

CONTEXT-AWARE INDIAN SIGN LANGUAGE TRANSLATION

A PROJECT REPORT

Submitted by,

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Under the guidance of,

Ms. Ankita Bhaumik

in partial fulfillment for the award of the degree of

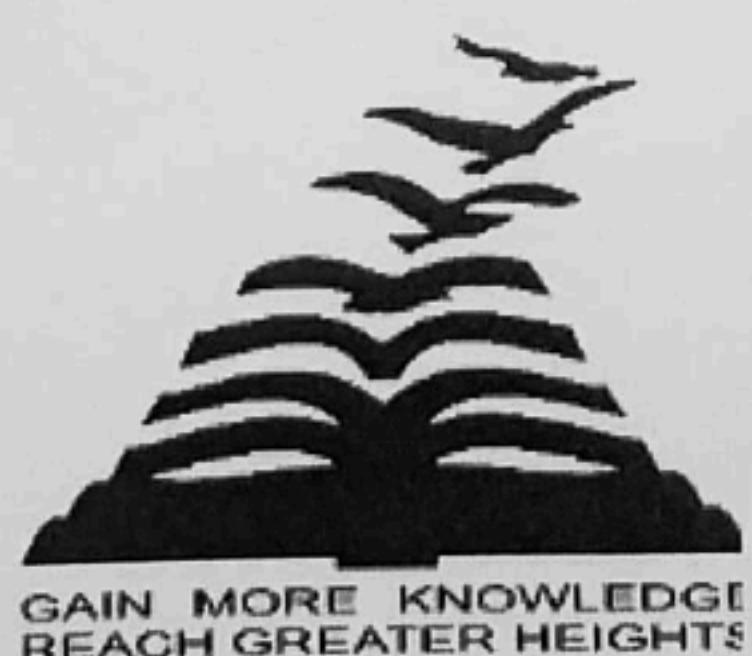
BACHELOR OF TECHNOLOGY

IN



COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE).

At



PRESIDENCY UNIVERSITY

BENGALURU

MAY 2025

PRESIDENCY UNIVERSITY

SCHOOL OF COMPUTER SCIENCE ENGINEERING

CERTIFICATE

This is to certify that the Project report “**CONTEXT-AWARE INDIAN SIGN LANGUAGE TRANSLATION**” being submitted by “**Mr.Rakesh Kumar Jha, Mr. Yogesh Seervi B, Mr. Aryan S P, Mr.Kancharla Rishikanth Reddy**” bearing roll number(s) “**20211CSD0060, 20211CSD0088, 20211CSD0123, 20211CSD0145**” 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.

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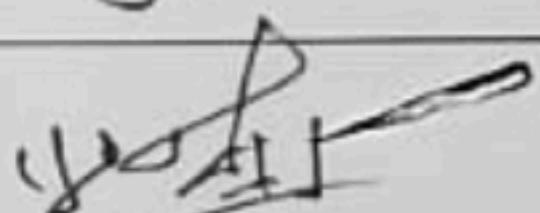
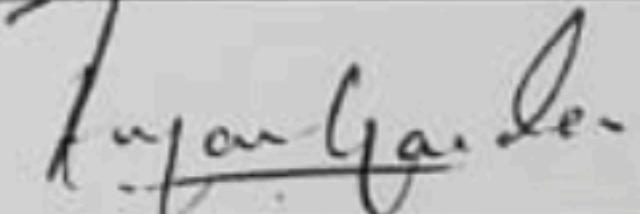
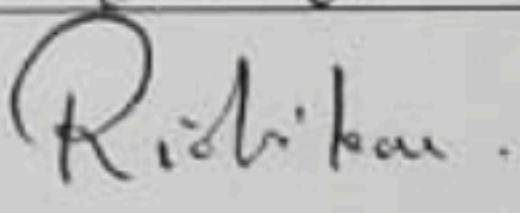
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DECLARATION

We hereby declare that the work, which is being presented in the project report entitled **CONTEXT-AWARE INDIAN SIGN LANGUAGE TRANSLATION** 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 **Ms.Ankita Bhaumik, ASSISSTANT PROFESSOR School of Computer Science Engineering & Data Science, Presidency University, Bengaluru.**

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

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ABSTRACT

Translation systems for Indian Sign Language (ISL) have become a game-changer in bridging the communication gap between the general public and the hearing-impaired community. The integration of ISL into mainstream communication is essential for advancing equitable access to public services, work, healthcare, and education in a multicultural nation like India where linguistic plurality is important. Real-time ISL detection and translation systems that can translate gestures into spoken or written language and vice versa have been made possible by the development of artificial intelligence (AI), deep learning, and computer vision. The goal of these technologies is to prevent communication obstacles from excluding hearing-impaired people from significant social contacts.

Text-to-speech conversion, natural language processing, gesture detection, and user interface design are some of the elements that make up the ISL translation framework. These systems may more accurately recognise and understand both static signs and dynamic gestures by combining transformer-based models, recurrent neural networks (RNNs), and convolutional neural networks (CNNs). Even in a variety of lighting and ambient situations, identification accuracy is further improved by integrating multimodal data inputs, such as RGB pictures, depth information, and motion data.

Even with advances in technology, a number of problems still exist. These include geographical differences in sign language, the necessity for ethical data management, the absence of sizable, labelled ISL datasets, and the computing demands of real-time processing. However, ISL systems are set to become a commonplace component in smart cities, classrooms, hospitals, and workplaces with ongoing research and development, including inclusive policy frameworks and user-centred design methods.

This essay examines the practical, ethical, and technological aspects of putting ISL translation systems into place, emphasising how they support the Sustainable Development Goals (SDGs) of the UN, especially those related to accessible innovation, high-quality education, and less inequality. ISL technology has the potential to create a society that is more empowered and inclusive through transdisciplinary cooperation and responsible AI deployment. However, the creation and use of ISL identification systems is very compatible with the Sustainable Development Goals (SDGs) of the United Nations, namely Goal 9 (Industry, Innovation, and Infrastructure), Goal 10 (Reduced Inequalities), and Goal 4 (Quality Education). For the hearing-impaired community, these systems have the potential to transform inclusive education, provide equitable access to healthcare, enhance employment prospects, and advance digital equality. A universally accessible environment may also be produced by implementing ISL solutions in smart city infrastructure, such as ATMs, public kiosks, metro stations, and medical facilities.