

Miló

A digital speech therapist for children





FOXP1

- FOXP1 syndrome is characterised by mild-to-severe intellectual disability, speech and language impairment regardless of cognitive abilities, and behavioural abnormalities.
- Speech and language impairment was reported in all FOXP1 patients and might be a fundamental characteristic of FOXP1 syndrome. Hence, it is important to address speech impairments to support the growth of FOXP1 patients.

Price of speech therapy:

\$100-250 /hour

x2 per week

Up to:

\$24,000 /year

- It is financially and logistically challenging for families to tackle speech impairment in their children.
- Parents who cannot afford the time to physically spend their children to therapy or afford the medical costs might end up compromising the communication and language development of the child.

1. Rappold, G. (2023, September 21). *FOXP1 syndrome*. GeneReviews® [Internet]. <https://www.ncbi.nlm.nih.gov/books/NBK594825/#:~:text=FOXP1%20syndrome%20is%20characterized%20by%20mild%2Dto%2Dsevere%20intellectual%20disability,%2C%20anxiety%2C%20repetitive%20behaviors%2C%20and>
2. Geller, A. (2024, February 23). *How much does speech therapy cost?*. Connected Speech Pathology. <https://connectedspeechpathology.com/blog/how-much-does-speech-therapy-cost#:~:text=If%20you%20are%20seeking%20speech,%24100%20to%20%24250%20per%20hour>

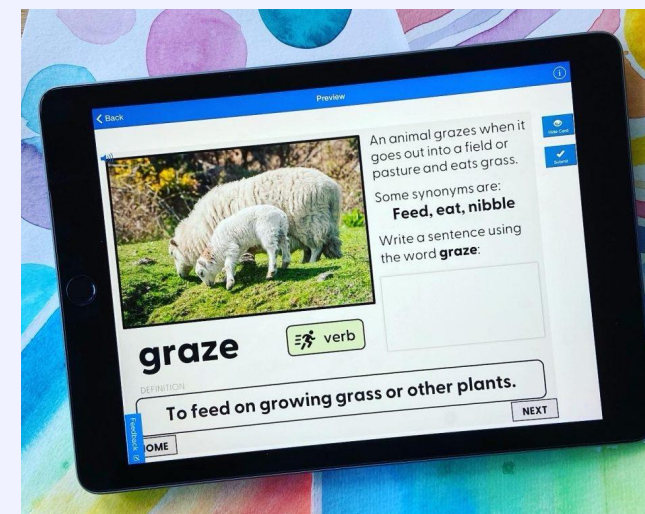
Speech Impairment and Therapy

- Most children with FOXP1 syndrome experience a delay in saying their first words and stringing words together to form sentences. Some may also remain minimally verbal.
- Affected children often have speech production disorders, including dysarthria, receptive language disorder and expressive language disorders.

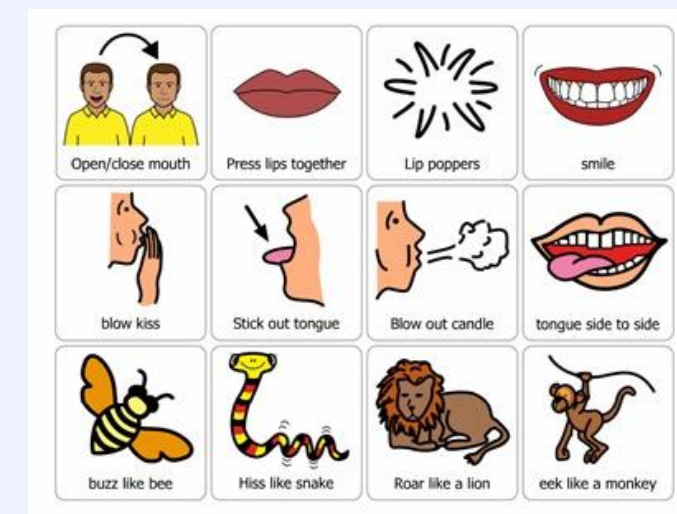
Speech therapy:



Articulation therapy

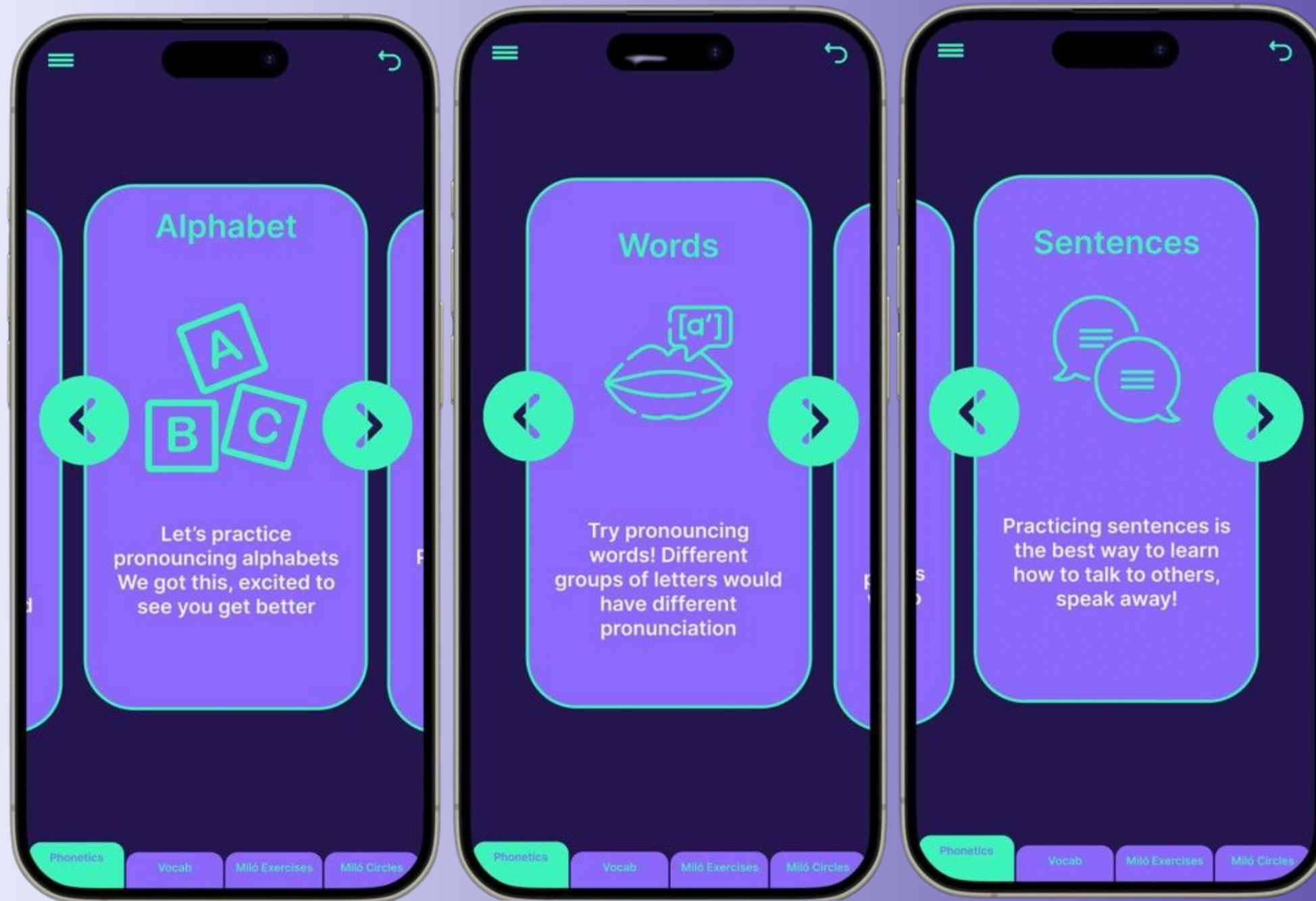


Language intervention activities

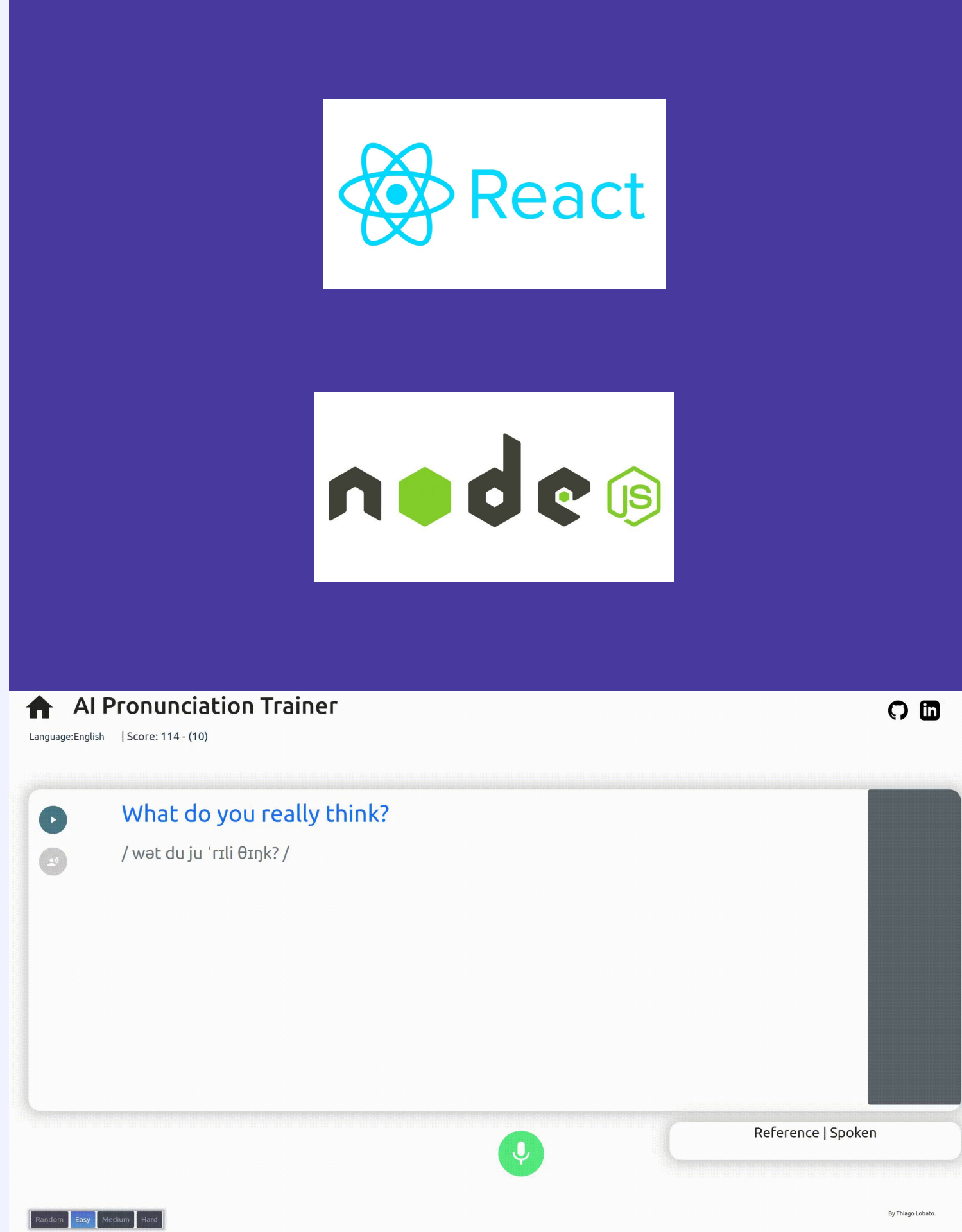


Articulation therapy

Speech Therapy



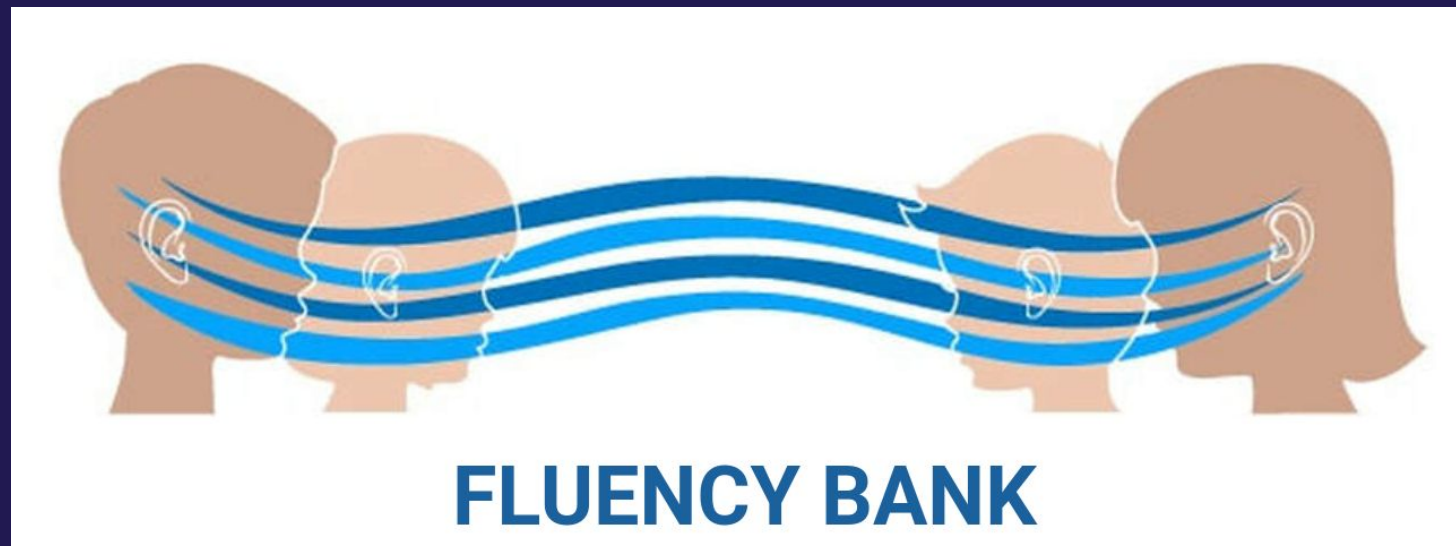
Methods



1. Thiagohgl. (n.d.). *THIAGOHGL/AI-pronunciation-trainer: This tool uses AI to evaluate your pronunciation*. GitHub. <https://github.com/Thiagohgl/ai-pronunciation-trainer>

Data and Model

- Silero VAD trained on English data with WER of 5% for clean audio and 10-12% for noisy audio.
- Fluency Bank data with >400 clips of speech impairment data to train a model to transcribe text for those with speech impairment.

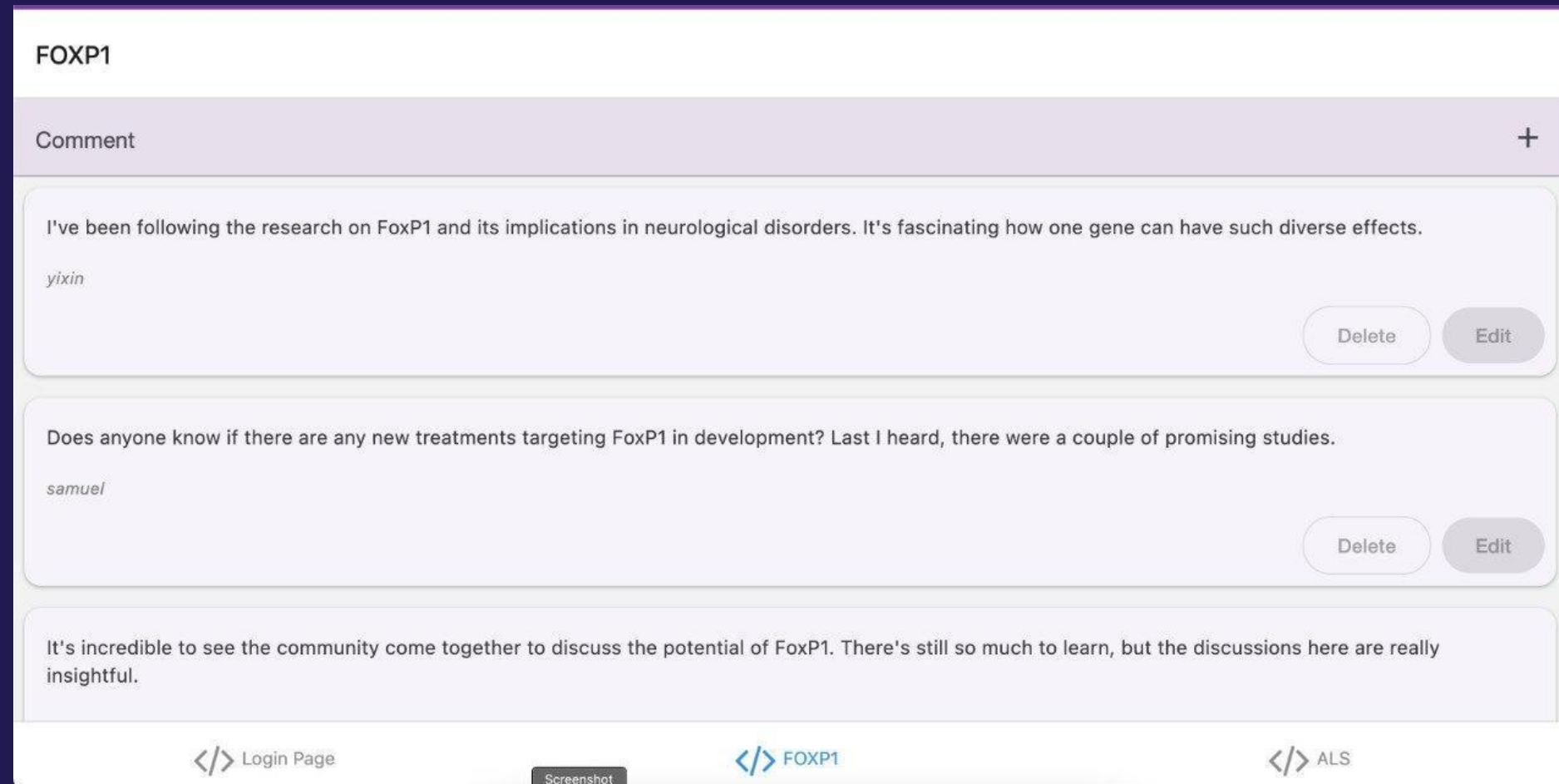


silero



Other Features

1. Milo Circles, a community platform for families of patients with speech impairment



2. Data collection, through an opt-in option for users of speech therapy to provide voice and performance data

Challenges and Discussion

- Difficulty in designing the syllabus and app features: We had a limited understanding on how to design learning materials to effectively engage children. We originally included a lot of text features in our app, but realised that the children will not be able to understand words or be engaged. Hence, we pivoted to using a human avatar to teach and respond to children's voice input.
- Choice of language model: We used a smaller model, which has a higher error rate but allows for greater scalability.,
- Our app gives a preliminary idea on how speech therapy can be digitalised to make medical support more accessible to patients of FOXP1 and other diseases, but it requires further refinement in terms of syllabus and delivery of content.