Smart System to Support Hearing Impaired Students in Tamil

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This research paper introduces a groundbreaking smart system designed to assist hearing- impaired students in comprehending spoken Tamil, the second language in Sri Lanka. The system addresses the challenges faced by these students by incorporating cutting-edge deep learning techniques, including Convolutional Neural Networks, Hidden Markov Models, and Recurrent Neural Networks, for efficient feature extraction and sequence modeling within an Automatic Speech Recognition framework. Additionally, the paper proposes a novel method for automatically recognizing Tamil Sign Language gestures using advanced hand gesture recognition algorithms and a comprehensive dataset of Tamil Sign Language. The system encompasses four primary classification approaches, enabling the conversion of Tamil Sign Language to Text. Text to Tamil Sign Language, lip reading to Tamil Sign Language, Normal voice to Tamil Sign Language - Sign Language to Normal Voice and physical object identification to both text and Tamil Sign Language. Notably, the system achieves remarkable results, boasting an impressive accuracy rate of 0.99% surpassing existing Automatic Speech Recognition and Text-to-Speech systems. This significant breakthrough holds immense potential in enhancing the learning experience of hearing-impaired students in Tamil-speaking regions. Furthermore, the system's adaptability allows for future expansion to support additional languages, making it highly versatile for diverse educational and communication settings.

Keywords: *automatic speech recognition, convolutional neural networks, hearing impaired students, text-to-speech systems, Tamil sign language*