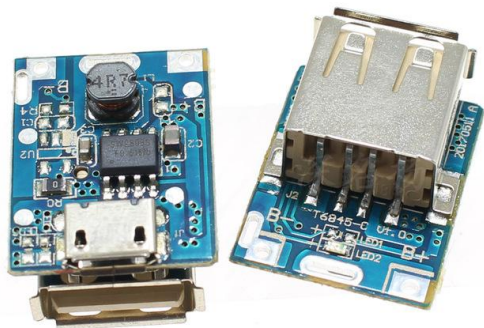
- **MIT App Inventor** is a web application integrated development environment originally provided by Google and now maintained by the Massachusetts Institute of Technology (MIT). It consists of :-
- App inventor designer - where we design the App's User Interface by arranging both on and off screen components.
- App inventor Blocks Editor - Where we assemble the program blocks that specify how the components you select should behave.

VS CODE



- **Visual Studio Code** is a free source-code editor made by Microsoft for Windows, Linux, and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git.
- Users can change the theme, keyboard shortcuts, preferences, and install extensions that add additional functionality.

PICTURES

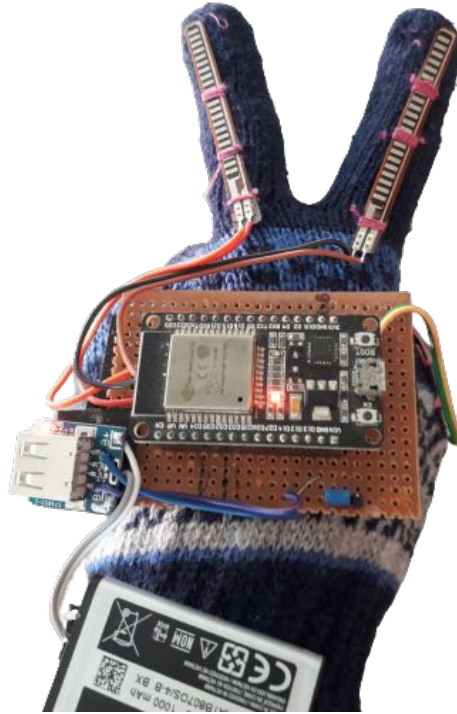


RESULT

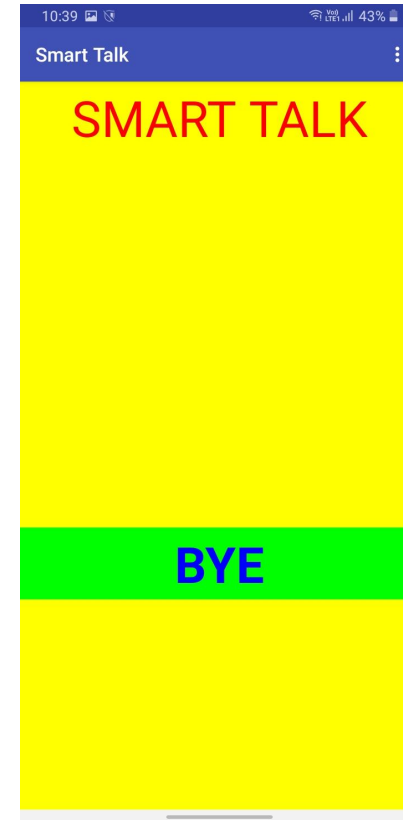


- Through ESP32 hand gestures were recognized and output is obtained. The project is successfully completed.

OUTPUT



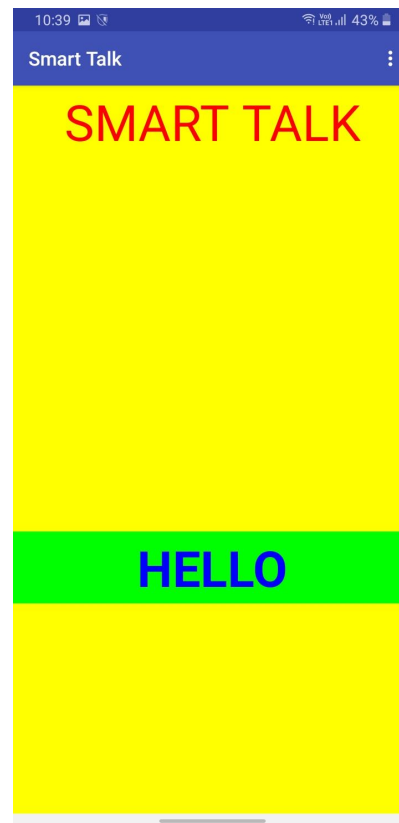
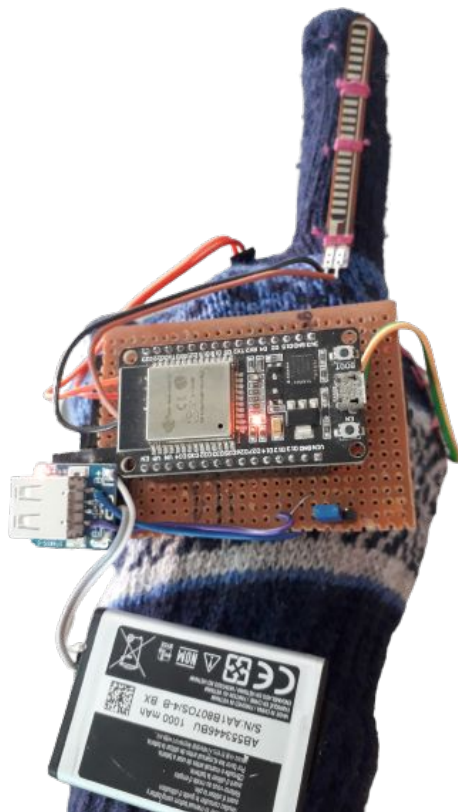
OUTPUT



OUTPUT



OUTPUT



CONCLUSION



- Smart talk is a system for speech impaired and hearing impaired people using glove technology and enables normal people to communicate with them.
- This can also help in bridging the communication gap between a blind and a mute person. The project can be enhanced further by including more words and different standard sign language.

REFERENCES

- Arduino project hub <https://create.arduino.cc/projecthub>
- K. Gunasekaran and R Manikandan, “Sign Language to Speech Translation System Using PIC Microcontroller” International Journal of Engineering and Technology, Vol. 5, pp. 1024-1028, May 2013.
- P. Verma, S.L. Shimi and S. Chatterji, “Design of Smart Gloves”, International Journal of Engineering Research & Technology, Vol. 3, pp. 210-214, November 2014.

