

INVESTIGATION OF ACOUSTIC MODELING FOR AUTOMATIC SPEECH RECOGNITION USING DEEP LEARNING TECHNIQUES

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Speech is a natural interface that plays a major role in human computer interaction. Speech enables people to connect in more expressive, emotional, and meaningful ways. Speech recognition is one of the ubiquitous applications widely used across the globe. Developing automatic speech recognition (ASR) models involves many challenges, such as vocabulary, speech patterns, spelling errors, ambient noise, and local slang. The rising need for such systems for English and low-resource Indian languages motivated the development of more accurate ASR models. Despite advances, the efficacy of ASR is affected by challenges such as varied dialects, spelling errors, a lack of low-resource Indian ASR systems, and a noisy environment. The ASR's performance remains far from satisfactory as a result of the aforementioned difficulties. To address the challenges of the current ASR system, the proposed research work is folded into four contributions: an end-to-end ASR model with beam search decoding, a spelling error detector and corrector module, a multilingual ASR model for low-resource Indian languages, and a multimodal audio-visual speech recognition system. Deep learning algorithms are utilized to train the models in the proposed research work, which have revolutionized the field of ASR and continue to drive significant advances in the accuracy and speed of speech recognition systems.