ABSTRAK

EVALUASI KINERJA *SPEECH-TO-TEXT* DENGAN REDUKSI KEBISINGAN *SPECTRAL GATING* DAN *WIENER FILTERING* PADA AUDIO BAHASA LAMPUNG

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Pelestarian bahasa daerah seperti Bahasa Lampung menjadi semakin penting di tengah ancaman kepunahan budaya lokal. Penelitian ini bertujuan untuk mengevaluasi kinerja sistem *Speech-to-Text* (STT) terhadap audio berbahasa Lampung dialek Api melalui penerapan dua metode reduksi kebisingan, yaitu *Spectral Gating* dan *Wiener Filtering*. Sistem transkripsi utama dikembangkan menggunakan pendekatan *Hidden Markov Model* (HMM), dan untuk memperkuat evaluasi, penelitian ini turut melibatkan *Whisper*, model STT modern berbasis *deep learning* dari *OpenAI*. Dataset berupa rekaman cerita pendek dari penutur asli diproses melalui tahap reduksi kebisingan sebelum dilakukan transkripsi otomatis. Evaluasi kinerja dilakukan menggunakan tiga metrik utama: *Signal-to-Noise Ratio* (SNR), *Word Error Rate* (WER), dan *Character Error Rate* (CER). Hasil menunjukkan bahwa *Spectral Gating* memberikan peningkatan SNR tertinggi, dengan rata-rata di atas 21 dB, serta secara signifikan menurunkan nilai WER dan CER. Sementara itu, penggunaan *Whisper* pada data uji memperlihatkan peningkatan akurasi transkripsi, terutama pada audio yang telah melalui proses reduksi kebisingan. Penelitian ini menunjukkan bahwa integrasi teknik pengurangan kebisingan dengan sistem STT konvensional dan modern dapat meningkatkan kualitas transkripsi, serta mendukung pelestarian bahasa daerah melalui dokumentasi digital yang lebih akurat.

Kata Kunci : *Speech-to-Text*, Bahasa Lampung, *Hidden Markov Model*, *Whisper*, Reduksi Kebisingan, *Spectral Gating*, *Wiener Filtering*, *Word Error Rate*, *Character Error Rate*, Pelestarian Bahasa.

ABSTRACT

PERFORMANCE EVALUATION OF SPEECH-TO-TEXT WITH SPECTRAL GATING AND WIENER FILTERING NOISE REDUCTION ON LAMPUNG LANGUAGE AUDIO

By

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The preservation of regional languages such as Lampung is increasingly important amid the threat of cultural extinction. This study aims to evaluate the performance of a Speech-to-Text (STT) system for Lampung language audio (Api dialect) by applying two noise reduction methods: Spectral Gating and Wiener Filtering. The main transcription system is developed using a Hidden Markov Model (HMM) approach, and to enhance the evaluation, the study also incorporates Whisper, a modern deep learning-based STT model from OpenAI. The dataset consists of short narrative recordings collected from native speakers, which were processed through noise reduction prior to transcription. System performance was evaluated using three key metrics: Signal-to-Noise Ratio (SNR), Word Error Rate (WER), and Character Error Rate (CER). Results indicate that Spectral Gating yielded the highest SNR improvement, averaging over 21 dB, and significantly reduced WER and CER. Additionally, the use of Whisper on test data showed improved transcription accuracy, particularly on audio that had undergone noise reduction. This study demonstrates that integrating noise reduction techniques with both conventional and modern STT systems can significantly enhance transcription quality, while also supporting the digital preservation of regional languages through more accurate documentation.

Keyword : Speech-to-Text, Lampung Language, Hidden Markov Model, Whisper, Noise Reduction, Spectral Gating, Wiener Filtering, Word Error Rate, Character Error Rate, Language Preservation.