



Cantonese-English Code-Switching Live Conversation Translator

Kasey La

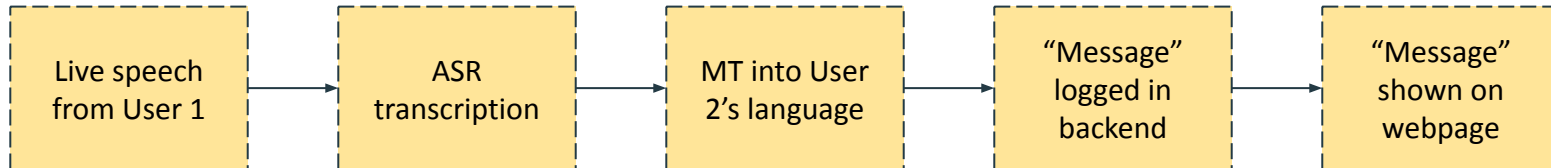


Introduction

- Project goal
 - Use **Automated Speech Recognition** and **Machine Translation** to create an app that supports translating live conversations with Cantonese, English, or a mix of both (code-switching)
- Motivation
 - Many heritage Cantonese speakers have trouble communicating with their family members since they can understand but cannot speak the language or they code-switch when speaking
 - Cantonese is not typically supported in translation apps
 - It was only added to Google Translate about a year ago!
 - There used to be an app that did live conversation translations with Cantonese support but it's been discontinued for about a year
 - This project is heavily inspired by my grandmother who used and benefited from this now-discontinued app

App Architecture

- **ASR:** OpenAI Whisper (medium)
 - Task set to “transcription” only
- **MT:** OpenAI GPT-4o mini
- **Frontend:** Streamlit
- **Backend:** SQLAlchemy



ASR with Whisper

- Issues & solutions
 - Cantonese colloquial vocabulary gets transcribed as their Standard Chinese counterparts and English gets translated into Standard Chinese
 - **Solution:** Include an initial prompt that provides an example output containing code-switching text
- Evaluation method
 - Split Cantonese and English: CER for Cantonese, WER for English
 - Cantonese-English code-switching audio and gold transcriptions retrieved from the MCE dataset by Xie and Chen (2025) (https://github.com/Shelton1013/Whisper_MCE)

ASR with Whisper

- Evaluation Results

	Batch 1 (86 samples)	Batch 2 (90 samples)	Batch 3 (89 samples)
Baseline (no prompt)	CER: 0.528 WER: 0.593	CER: 0.543 WER: 0.688	CER: 0.544 WER: 0.672
Initial prompt	CER: 0.116 WER: 0.141	CER: 0.136 WER: 0.216	CER: 0.161 WER: 0.268

MT with GPT-4o mini

- Issues & solutions (when the English input contains code-switched text)
 - Cantonese colloquial vocabulary gets translated into their Standard Chinese counterparts
 - **Solution:** Few-shot prompting with colloquial vocabulary
 - Some English words did not get translated into Cantonese and remained as English
 - **Solution:** In the prompt, mention that input may contain both languages and to ensure that no English from the input is left in the output
- Evaluation method
 - My best judgment



Live Demo

Live Demo Prompts

- Speech
 - Conversation with Cantonese-English code-switching dialogue, feat. Zixin (Abigale) Jiang
- File Upload (all from MCE dataset)
 - Cantonese → English
 - 6-76: 每一步 progress 都要 celebrate, 因為你已經比之前好啲啦。
 - 100-20: 我希望我啲 pets 係 Pokemon, 咁我就可以當 Pokemon trainer 喇, 咁 cool 呢。
 - English → Cantonese
 - 71-22: 去過 Japan 嘅 Tokyo, 嗰度嘅 technology 真係太 amazing, 仲有超級 clean 嘅 street, 真係讓我 deeply impressed。
 - 98-5: 呢個 weekend supposed to be sunny, 可以去 BBQ 啦！