

Speak Up

SpeakUp, mobile application to overcome stuttering.

Sri Lanka Institute of Information Technology.

Group members

Vaikunthavasan Prasanna

Alagarasan Mahalingam

Noah Amalan Premkumar

Roshan Akthar J.A

Supervisors

Dr. Koliya Pulasinghe - Supervisor

Dr. Malitha N. Wijesundara - Co-Supervisor

Mrs. Weerasinghe Yvonne - External Supervisor

70 Million people affected by stuttering worldwide

People show significant **improvement** after few weeks training with a therapist - Speech Language Pathologist (SLP)



<https://en.wikipedia.org/wiki/Stuttering>

Problem

- 1) Not everyone gets a chance to reach out to a therapist.
- 2) Patients get limited to the therapy done inside the therapy room
- 3) There are no technology based solution to help them to train themselves

Imagine, We have a machine that helps them
speak better...

Existing solutions

 Android	 iOS	 Windows phone
Stuttering Help Trial	How to Stop Stuttering-Proactive Speaking Mobile Speech Trainer App	Stuttering Analysis App
DAF Delayed Auditory Feedback	MPiStutter	Stuttering
Stutter Rater	Speech4Good	STUTTERING

It's not that simple! We have to

- 1) Identify the stuttering severity.
- 2) Identify the syllable rate.
- 3) Provide practices to overcome stuttering.
- 4) Implement proven methods followed in a therapy such as “slowed reading” and “easy onset” inside mobile application.

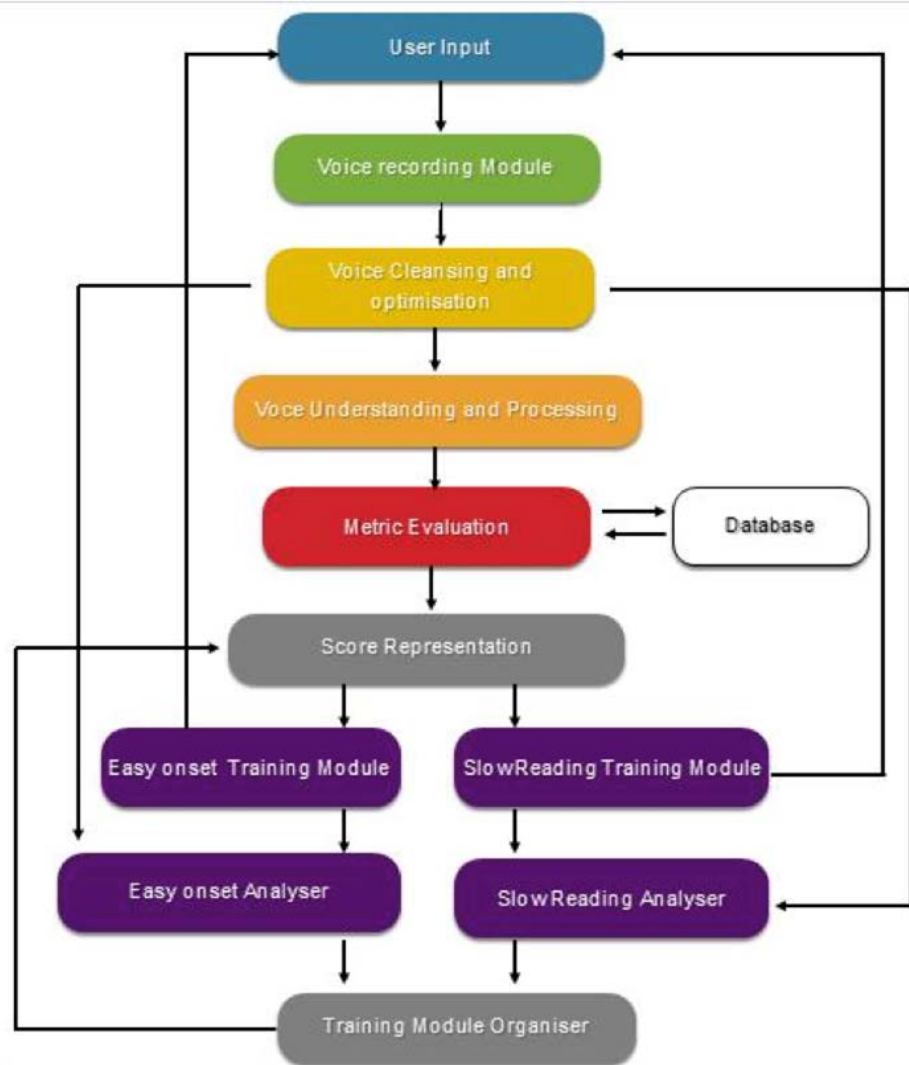
SpeakUp has

- 1) Speech to text recognition module
- 2) Voice filtering and optimization module
- 3) Calculate syllable count/rate of voice input
- 4) Gamification and score model
- 5) A backend platform to connect the users with Speech Language Pathologists.

What makes SpeakUp even more interesting?

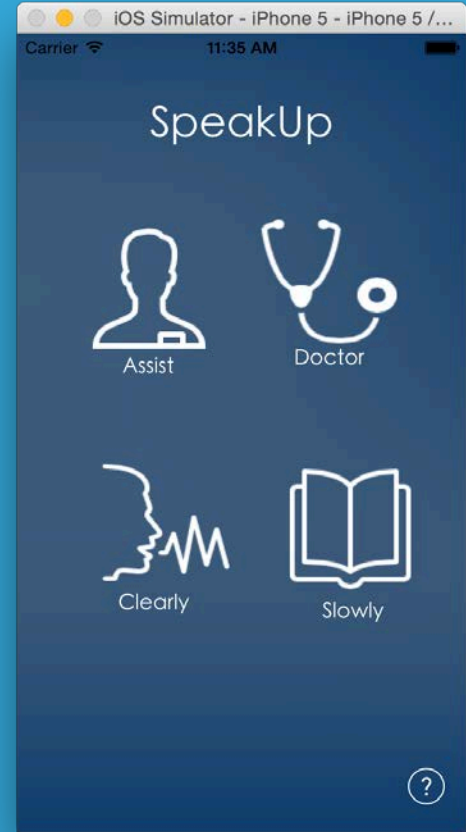
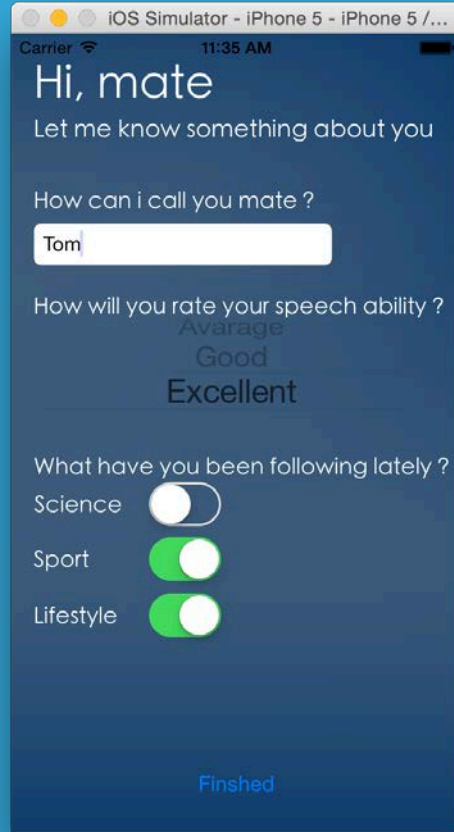
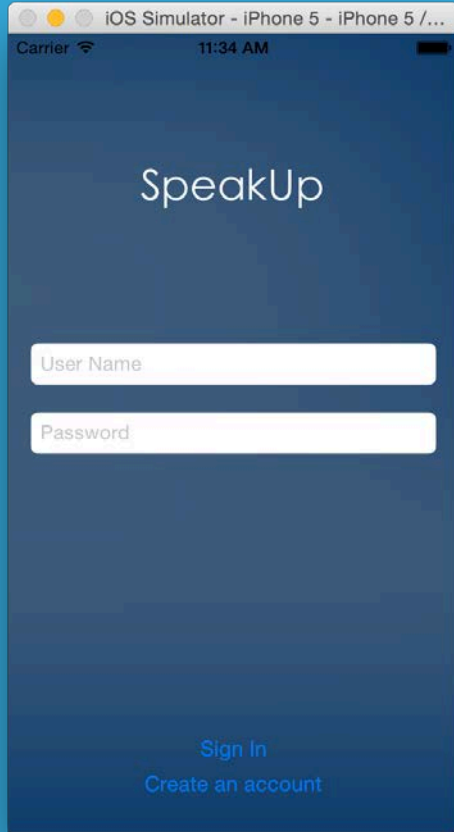
Improvement exercises (Level Based) - Research study on two traditionally practiced technologies by SLP's.

Training module categorization (Shuffling the exercises)
- Research study on dynamically shuffle and provide users with exercises that taps their interests.



Identifying stuttering

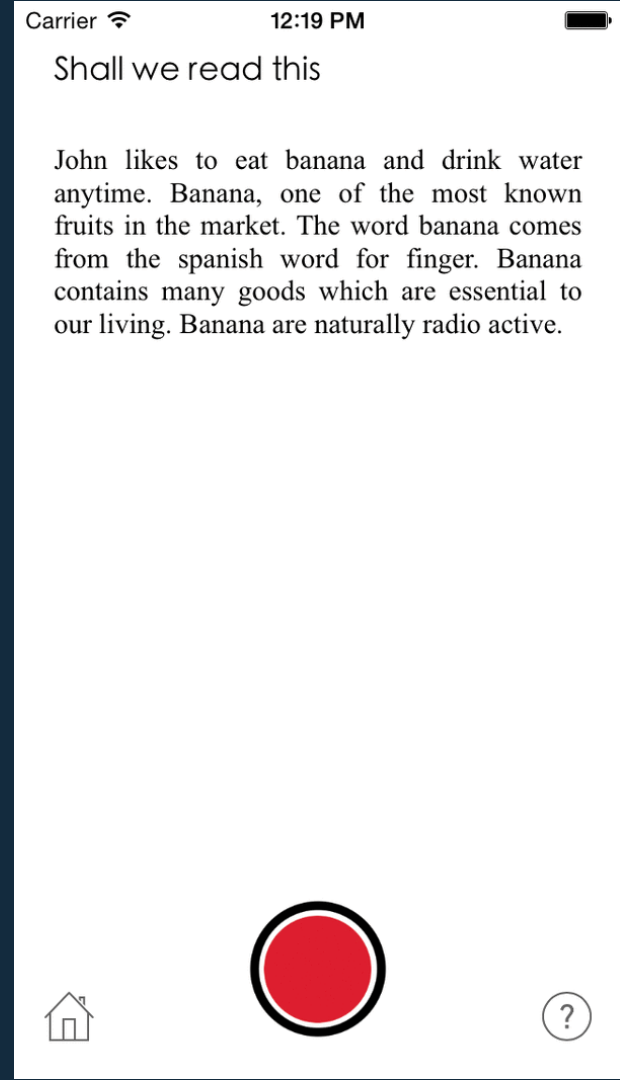
- 1) Converting speech to text of user voice input after voice filtering and optimization.
- 2) Dividing the audio file into small samples
- 3) Calculating the mean, median values
- 4) Identifying the peak points above the mean value as syllables.
- 5) If the number of syllables calculated are greater than the actual syllables in the text it denotes the user has stuttered.



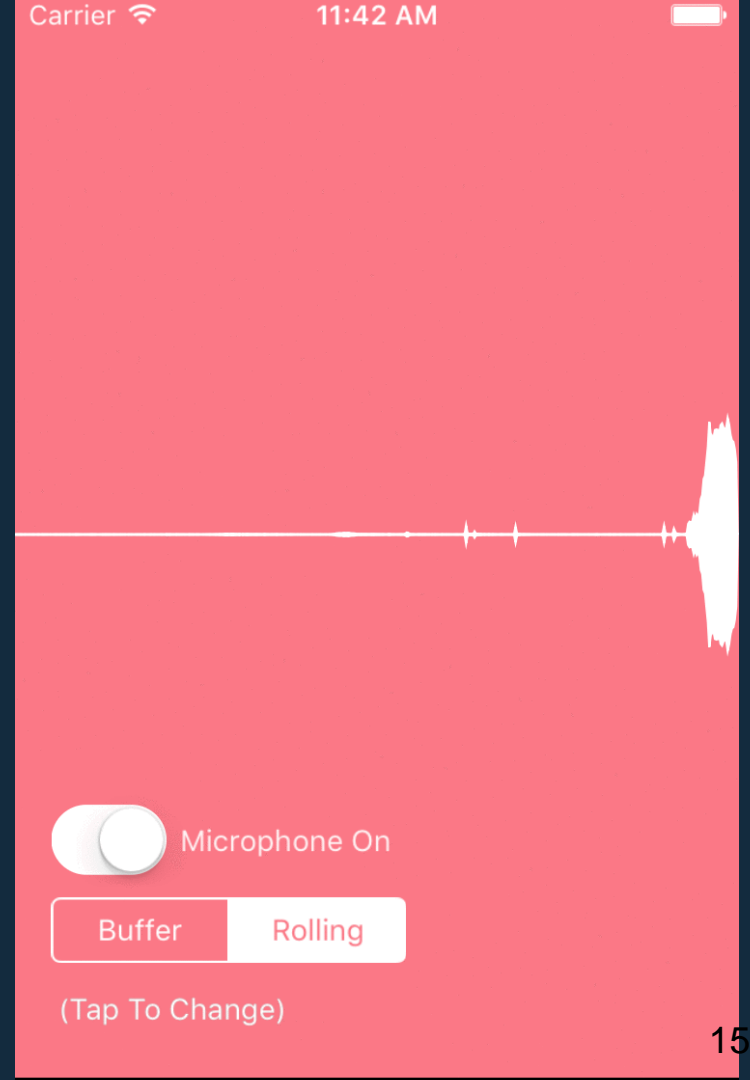
Welcome message with instructions



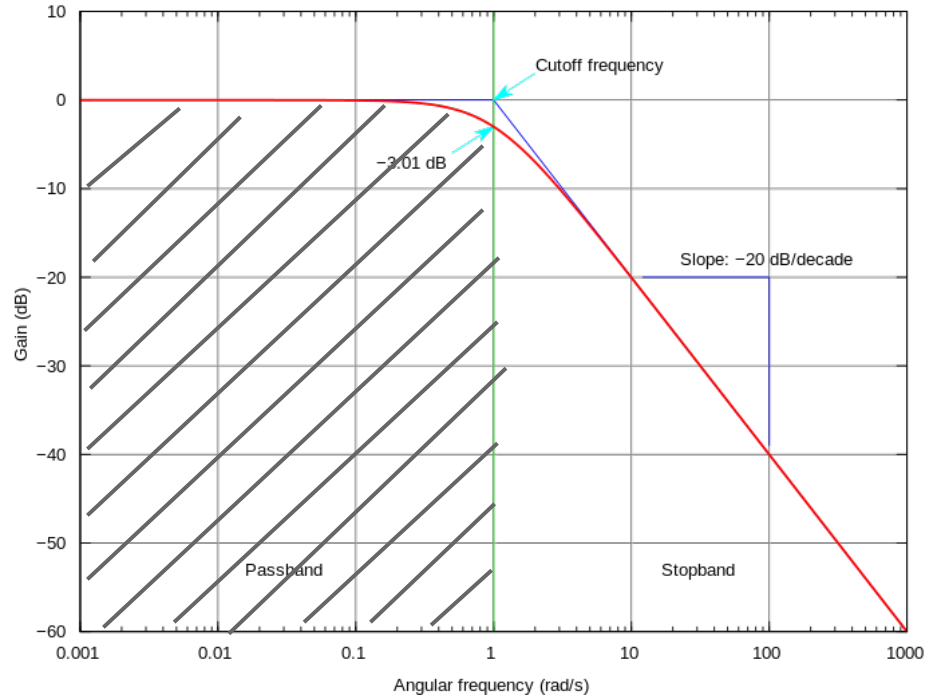
Initial test



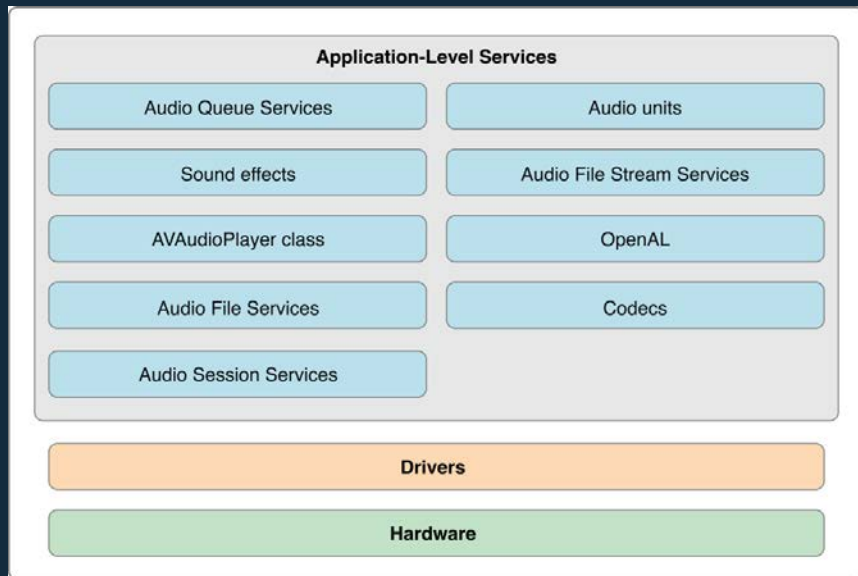
Voice input is taken for analysis



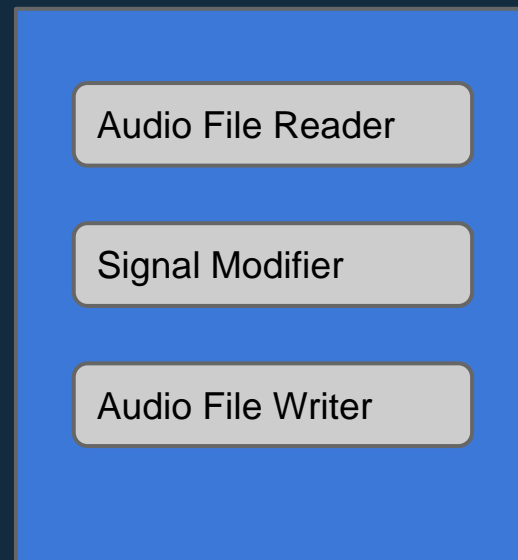
Passing through a low pass filter



Implementation of Low pass filter in iOS



iOS Core Audio Architecture



Implementation inside SpeakUp

Modules behind voice analysis

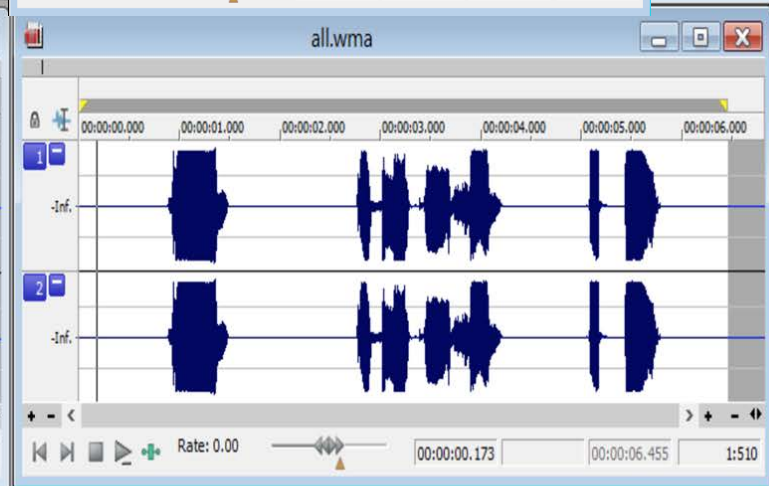
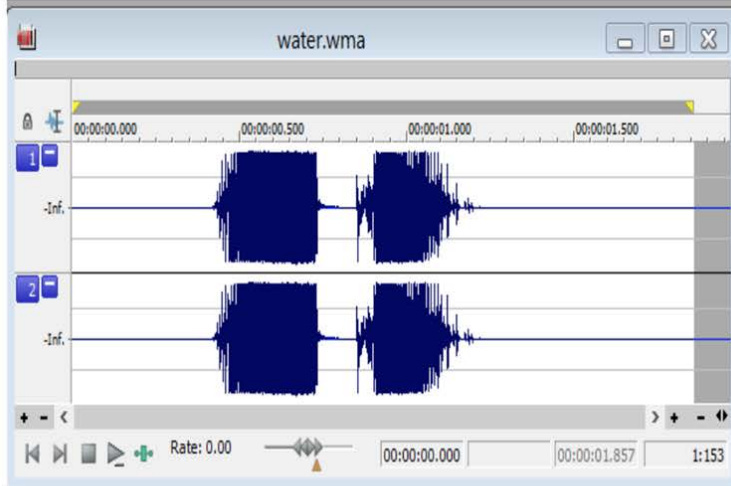
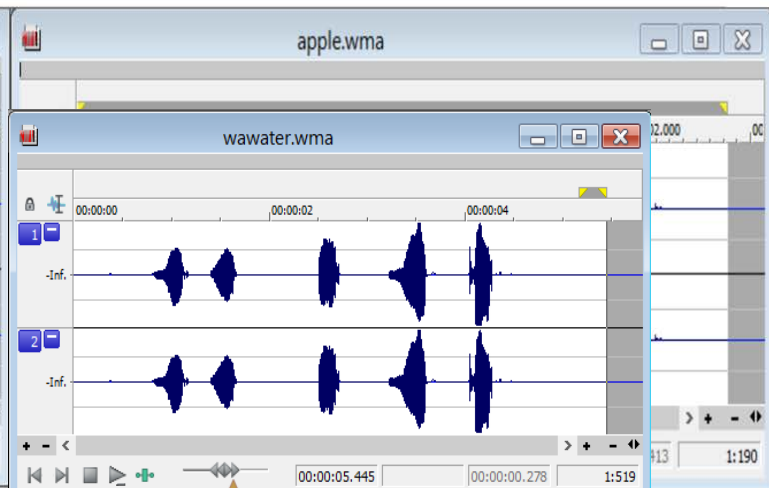
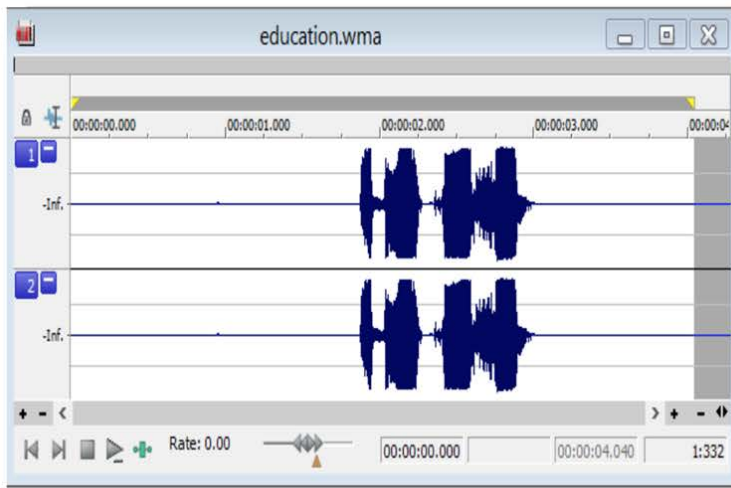
- 1) Voice filtering and optimisation
- 2) Speech to text recognition
- 3) Syllable Count

Dividing the audio file into small samples

Calculating the mean, median values

Identifying the peak points above the mean value as syllables.

If the number of syllables calculated are greater than the actual syllables in the text it denotes the user has stuttered.

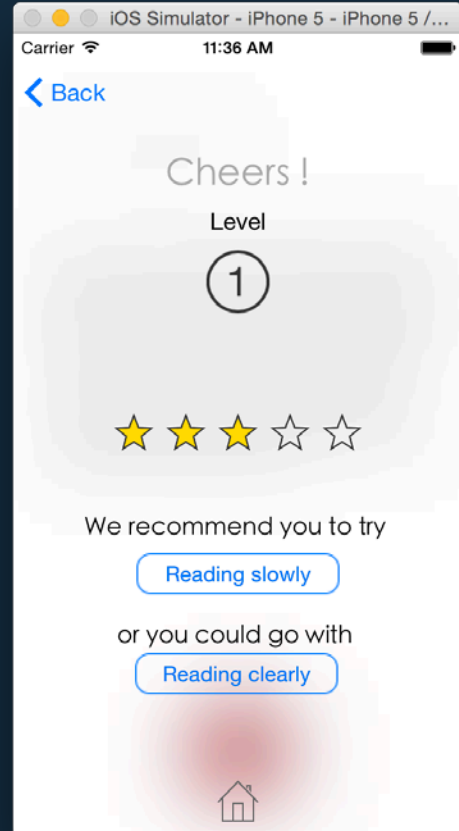


Processing time (Building peaks for water.wma): 0.016 seconds

44,100 Hz 16 bit Stereo 00:00:06.455

After initial test..

Reading Slowly – Slowed Reading
Reading Clearly – Easy On set

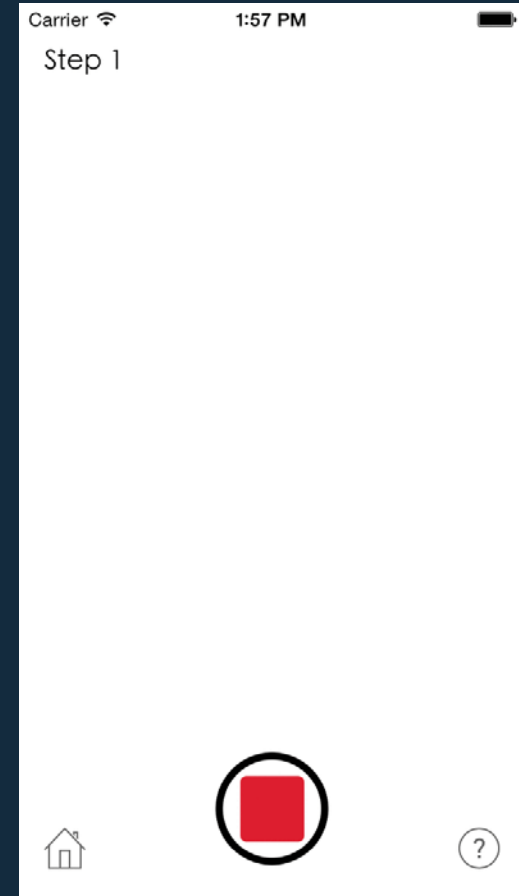


Slowed reading

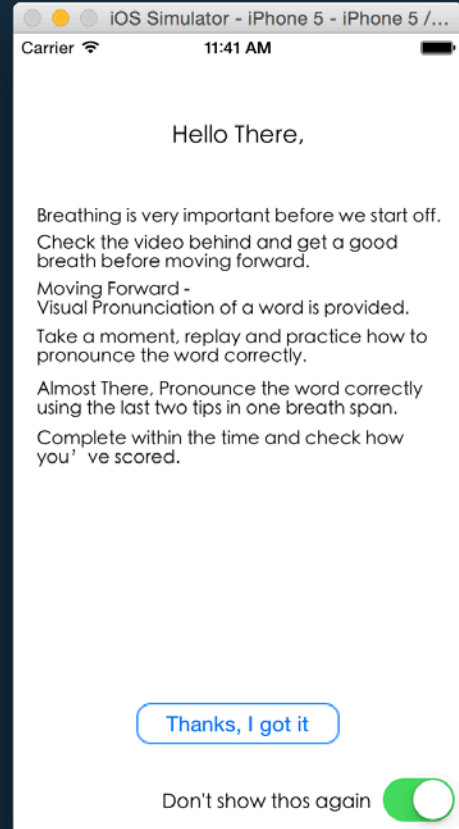
80 Syllables/min

100 Syllables/min

120 Syllables/min

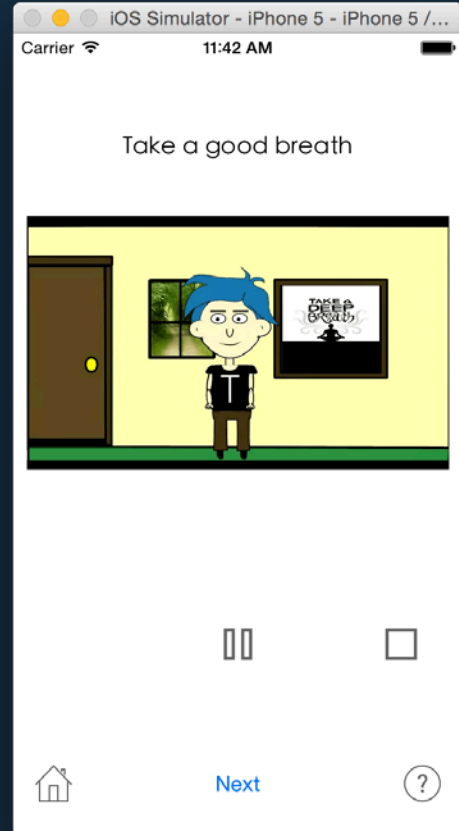


Easy onset



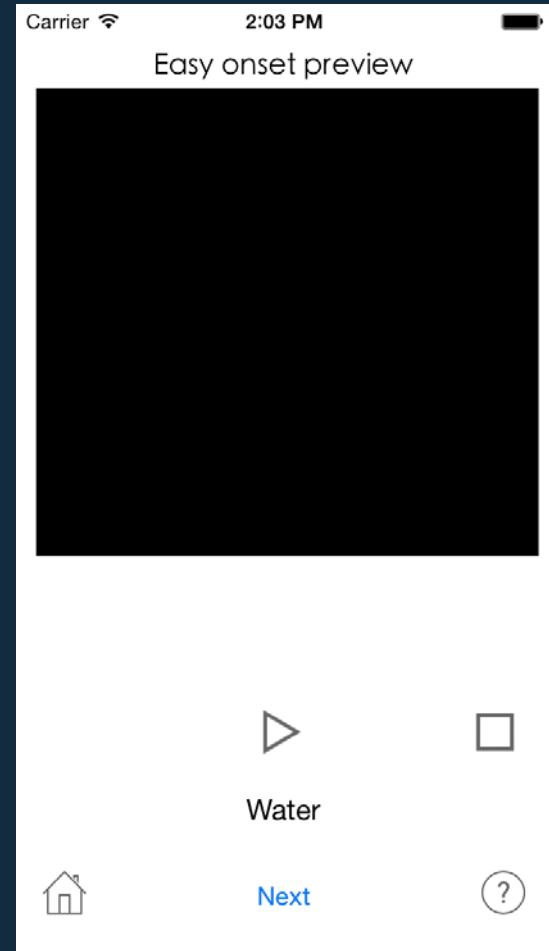
Easy onset - Step 1

Taking a Good Breath



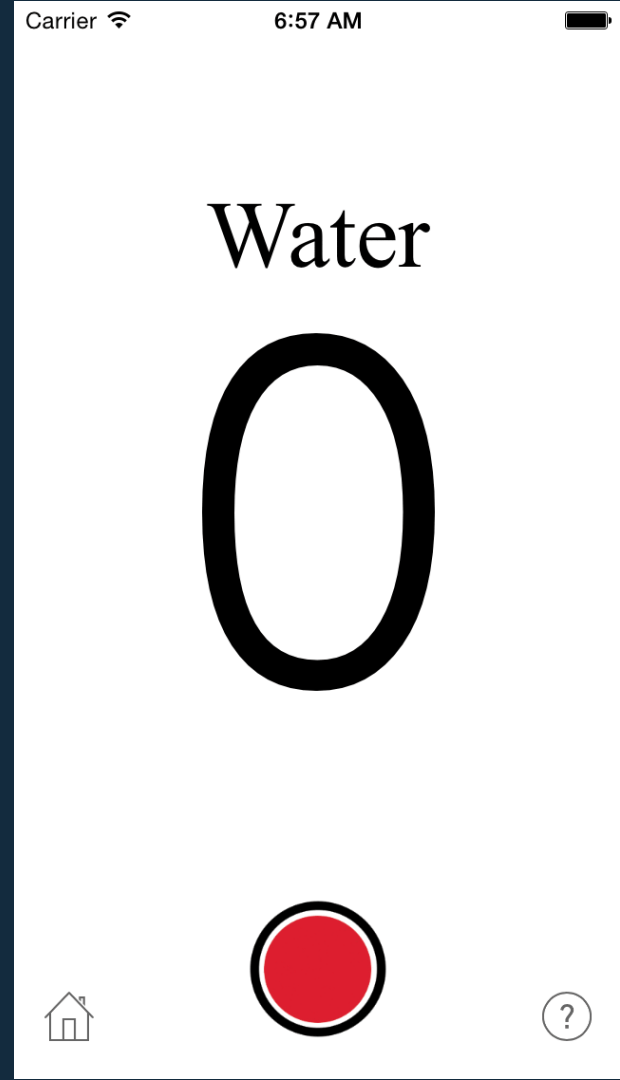
Easy onset – Step 2

Making the lips correctly



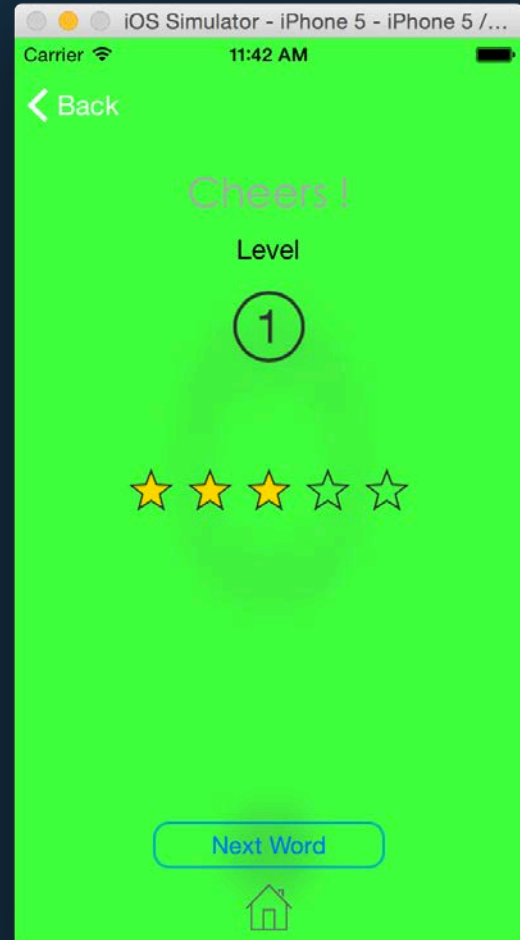
Easy onset – Step 3

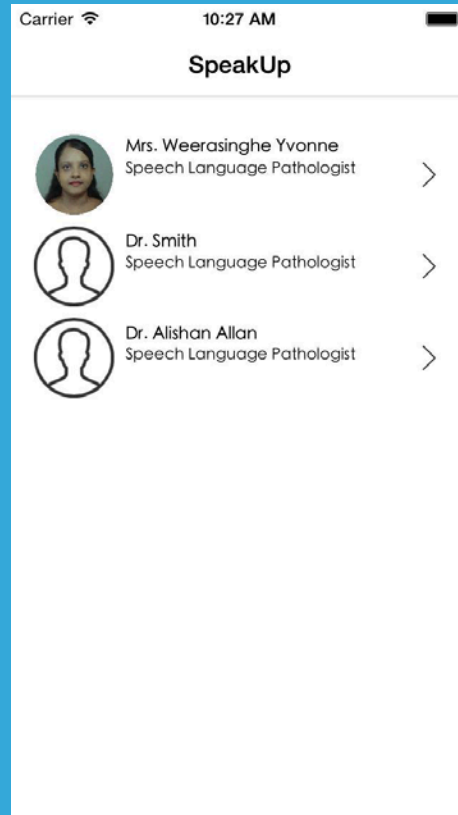
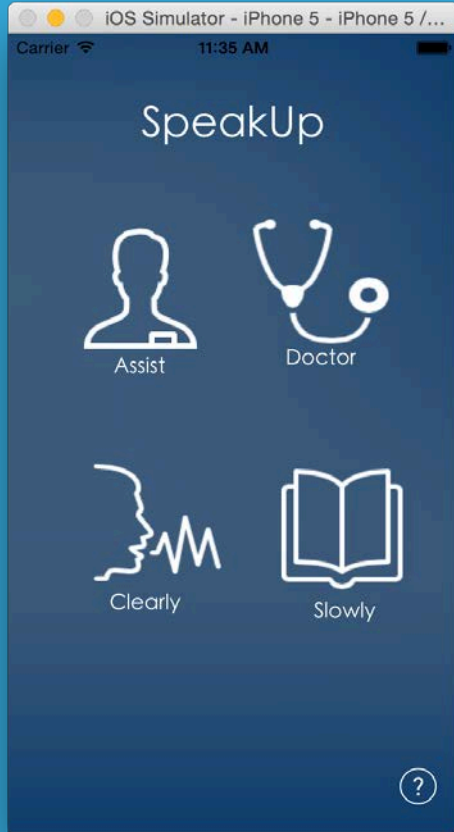
Utilizing the recommended time span
to pronounce words



Easy onset

Score and option to move to other words





Thank you