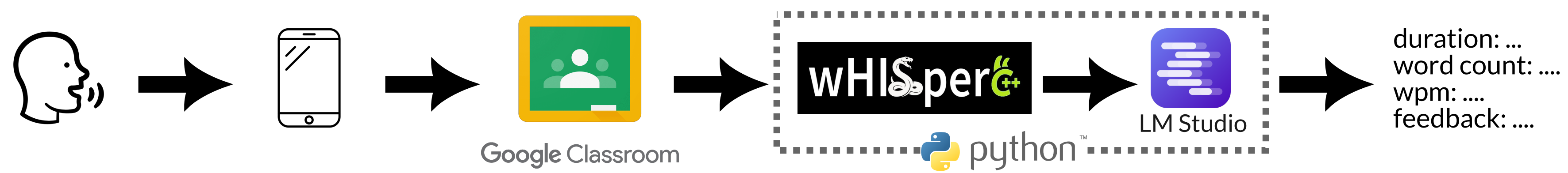


DIY approach for an AI-based toolchain to provide feedback on a 4/3/2/fluency activity

James Ellinger - Nippon Medical School (j-ellinger@nms.ac.jp)

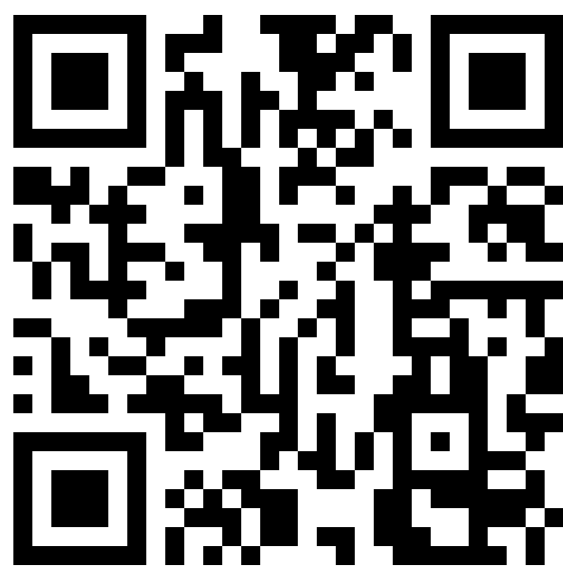


Background

- 4/3/2 activity: students practice a short speech under increasing time pressure
- A well-documented method used to help students improve spoken fluency
- Students often desire feedback, but giving individual comments can be time-consuming
- Taking advantage of the recent boom in artificial intelligence (AI) tools might be one way to address the time problem
- Using local, or private, AI tools could provide a more secure option by protecting student data as well as a more customizable experience. Ultimately, students might be able run the tools directly on their own device

Research Aims

- 1) Develop a custom toolchain for use on a consumer-grade PC that:
 - (i) uses open-source AI tools to generate transcripts of student speeches from a 4/3/2 activity
 - (ii) provides point-by-point feedback using a locally-run AI large language model.
- 2) Informally assess student attitude and motivation towards using the aforementioned tool as a way to enhance spoken fluency.



Code and instructions available on GitHub
⚠️Use of command line required⚠️

Methods

- A custom toolchain using an Apple M2 Mac Mini was developed, using Whisper.cpp for AI-based speech recognition and LM Studio (with Meta Llama 3.1 8b) for feedback.
PC specs:

Chip: Apple M2	RAM: 16 gb
CPU: 8 cores	GPU: 10 cores
- Students recorded the final 2 minutes of a 4/3/2 activity on smartphones and submitted to Google Classroom.
- The toolchain automatically processed audio, provided word count, speech rate, and improvement tips.
- Students revised and re-recorded their speech, receiving updated data on word count and speech rate to track progress.

Outcomes

- Student speeches were transcribed quickly (7 to 10 seconds per transcript) as was AI-generated feedback (10 to 13 seconds per transcript).
- Errors in transcription varied by student but were roughly 3 or 4 errors per 100 words.
- Revised speeches based on the AI-generated feedback showed an average of 11% improvement in speech rate.
- Students responded to an informal survey, indicating a positive attitude toward using these AI-based tools, with requests to increase the frequency of use during class time. They indicated that frequent use of these tools would improve their motivation.
- Feedback from Meta Llama 3.1 8b lacked some detail. Consider another option such as Gemma 3 12b at the cost of slower processing.

References and Attributions

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The Noun Project (thenounproject.com)



日本医科大学
NIPPON MEDICAL SCHOOL