AI tool/mobile app for Indian Sign Language(ISL) generator from audio-visual content

PROJECT REPORT

Submitted by,

Ms. A Siva Sahithi   - 20211CSE0164

Mr. Kakarla Manoj Kumar- 20211CSE0884

Mr. Shreyank Shankar Sarwade   -20221LCS0005

Under the guidance of,

Mr. Akarsh Singh

in partial fulfillment for the award of the degree of

BACHELOR OF TECHNOLOGY

IN

COMPUTER SCIENCE AND ENGINEERING

At

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTE
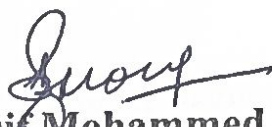
PRESIDENCY UNIVERSITY

BENGALURU MARCH 2025

CERTIFICATE

This is to certify that the Project report **"AI tool/mobile app for Indian Sign Language(ISL) generator from audio-visual content "** being submitted by "ASivaSahithi, Kakarla Manoj Kumar, Shreyank Shankar Sarwade " bearing roll number(s) "20211CSE0164, 20211CSE0884, 20221LCS0005" in partial fulfillment of the requirement for the award of the degree of Bachelor of Technology in Computer Science and Engineering is a bonafide work carried out under my supervision.

Mr. Akarsh Singh
Assistant Professor
School of CSE
Presidency University

Dr. Asif Mohammed
HOD& Professor
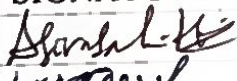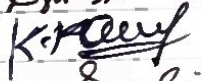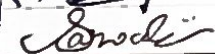School of CSE
Presidency University

Dr. MYDHILI NAIR
Associate Dean
School of CSE
Presidency University

Dr. SAMEERUDDIN KHAN
Pro-Vc School of Engineering
Dean -School of CSE
Presidency University

PRESIDENCY UNIVERSITY

SCHOOL OF COMPUTER SCIENCE ENGINEERING

DECLARATION

We hereby declare that the work, which is being presented in the project report entitled **AI tool/mobile app for Indian Sign Language(ISL) generator from audio-visual content** in partial fulfillment for the award of Degree of **Bachelor of Technology** in Computer Science and Engineering, is a record of our own investigations carried under the guidance of **Mr. Akarsh Singh, Assistant Professor,** School of Computer Science Engineering, Presidency University, Bengaluru.

We have not submitted the matter presented in this report anywhere for the award of any other Degree.

NAME	ROLL NUMBER	SIGNATURE
Aluru Siva Sahithi	20211CSE0164	
Kakarla Manoj Kumar	20211CSE884	
Shreyank Shankar Sarwade	20221LCS0005	

ABSTRACT

Effective communication between individuals who use Indian Sign Language (ISL) and those who rely on spoken language remains a significant challenge, particularly in critical settings such as education, healthcare, and daily interactions. The lack of accessible solutions for real-time conversion of speech into ISL limits the ability of the deaf and hard-of-hearing community to engage fully with the hearing population, exacerbating social isolation and information access disparities.

This project proposes an AI-powered Sign Language Generator for Audio-Visual Content in English/Hindi that leverages cutting-edge technologies to bridge this communication gap. The system captures spoken language using advanced speech recognition techniques provided by the Google Speech Recognition API, transcribing speech into text with high accuracy. When inputs are in Hindi, the system employs the Google Translate API to convert the text into English, ensuring a standardized vocabulary that maps to ISL gestures.

Once the text is processed, the solution dynamically maps words to a predefined set of ISL animations—either as full gesture GIFs for commonly used phrases or as sequential letter images for spelling out words not available as gestures. Visualization is achieved through a combination of Tkinter for GUI elements, PIL (Pillow) for image handling, and Matplotlib for rendering static images, thereby offering an intuitive and interactive user interface. The integration of OpenCV and NumPy further enhances the image processing capabilities, ensuring that the visual outputs are clear and accurate.

Beyond its immediate function of converting audio into sign language, this system is designed with scalability in mind. It has the potential to be integrated into assistive communication devices, educational software, and public service kiosks, making ISL more accessible across various domains. By fostering more inclusive communication, this project not only enhances accessibility for deaf individuals but also paves the way for a more integrated society where language barriers are minimized through innovative technology.

ACKNOWLEDGEMENT