



Video Dubbing with ML-driven Lip Synchronization

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Objective

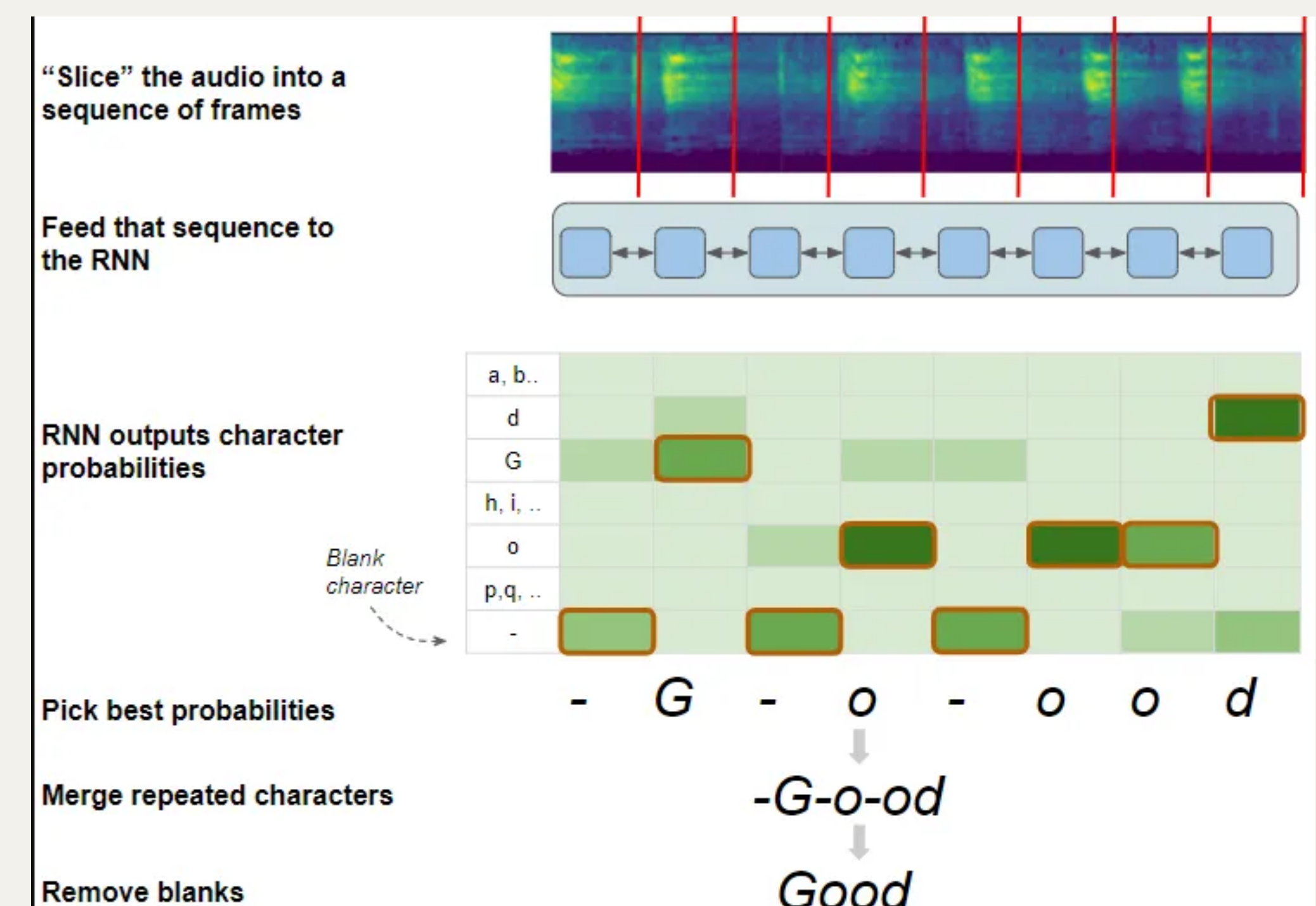
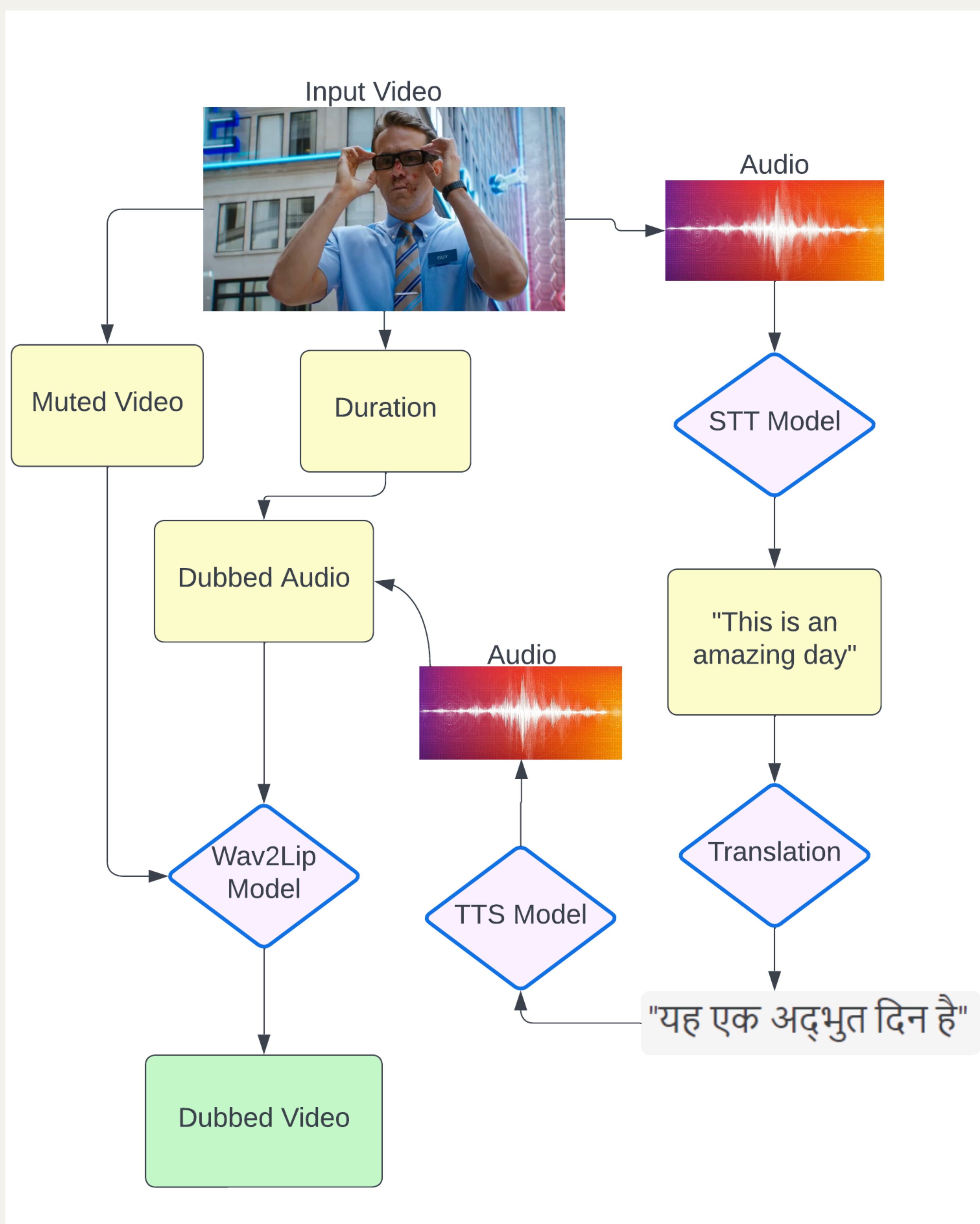
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Develop an automated and efficient dubbing solution to eliminate waiting times for binge-watchers eagerly anticipating their favorite movies dubbed in their preferred language.

Introduction

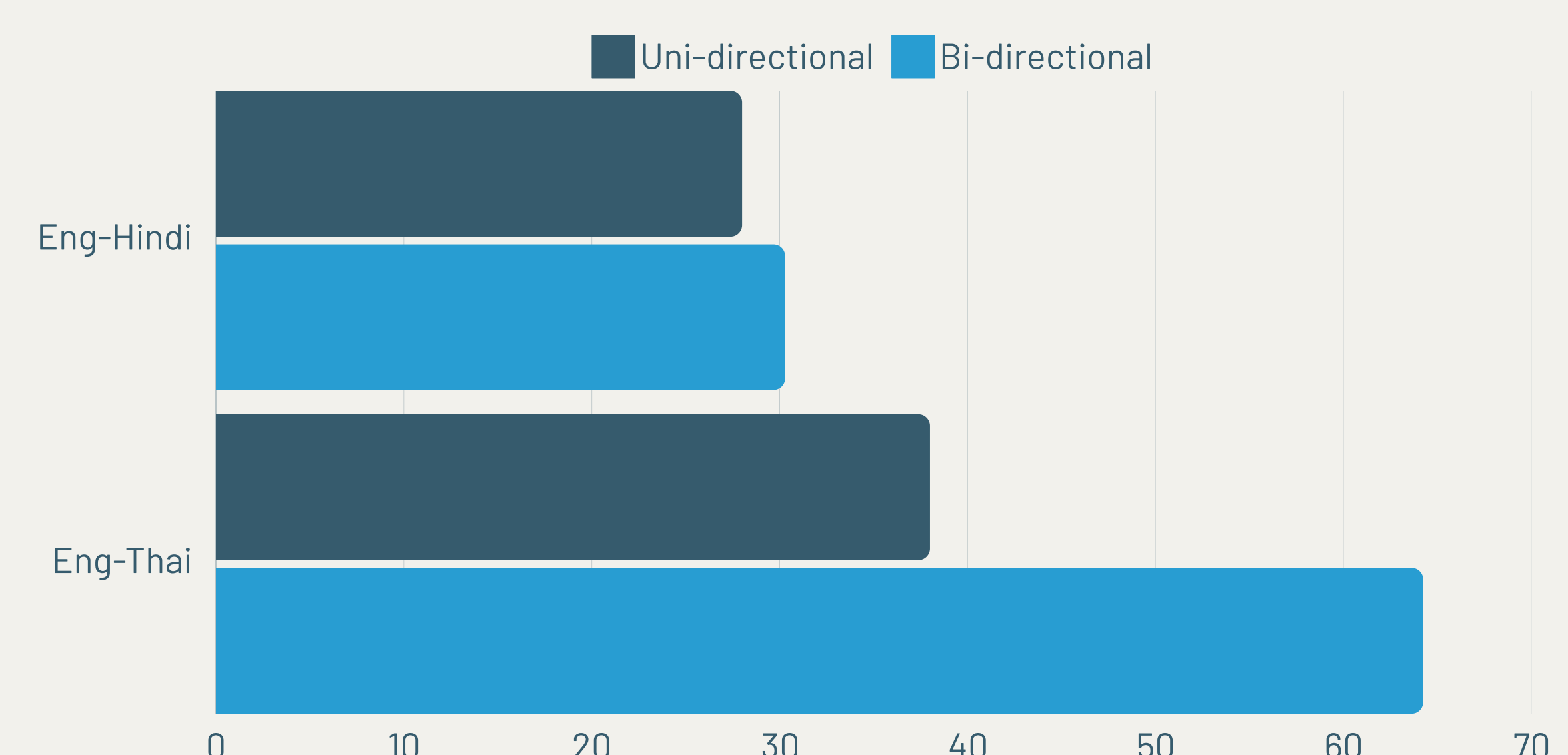
- Global educational and entertainment content faces language barriers.
- Example: India produces over 1500 films in 20+ languages yearly.
- Internet binge-watching worsens dubbed content accessibility.
- Proposed AI solution: precise lip sync, seamless translation.
- ML algorithm like bi-directional LSTM, CNN + bidirectional RNN used for multilingual support.

WorkFlow



Analysis

- BLEU Score of **28%** and **30.29%** for English to Hindi using unidirectional LSTM and bidirectional LSTM with attention, respectively.
- BLEU Score of **64.25%** for English to Thai using bidirectional LSTM with attention.
- For STT 2 Convolutional layers and 5 bidirectional RNN layers achieved a Word Error Rate (WER) of **7.46%**.



Results , Findings and Future Scope

- Conducted experiments on three videos, achieving accurate translation and lip synchronization.
- Considered context in speech-to-text for disambiguating abbreviations like "Mr." and "Mister."
- Implemented word similarity for consistent translation durations.
- Planning to develop a deep learning model capturing emotions, facial expressions, and atmosphere for accurate expression in translated videos.



Related literature

- Cong et al. Learning to Dub Movies via Hierarchical Prosody Models.
- Prajwal et al. A Lip Sync Expert Is All You Need for Speech to Lip Generation In The Wild.
- Bahdanau et al. Neural Machine Translation by Jointly Learning to Align and Translate.
- Sutskever et al. Sequence to Sequence Learning with Neural Networks.
- Baidu Research Deep Speech 2: End-to End Speech Recognition
- Kurt et al. Perceptual audio features for emotion detection