



Hands UP

User Manual

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1 Introduction

Hands UP is an innovative application that bridges the communication gap between signers and non-signers. Using advanced AI technology, the application detects and translates sign language in real-time through the device's camera, converting signs into both text and spoken language without significant delays. Beyond translation, it also serves as an interactive learning platform with structured lessons and feedback on signing accuracy.

1.1 Who Needs Hands UP?

Hands UP is intended to be used in conversations between people who can sign and those who cannot sign. It bridges the communication gap by translating what is being signed into English and saying it out loud. Furthermore, Hands UP can be used by those looking to learn sign language. Our intuitive curriculum allows users of all skills to either get started, touch up their skills or become a pro at sign language.

1.2 Key Features of Hands UP

- Gesture recognition
- High translation accuracy
- Text-to-Speech
- Intuitive learning interface
- Sign Surfers (educational game)
- Sing & Sign (for kids)

2 Technical Specification

| Component | Specification |
|-----------------------|---|
| Gesture Recognition | Mediapipe |
| AI inferencing | CNN, LSTMs in TensorFlow and Huggingface Gloss Models |
| Text to Speech | React SpeechSynthesis API |
| Models and Animations | Mixamo, Sketchfab and Blender |

3 System Requirements

Minimum Requirements:

- Operating System: Windows 10/11, macOS 12+, Linux (Ubuntu 22.04+)
- Processor: Intel i5 or equivalent
- RAM: 8 GB
- Camera: 720p webcam or higher
- Internet Access

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4 Getting Started

4.1 Start The App

1. Go to www.handsup.onrender.com
2. **Sign up** (or Login if you're a returning user) create a new account with your personal details. The signup page will look as follows.

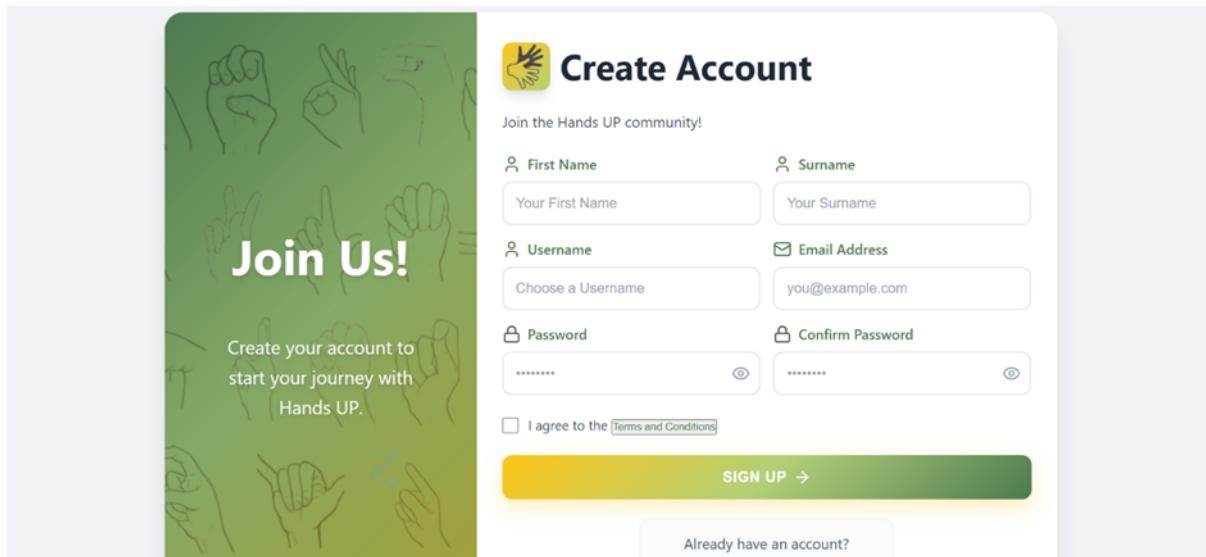


Figure 1: Hands UP sign up page

You will need to accept the terms and conditions to continue, see more here [Terms And Conditions](#)).

4.1.1 Forgotten Password

If you are a returning user and forgot your password, click on **Forgot Password** on the login page to be redirected to the password reset page.

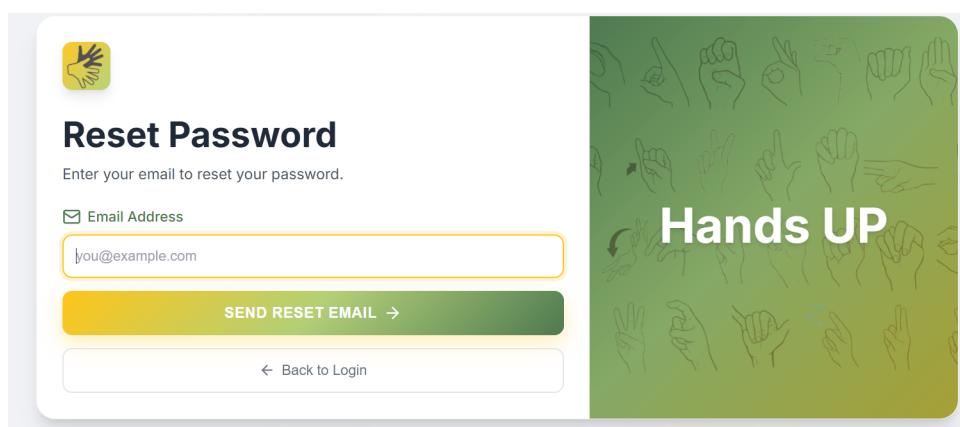


Figure 2: Password reset

4.2 App Navigation

Different pages of the app can be accessed through the navigation bar at the top right of your screen.



Figure 3: Navigation bar

4.3 Camera Access

Hands UP requires camera access, as such you will be prompted to grant camera access on the translate page, learn page or in the game.

1. **Grant camera access** when prompted (“Allow while visiting this app” or “Allow this time”).

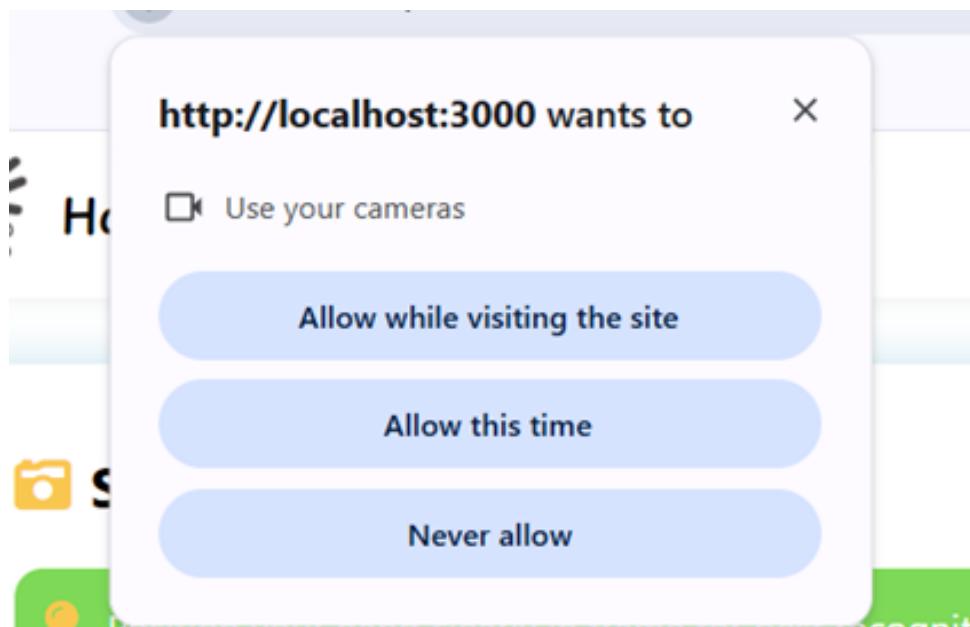


Figure 4: Camera access prompt

4.4 Gesture Recognition

To begin translating, do the following:

1. Navigate to the translate page via the navigation bar. Ensure that you are in proper lighting where all your fingers and your upper body are visible.
2. Take note of the additional tips given and use the **Test Your Setup** for optimal results.
3. Click the **green** “Start Signing” button and immediately start – the button will turn white. Click again to stop signing.



Figure 5: Before and after clicking the button

4. To the right of your screen, the ASL gloss will appear. After which the buttons will be enabled.



Figure 6: Translation and Sound Icons

5. Click on "Translate Gloss" to translate the gloss to its English equivalent.
6. Click on "Speak" to hear the outputted translation.



Figure 7: Translator Idle State



Figure 8: Translator Collection State



Figure 9: Translator Done State

7. The border of the camera input will change depending on what state the translation is in. More information is under the camera input box.
8. You can also stop signing, and click on the top right icon in the box to switch between letters, numbers and glosses.

4.5 Learning Signs

To begin learning sign language, do the following:

1. Navigate to the learn page where you will be met by a welcome message, thereafter an optional placement test will popup to see what you already know so that your learning is tailored to your needs.

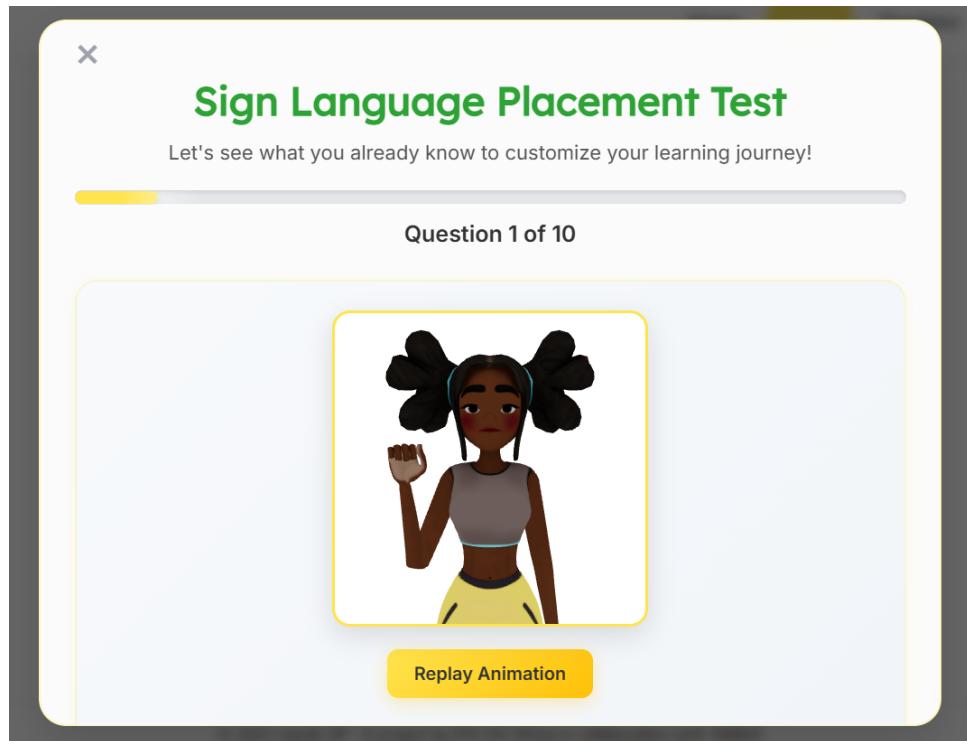


Figure 10: Learn placement test

2. Thereafter, the learning categories will be open, the number depends on how well you did in the test and the rest will open as you continue learning.

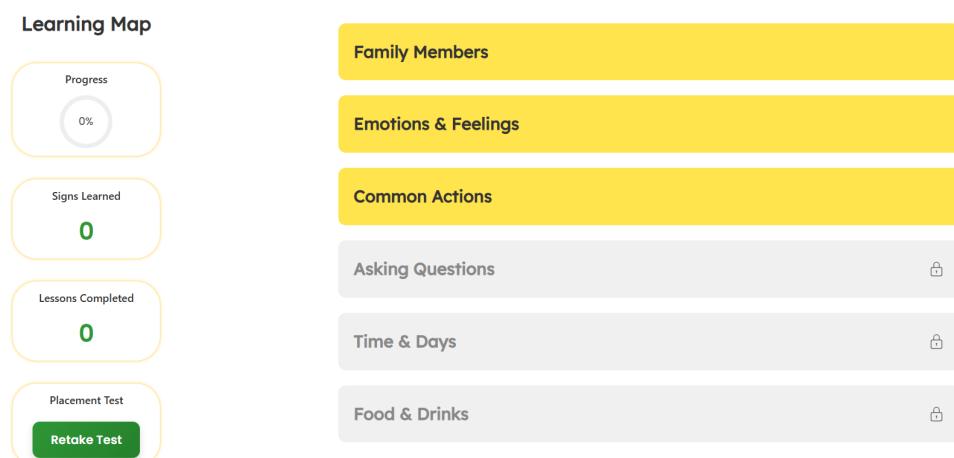


Figure 11: Learn categories and learning map

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3. Follow along with the animation, ensuring that your finger, hand and arm placements align with that of the animation. You may use your dominant hand.

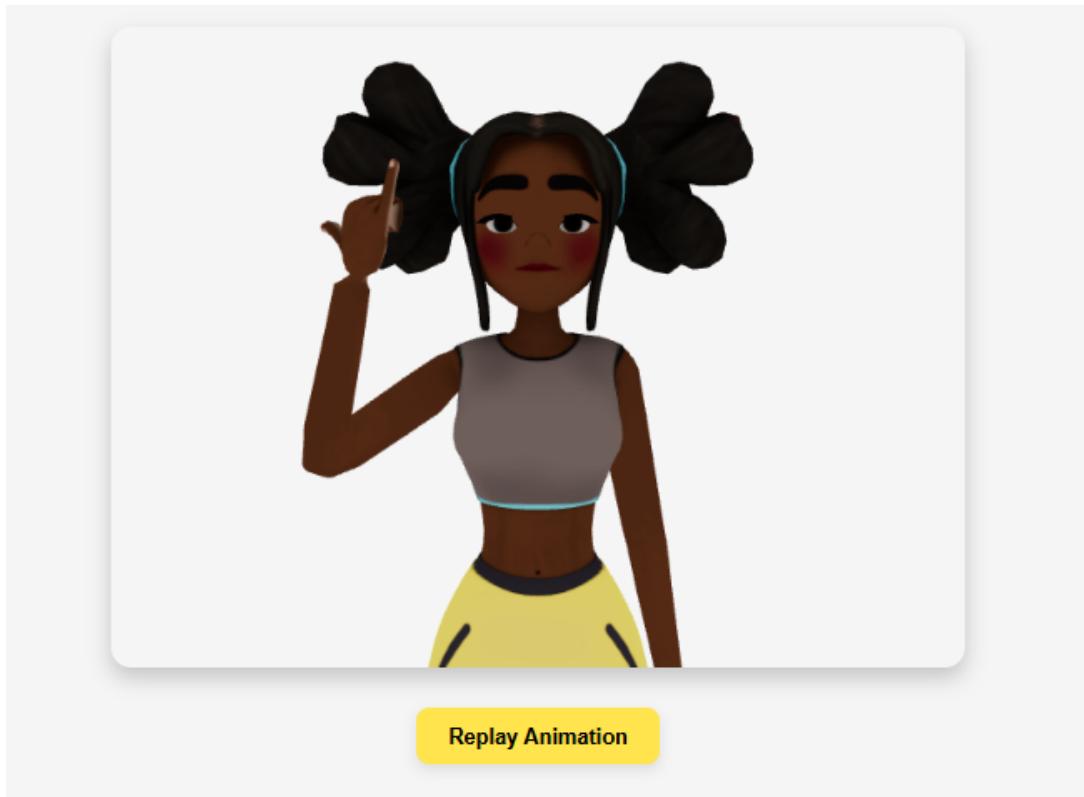


Figure 12: Sign animation

4. Replay the animation if necessary and use the memory hints (not in image).
5. Move along the signs using the arrows on the left and right sides of the screen or by going back to the category page and choosing a different sign to learn.
6. At the end of each category there will be a quiz to test how well you have learned the signs. Answer it according to receive a score out of 5.

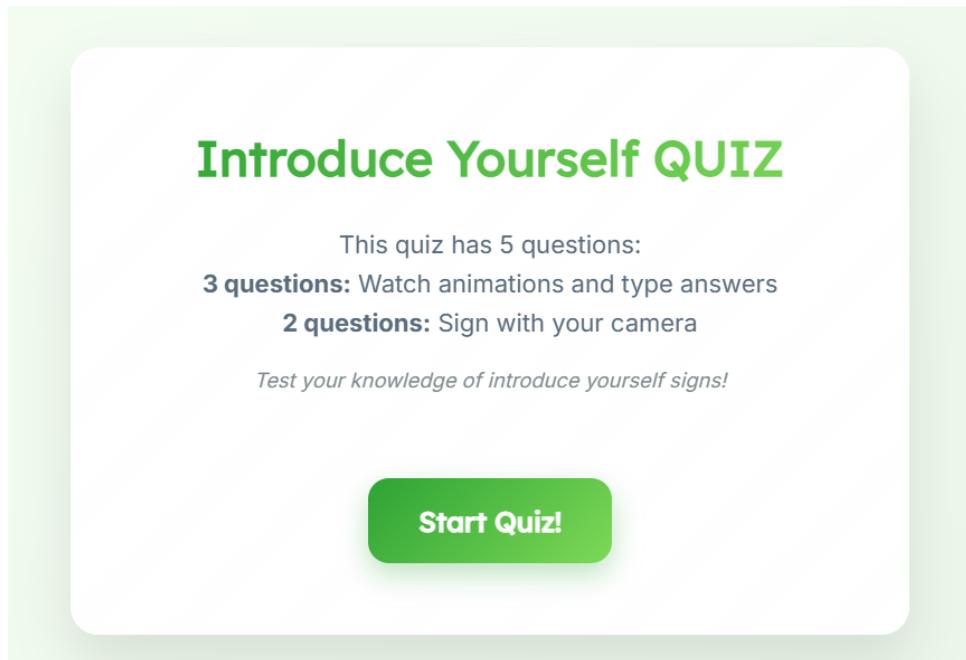


Figure 13: Quiz Start

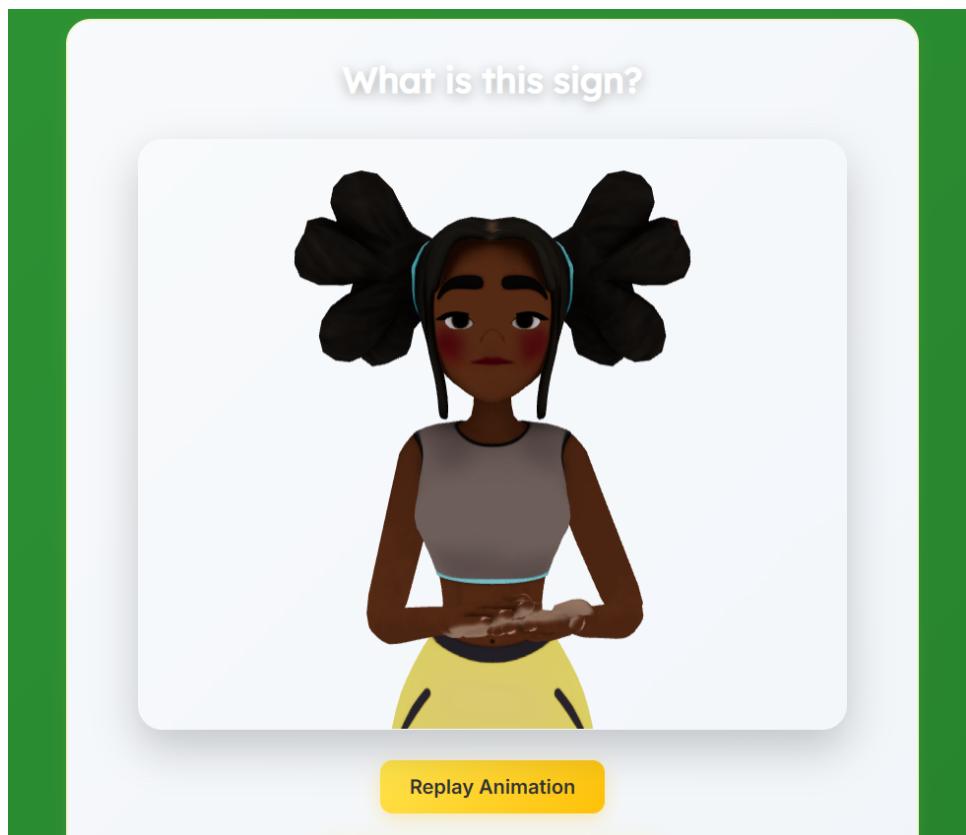


Figure 14: Quiz

7. Input the correct sign when the questions come up.

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8. Some questions require camera input, so allow permissions as mentioned in the Gesture Recognition section (4.4) of this manual.



Figure 15: Quiz Camera Input

5 Sign Surfers

5.1 Playing The Game

1. Start by going through the Game Guide to know how to play the game.

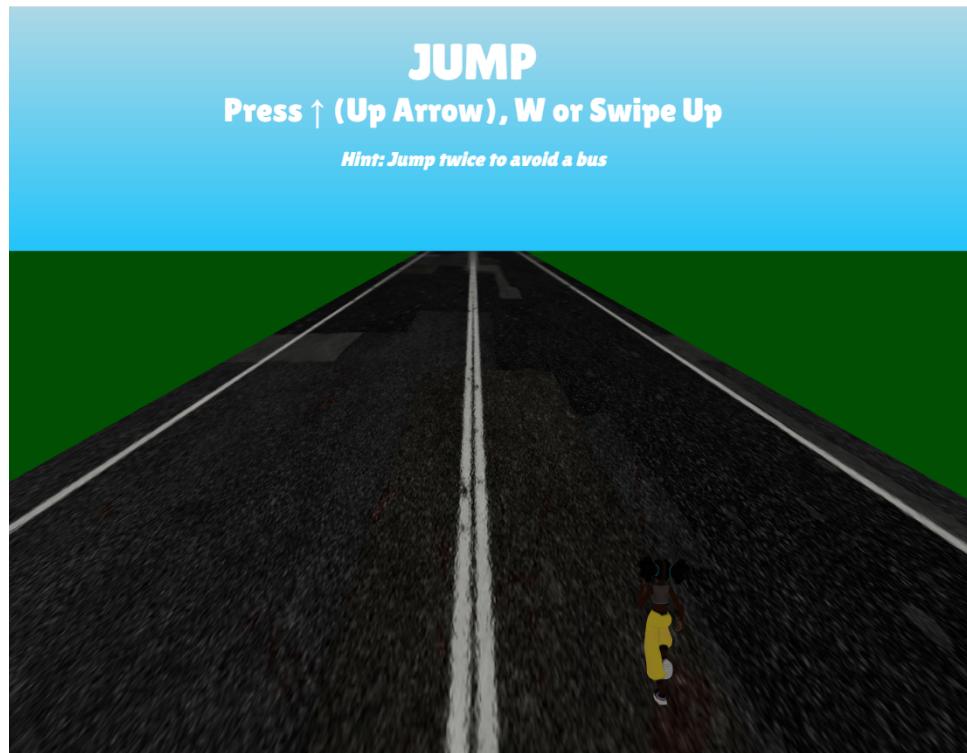


Figure 16: Enter Caption

2. Click on START to begin the game.

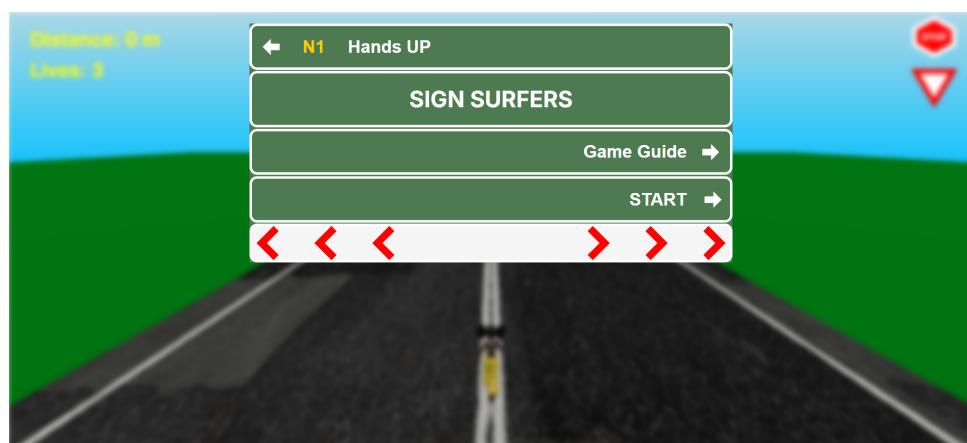


Figure 17: Sign Surfers start screen

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- Play the game and collect sign coins to make the word displayed at the top while avoiding vehicle. be ready to throw up some signs!

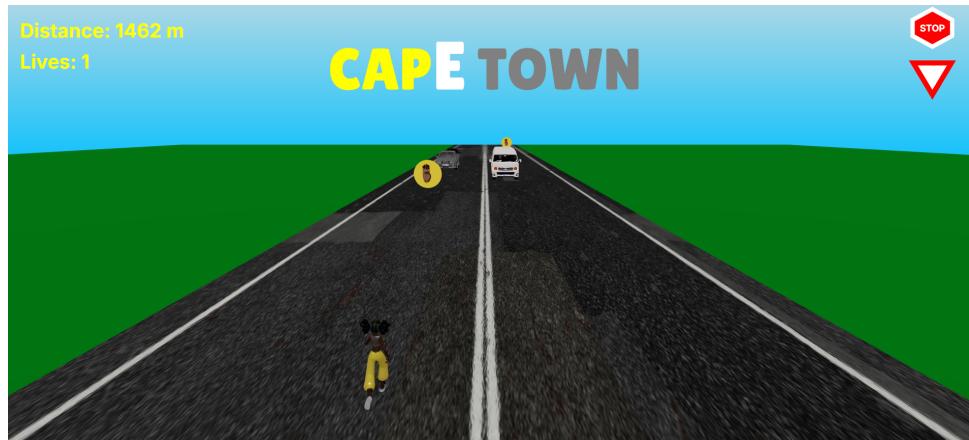


Figure 18: Sign Surfers in action

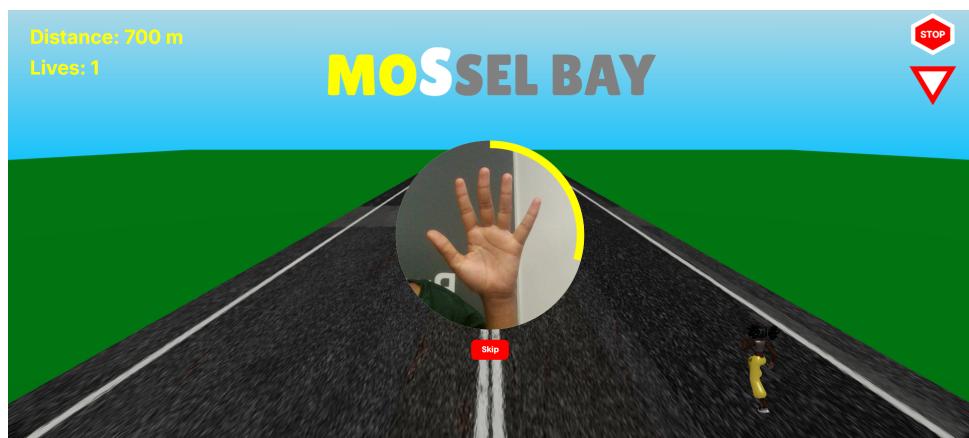


Figure 19: Game Input

- To pause, press the yield sign(upside down triangle) and to stop, press the stop sign on the top right of the screen.



Figure 20: Pause and Stop buttons

6 Sing & Sign

6.1 About Sing & Sign

1. Sing & Sign aims to provide inclusion for children who may not have the privilege of playing and singing nursery rhymes.
2. The Nursery Rhymes are to be accessed by children, with the assistance of an adult for a more conducive experience.

6.2 Using Sing & Sign

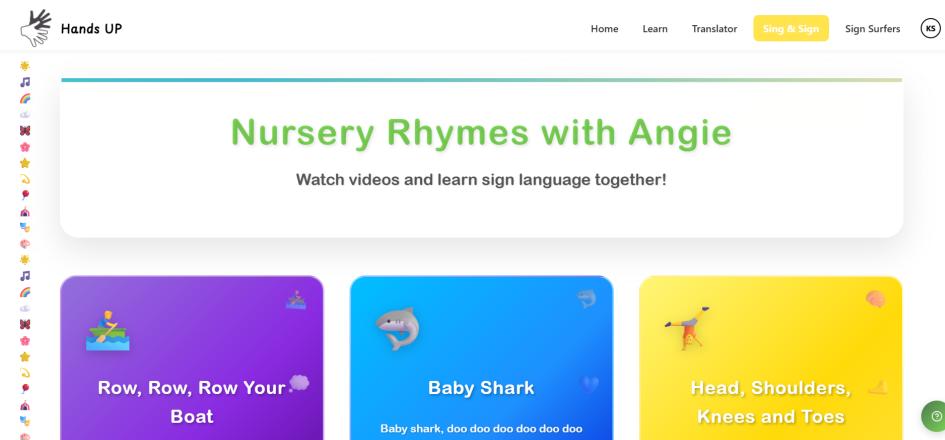


Figure 21: Sing & Sign page

1. Access the Nursery Rhymes pages through the navigation bar.
2. Click **Play Video** and watch Angie sign the song!

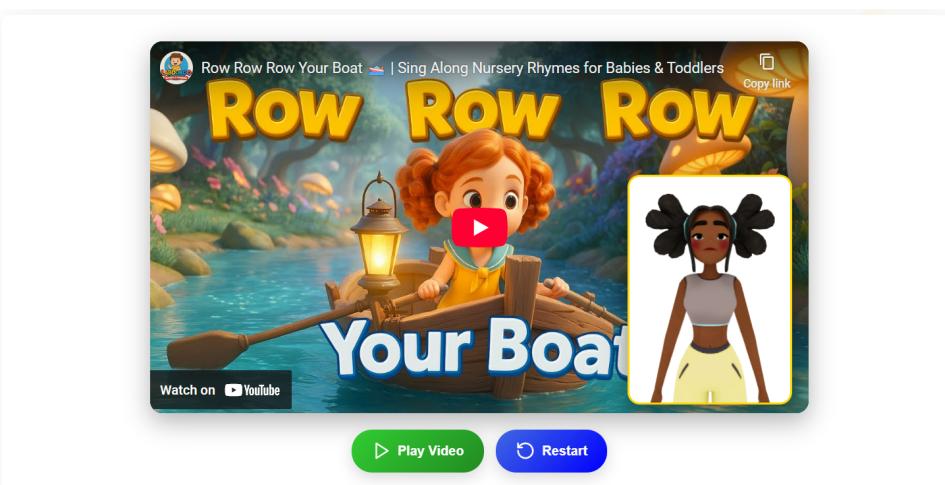


Figure 22: Nursery Rhymes

7 Settings and Customisation

You can update details such as your name, username, email and password. Additionally, you can customise your profile by adding a picture. Here you can also set your preferred hand for the translator.

7.1 Changing Your Details

1. Navigate to your profile by clicking the circle with your initials in the navigation bar. It should look like the picture below.

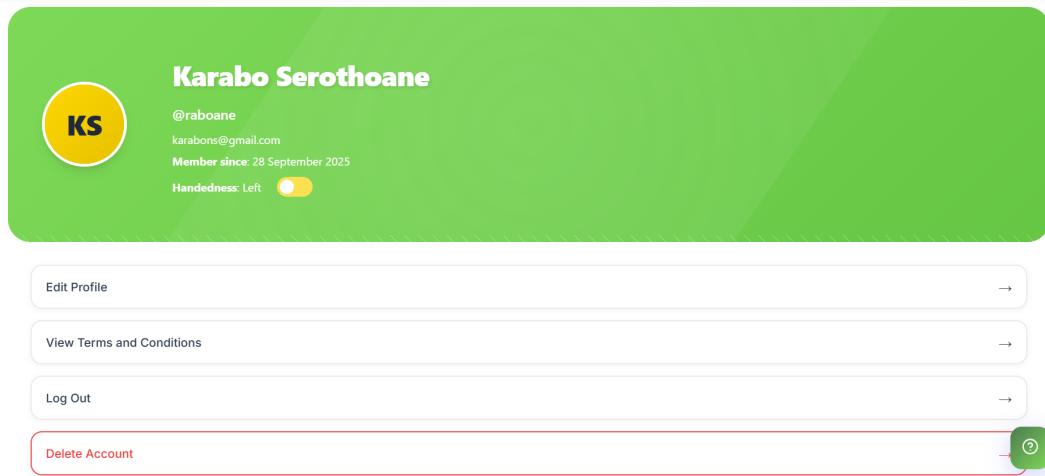


Figure 23: Profile page

2. Click on **Edit Profile** and the popup below will appear. After making your changes, ensure that you press **Save Changes**.

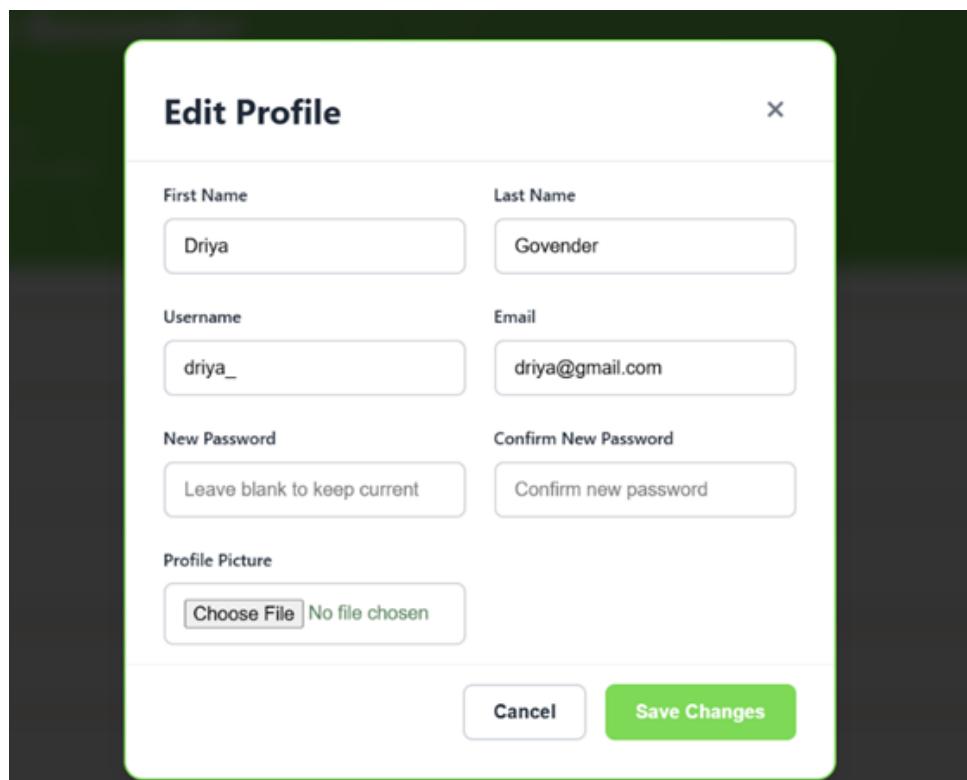


Figure 24: Edit details popup

7.2 Terms And Conditions

On this page you can also read our terms and conditions if you need a refresher.

7.3 Deleting Your Account

To delete your account, click on the **Delete Account** tab. You will be asked to confirm deletion, thereafter you will be redirected to the sign in page.

8 Troubleshooting

8.1 Camera Access

Should you need to grant camera access when the popup has disappeared, follow these steps:

1. In your search bar, click on the circle to the left of the URL



Figure 25: Search bar

2. Here you can click on the camera access toggle and then refresh for your changes to be applied.

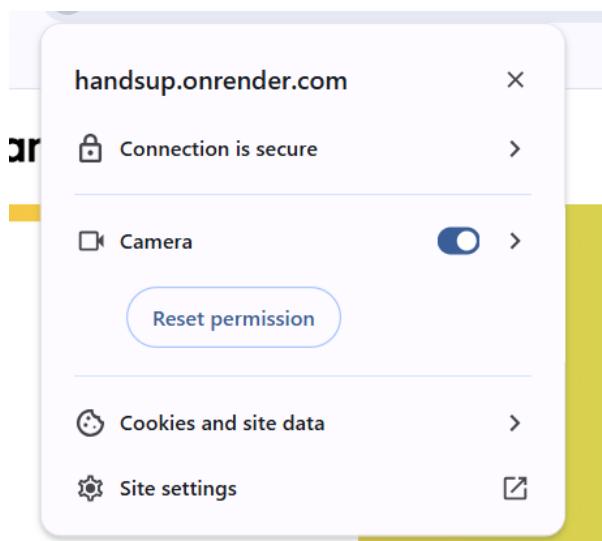


Figure 26: Camera permission toggle

8.2 Text Output To Speech

If you are unable to hear the translation provided in the results section , do the following:

1. Ensure that your device is not on mute. Increase the volume to max to ensure that it is not too low to be heard.
2. Try opening the web app in a different browser. Try Google Chrome, Microsoft Edge and Firefox.

Should you still have issues after trying these, see the next section of this manual.

9 Downloading the App

This can only be done on non IOS/Apple devices.

Ensure that you clear your device cache before attempting these steps. Refer to your device's specifications.

9.1 On Laptop

1. Click on the three vertical dots in the top right of your browser (Preferably Google Chrome as steps may differ in another).
2. Click Cast, save and share.
3. Choose 'Install App', 'Add to Home Screen' or similar from the options. Find the app on your laptop.

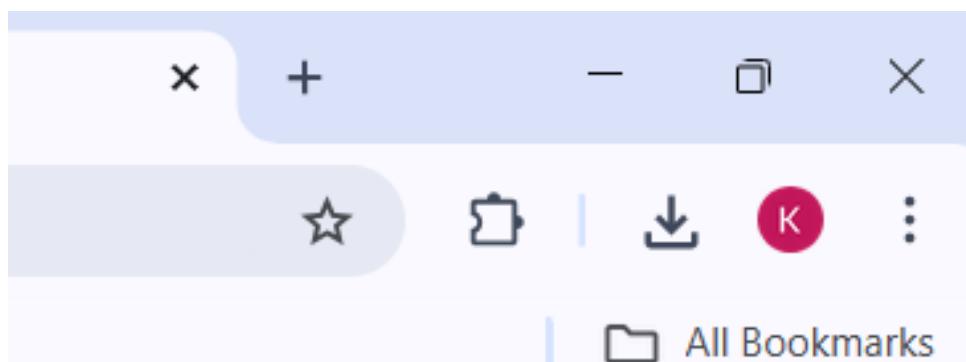


Figure 27: Three dots in browser

9.2 On Mobile

1. Click on the three vertical dots in the top right of your browser (Preferably Google Chrome as steps may differ in another).
2. Click on 'Add to Home Screen' or similar then 'Install'. After a few minutes, find the app on your phone.

10 Contact and Support

10.1 In-app Help Menu

1. For quick issue looks ups, a help menu can be accessed from every page on the app.



Figure 28: Help menu

2. After clicking on the icon, the popup below will appear. Assistance can be found per topic so check the one that you are interested in. You can also use the search bar to find what you are looking for.

In the Help Center you can also find FAQs.

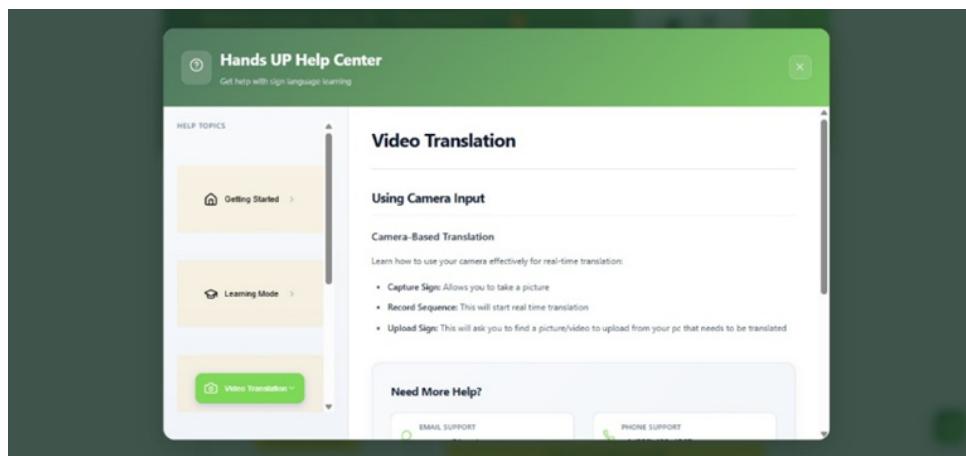


Figure 29: Help menu popup

10.2 Additional Support

If this manual and the help menu do not assist in fixing any issue you have or you would like to ask about something else, please contact us here:

tmkdt.cos301@gmail.com or
Driya Govender: 071 613 4265