



# Language Learner

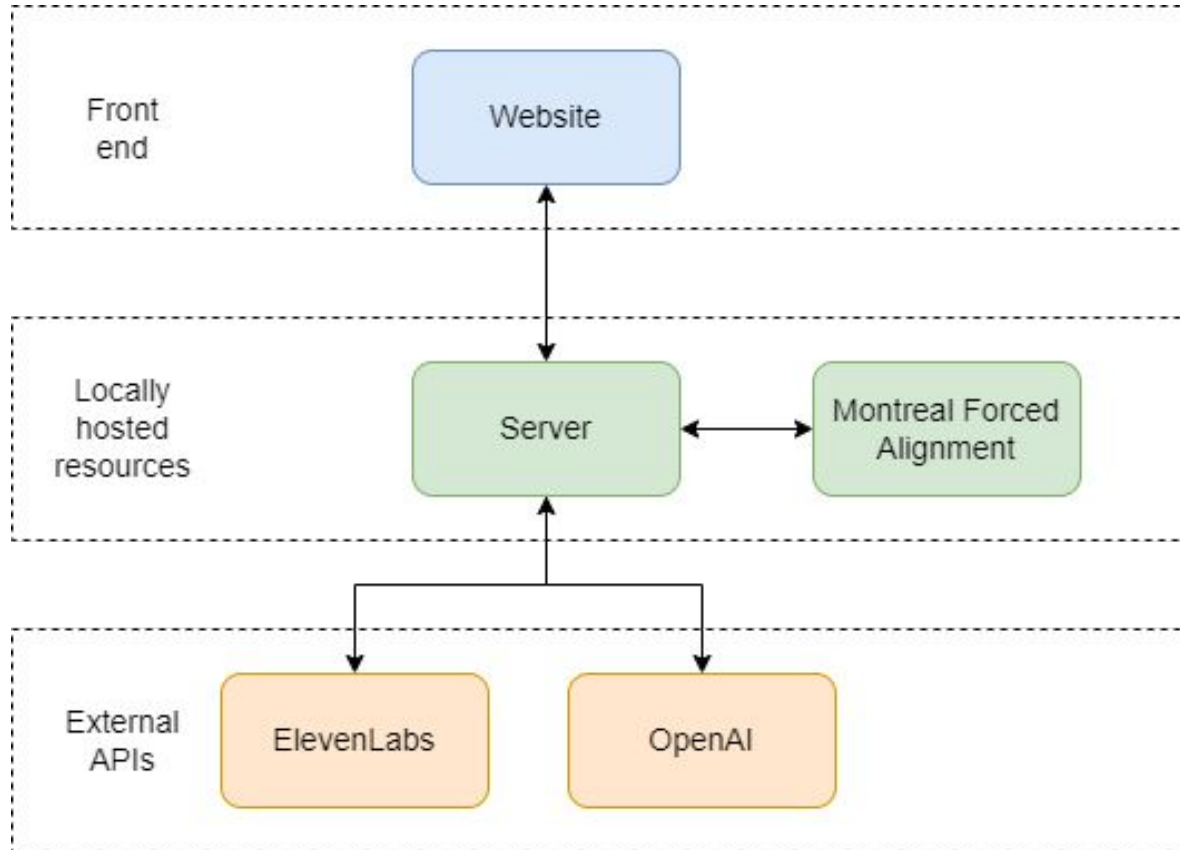
By Rahel Gunaratne



# Purpose

- Retain standard tools like grammar, roleplay, suggesting improvements
- But pronunciation is very important
- Tool provides analysis on pronunciation

# Architecture

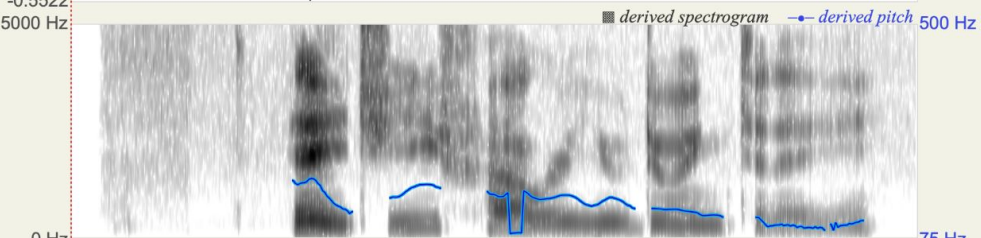


# Montreal Forced Aligner

- Aligns speech signals with their transcription
- Acoustic models & Pronunciation dictionaries
  - words ↔ phonetics
  - E.g. the ARPABET
- Tracks time and split your words into phones



|                 |          | IPA Symbol | ARPAbet (SV) | ARPAbet (UV) | Examples |
|-----------------|----------|------------|--------------|--------------|----------|
| Vowels          | Front    | i          | i            | IY           | beat     |
|                 |          | ɪ          | I            | IH           | bit      |
|                 |          | e          | e            | EY           | bait     |
|                 |          | ɛ          | E            | EH           | bet      |
|                 |          | æ          | @            | AE           | bat      |
|                 | Back     | ɑ          | a            | AA           | Bob      |
|                 |          | ɔ          | o            | AO           | bought   |
|                 |          | o          | o            | OW           | boat     |
|                 |          | U          | U            | UH           | book     |
|                 |          | u          | u            | UW           | boot     |
|                 | Mid      | ɜ          | R            | ER           | bird     |
|                 |          | ə          | x            | AX           | ago      |
| ʌ               |          | A          | AH           | but          |          |
| Diphthongs      |          | aɪ         | Y            | AY           | buy      |
|                 |          | aʊ         | W            | AW           | down     |
|                 |          | ɔɪ         | O            | OY           | boy      |
|                 |          | ɪ          | X            | IX           | roses    |
| Stop Consonants | Voiced   | b          | b            | B            | bat      |
|                 |          | d          | d            | D            | deep     |
|                 |          | g          | g            | G            | go       |
|                 | Unvoiced | p          | p            | P            | pea      |
|                 |          | t          | t            | T            | tea      |
|                 |          | k          | k            | K            | kick     |
| Fricatives      | Voiced   | v          | v            | V            | vice     |
|                 |          | ð          | D            | DH           | then     |
|                 |          | z          | z            | Z            | zebra    |
|                 |          | ʒ          | Z            | ZH           | measure  |
|                 | Unvoiced | f          | f            | F            | five     |
|                 |          | θ          | T            | TH           | thing    |
| s               |          | s          | S            | so           |          |
|                 | ʃ        | S          | SH           | show         |          |



≡ modifiable TextGrid

|   |     |       |     |   |     |     |       |       |              |             |
|---|-----|-------|-----|---|-----|-----|-------|-------|--------------|-------------|
| 1 | hey | chief | h   | o | are | you | doing | today | words (1/11) |             |
| 2 | EY1 | CH    | IY1 | F | ER0 | Y   | I     | T     | EY1          | phones (22) |

Visible part 3.744000 seconds 3.744000

Total duration 3.744000 seconds

# Future Work

- Improving the roleplay scenarios
  - Custom roleplay's scenarios
  - Live feedback and analysis
  - Ask for help
- Improving the pronunciation analysis
  - Map phones to Elevenlabs tts so it can specifically articulate the difference
- Support for other languages

# Business Case

- Major market for language learning that hire human tutors
  - Many companies will pay for lessons for their employees to learn a language
  - The general public
- 
- Provides a pronunciation that not even Duolingo offers
  - Can cut costs
  - Easy access
  - Have fun while doing it

# Thank you!

[rahel.gunaratne@gmail.com](mailto:rahel.gunaratne@gmail.com)