SUMMER INTRNSHIP
on
AIoT AND IT'S APPLICATIONS
Sign Language to Speech Conversion for the Speech Impaired using Edge AI & IoT

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ABSTRACT

The project aims to bridge communication gaps faced by speech-impaired individuals by developing an **AI-powered** real-time American Sign Language (ASL) to speech conversion system. The system captures static hand gestures and classifies them using a trained Convolutional Neural Network (CNN). The recognized letter is then transmitted to a laptop, where it is vocalized using a text-to-speech engine. This solution is low-cost, portable, and designed to function offline, thus making it suitable for resource-limited environments.

This project is facilitated and supported by
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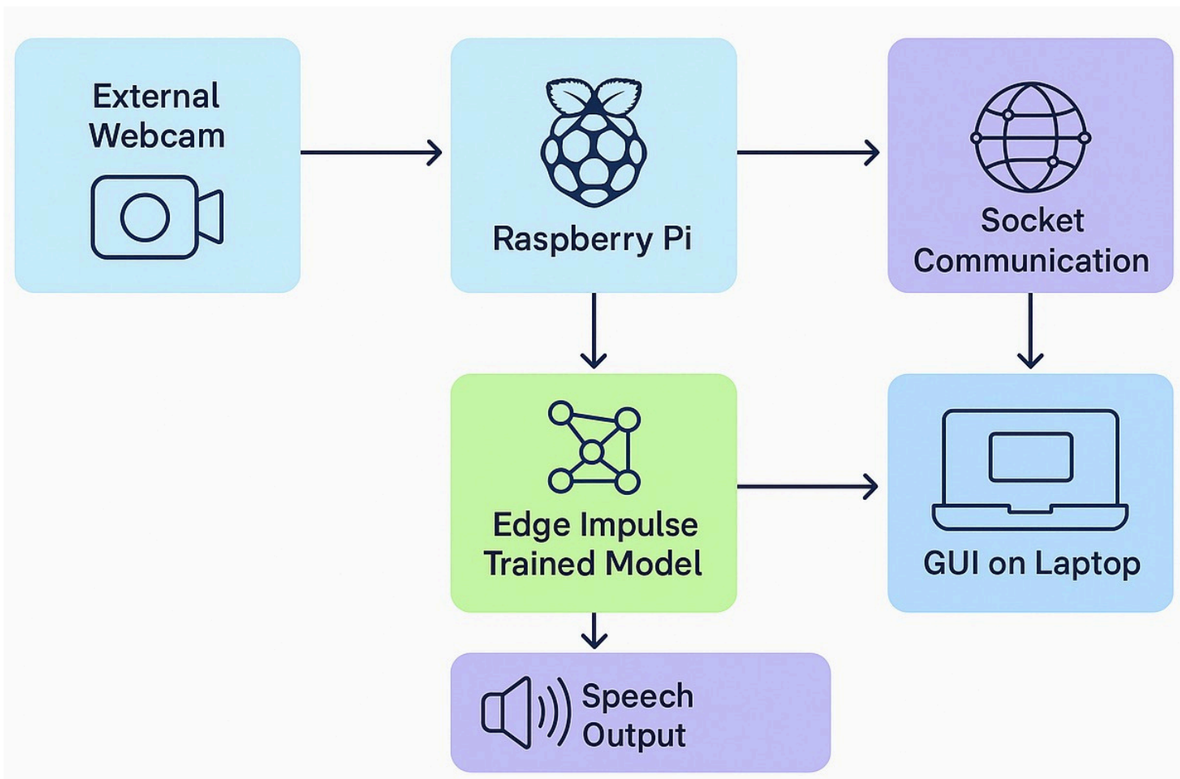
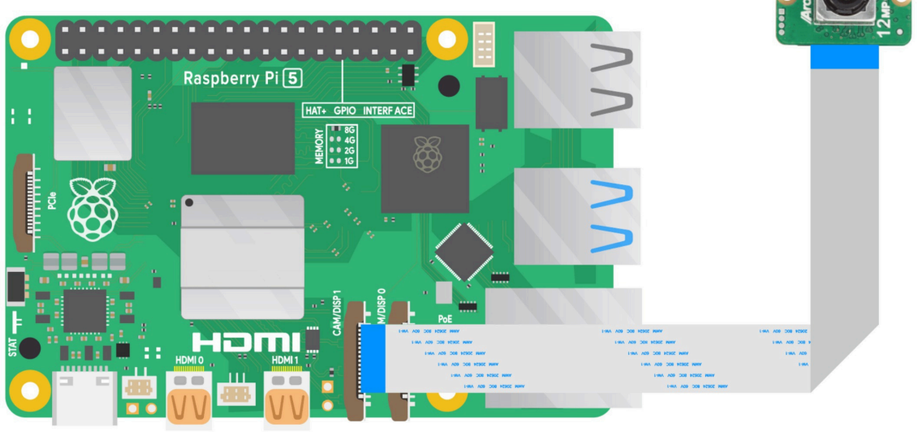
PROBLEMS IDENTIFIED

- **Lack of accessible, affordable, and portable tools** for real-time communication support for speech-impaired individuals.
- Existing sign language recognition systems often rely on **expensive hardware**

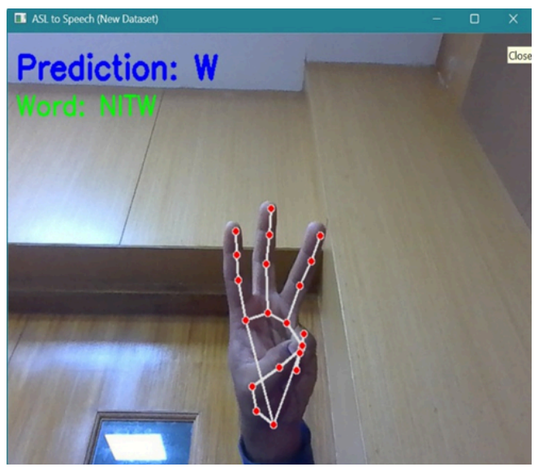
ALGORITHM FLOWCHART

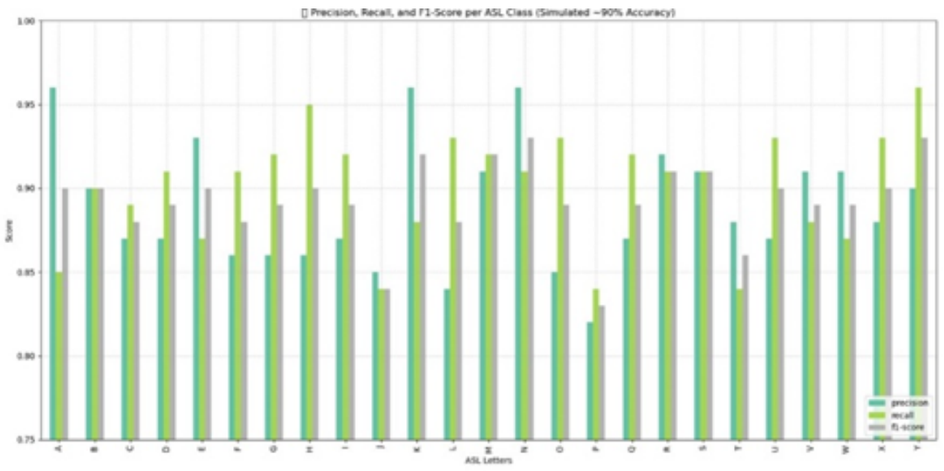


HARDWARE SETUP LAYOUT



TEST RESULTS





CONCLUSION

This project successfully demonstrates a practical AIoT solution for ASL to speech conversion using low-cost hardware. The system functions entirely offline, making it ideal for deployment in education centers, healthcare facilities, or rural areas. With further optimization such as dynamic gesture support, TensorFlow Lite deployment, and sentence-level recognition—this project can be expanded into a full-fledged assistive communication device to empower the speech-impaired community.

REFERENCES

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