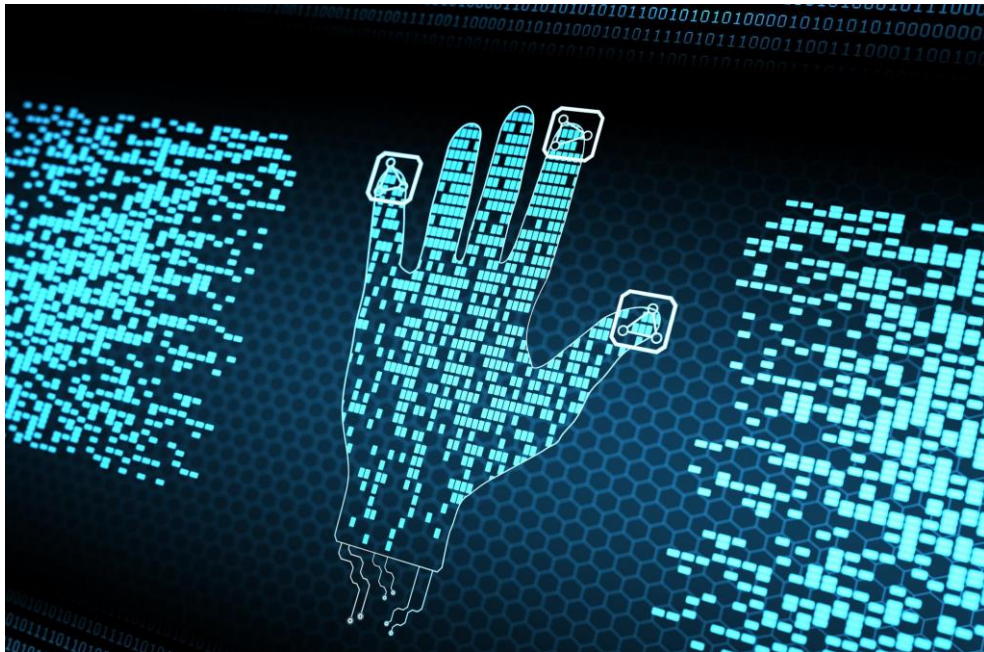


# MILO

## Motion Input for Language and Operation



**This is MILO!**

**An easy way to record hand gestures and recognize them!**

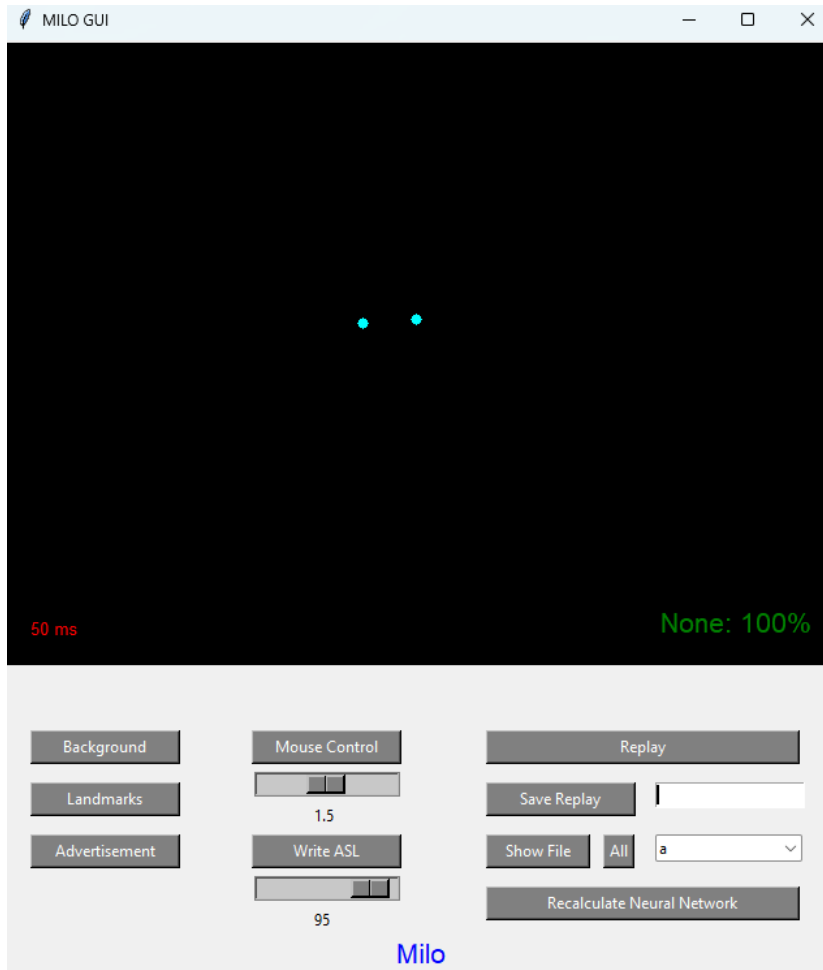
**You can control your mouse and type with specific hand motions.**

# MILO

## Tracks hands and eyes to look for gestures

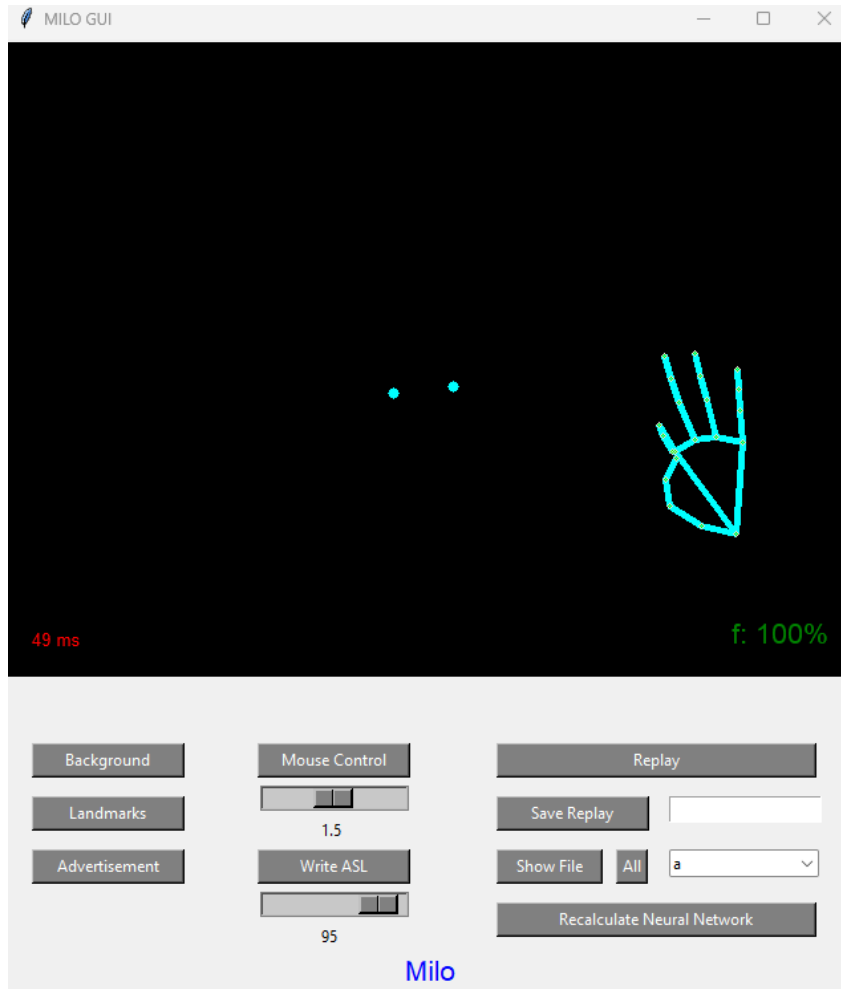
Milo has been trained to recognize the ASL Alphabet.

How confident it is in the gesture

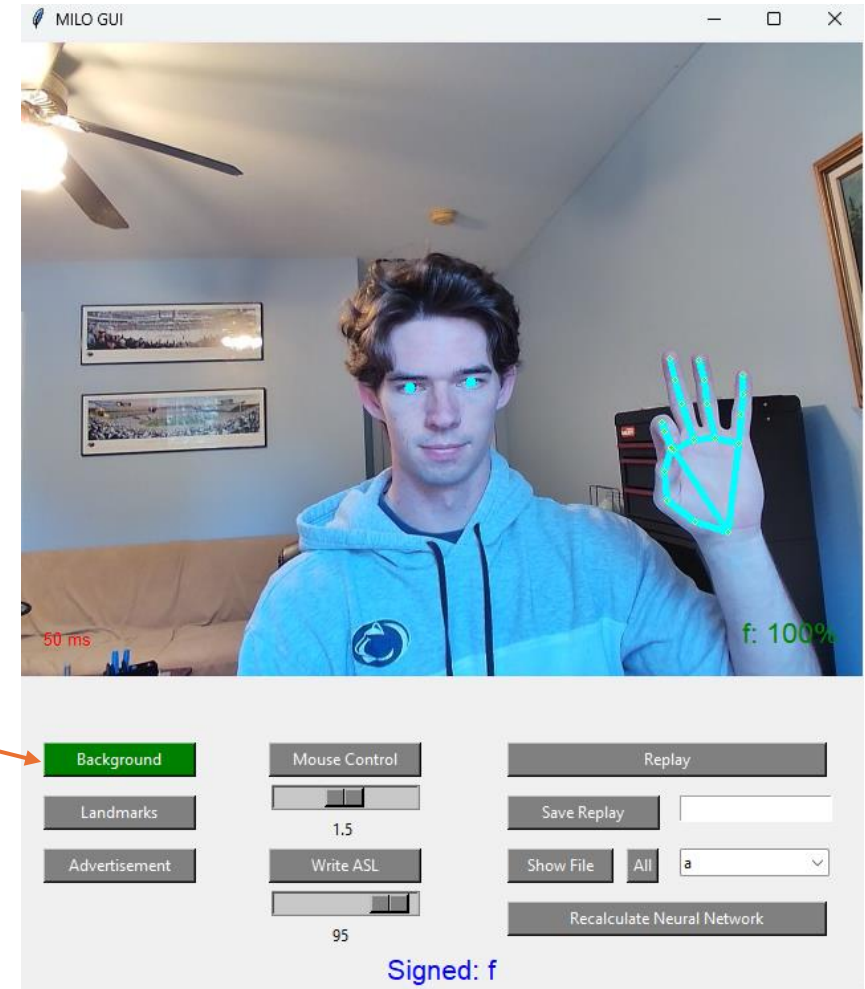


# MILO

## Background Button



Toggle between showing and hiding your background



# MILO

## Landmark Button

The screenshot displays the MILO GUI interface. At the top, there are two columns of red text listing hand joint coordinates. The left column lists coordinates for the left hand (Wrist, Thumb, Index, Middle, Ring, Pinky), and the right column lists coordinates for the right hand. Below this, a central area shows a cyan hand outline and a cluster of blue face landmarks. To the left of the hand outline, green text shows the top 5 MILO guesses from the neural network. Below the hand outline, red text indicates the nose position. At the bottom, a control panel includes buttons for 'Background', 'Landmarks', and 'Advertisement', a 'Mouse Control' slider set to 1.5, a 'Write ASL' slider set to 95, a 'Replay' section with 'Save Replay' and 'Show File' buttons, and a 'Recalculate Neural Network' button. A blue caption 'Displaying key points and data' is at the bottom center.

Position of left-hand features

Position of right-hand features

Top 5 MILO guesses from the neural network

Nose position

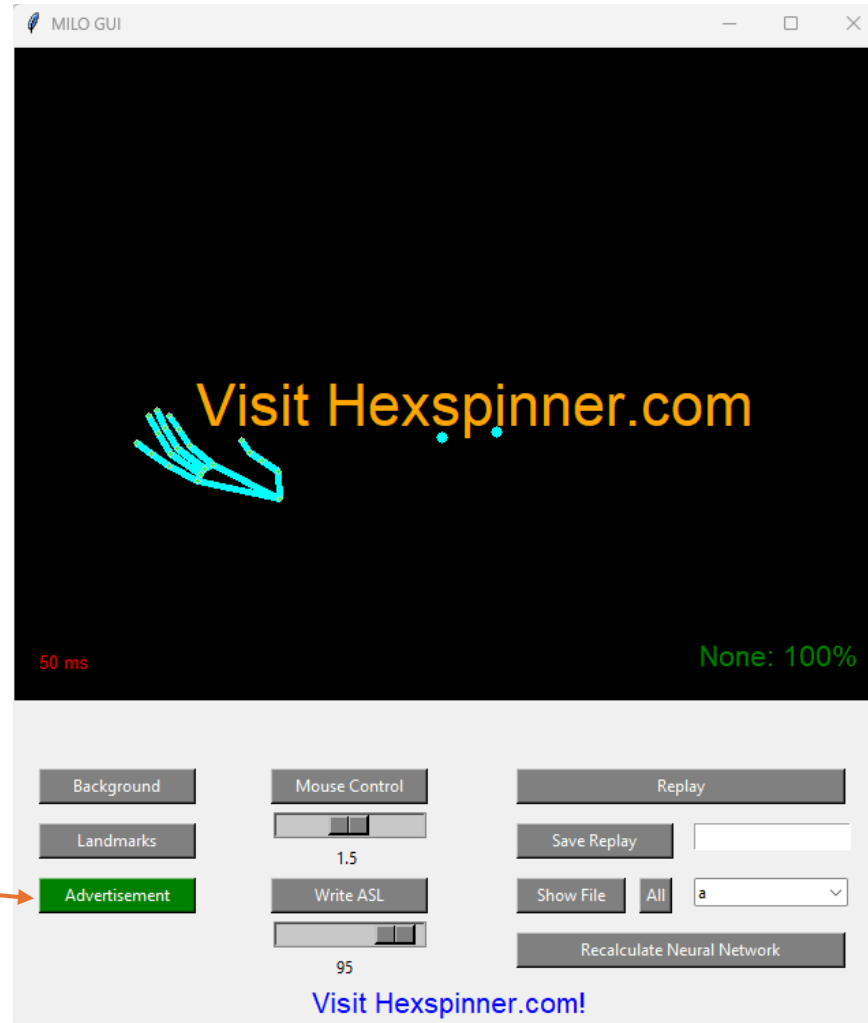
Additional face landmarks displayed

Toggle on additional info

Displaying key points and data

# MILO

## Advertisement Button



Fidget Toy Advertisement



# MILO

## Mouse Control Button

You can control the computer mouse with hand motion. See next slides for mouse control instructions.



Toggle mouse control

Slider for mouse sensitivity

[See instuctions on mouse control](#)

# MILO

## Mouse Control Instructions



MILO GUI

50 ms

None: 100%

Background

Landmarks

Advertisement

Mouse Control

1.5

Write ASL

99

Replay

Save Replay

None

Show File

All

a

Recalculate Neural Network

See instructions on mouse control

### Control the computer mouse with your hands!

- Use your left hand to toggle between: Off, Mode 1, and Mode 2.
- Use your right hand to move mouse and left/right/middle click

### Mode 1 (Direct control)

Mouse directly follows hand:

- Left pinky down
- Left index finger up
- Right hand open

### Mode 2 (Proportional Control)

Mouse movement changes by how far you are from the start position:

- Left pinky down
- Left index finger up
- Left middle finger up
- Right hand open



MILO GUI

49 ms

None: 100%

Background

Landmarks

Advertisement

Mouse Control

1.5

Write ASL

99

Replay

Save Replay

None

Show File

All

a

Recalculate Neural Network

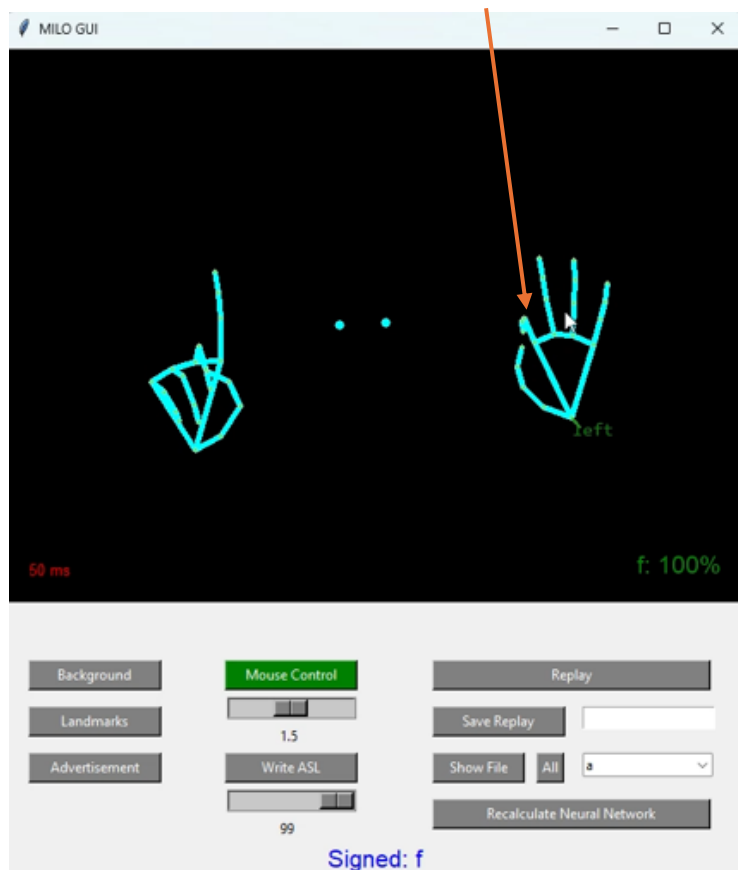
See instructions on mouse control

# MILO

## Mouse Control Instructions

Use your right hand to left, right, or middle click the mouse. Left hand can be in either mode 1 or mode 2.

Left click: Right index finger down



The screenshot shows the MILO GUI interface. The top window displays two hand gestures: a left hand on the left and a right hand on the right. An orange arrow points to the right index finger of the right hand, which is labeled 'left' in green. The bottom panel shows the 'Mouse Control' tab selected, with a slider set to 1.5. The 'Signed: f' indicator is visible at the bottom.

50 ms f: 100%

Background Landmarks Advertisement

Mouse Control 1.5 Write ASL 99

Replay Save Replay Show File All Recalculate Neural Network

Signed: f

Right click: Right middle finger down



The screenshot shows the MILO GUI interface. The top window displays two hand gestures: a left hand on the left and a right hand on the right. An orange arrow points to the right middle finger of the right hand, which is labeled 'right' in green. The bottom panel shows the 'Mouse Control' tab selected, with a slider set to 1.5. The 'Signed: f' indicator is visible at the bottom.

50 ms f: 67%

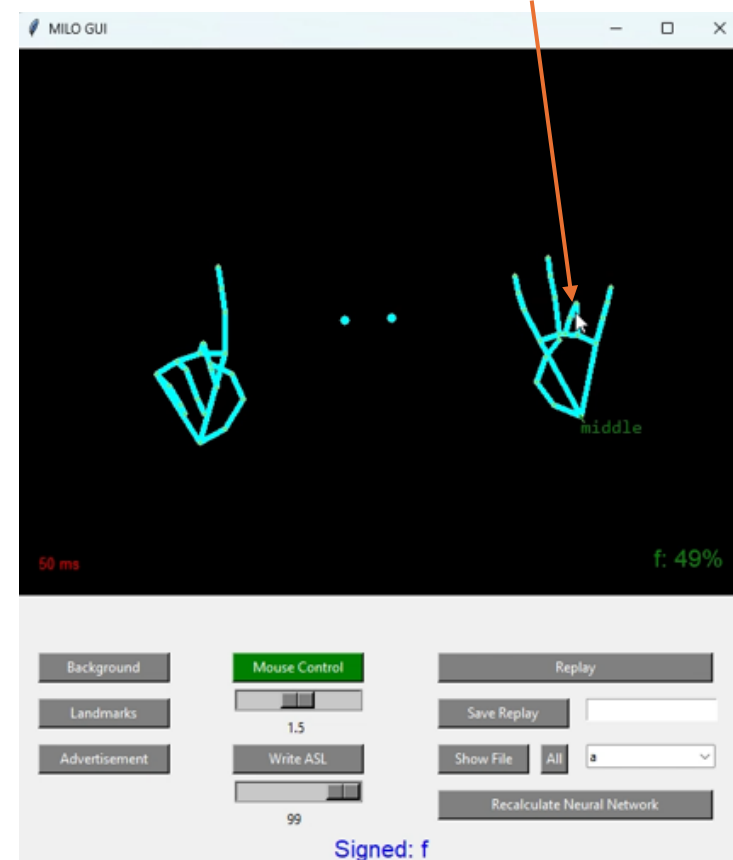
Background Landmarks Advertisement

Mouse Control 1.5 Write ASL 95

Replay Save Replay Show File All Recalculate Neural Network

Signed: f

Middle click: Right ring finger down



The screenshot shows the MILO GUI interface. The top window displays two hand gestures: a left hand on the left and a right hand on the right. An orange arrow points to the right ring finger of the right hand, which is labeled 'middle' in green. The bottom panel shows the 'Mouse Control' tab selected, with a slider set to 1.5. The 'Signed: f' indicator is visible at the bottom.

50 ms f: 49%

Background Landmarks Advertisement

Mouse Control 1.5 Write ASL 99

Replay Save Replay Show File All Recalculate Neural Network

Signed: f

# MILO

## Write ASL Button

You can type with MILO using ASL!

The typed value will appear on screen as well.

Will type the letter like if you were using your keyboard

Confidence %

Toggle Write ASL

Minimum confidence required to write the reading

The screenshot displays the MILO GUI interface. At the top, a window titled 'MILO GUI' shows a dark background with a green ASL hand sign. A green letter 'a' is positioned above the hand. Below the hand, the text '50 ms' is shown in red, and 'a: 100%' is shown in green. At the bottom of the GUI, there are several control panels: 'Background', 'Landmarks', 'Advertisement', 'Mouse Control' (with a slider set to 1.5), 'Write ASL' (a green button), and a slider set to 95. To the right of these panels are 'Replay', 'Save Replay', 'Show File' (set to 'All'), and 'Recalculate Neural Network'. Below the 'Write ASL' button, the text 'Signed: a' is displayed. On the right side of the screenshot, a browser window titled 'a' is open, showing the letter 'a' in the address bar. An orange arrow points from the 'a' in the browser to the 'a' in the MILO GUI. Another orange arrow points from the 'a: 100%' text in the MILO GUI to the 'Confidence %' label on the right. A third orange arrow points from the 'Write ASL' button to the 'Toggle Write ASL' label on the left. A fourth orange arrow points from the slider set to 95 to the 'Minimum confidence required to write the reading' label on the left.

Ln 1, Col 2 | 1 character | 100%

# MILO

## Replay Button

Replay 30 seconds worth of saved motion

The screenshot shows the MILO GUI interface. At the top is a large black video player area. Below it is a green timeline bar with the following text: "50 ms", "Start Frame: 0", "Frame: 36", "End Frame: 599", and "None: 100%". Below the timeline is a control panel with several buttons and sliders. The "Replay" button is highlighted in green. Other buttons include "Background", "Landmarks", "Advertisement", "Mouse Control", "Write ASL", "Save Replay", "Show File", "All", and "Recalculate Neural Network". There are also two sliders, one with the value "1.5" and another with "95".

Annotations with orange arrows point to the following elements:

- Set start frame:** Points to the "Start Frame: 0" text on the timeline.
- Current frame being played:** Points to the "Frame: 36" text on the timeline.
- Set end frame:** Points to the "End Frame: 599" text on the timeline.
- Toggle Replay:** Points to the green "Replay" button in the control panel.

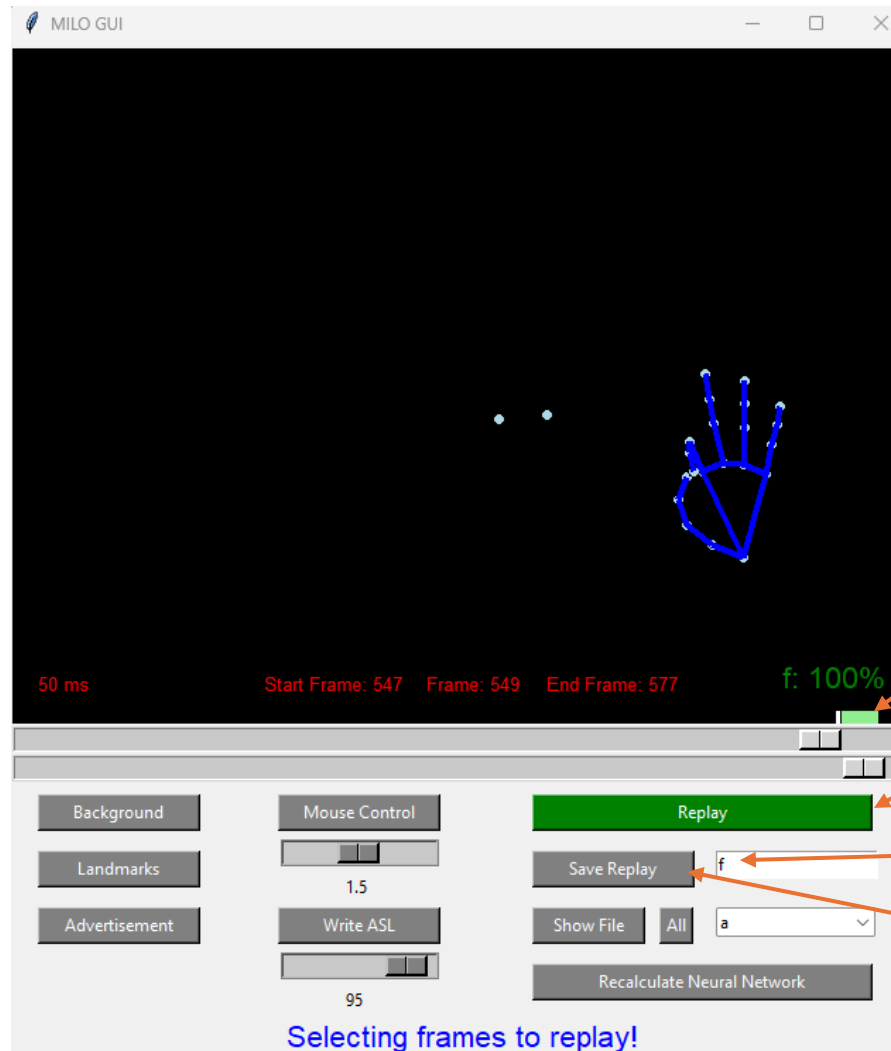
Additional annotations include:

- Replay 30 seconds worth of saved motion:** Located to the left of the video player.
- Selecting frames to replay!:** Located at the bottom center of the control panel.

# MILO

## Save Replay Button

Save a 1.5 second gesture



Must be 31 frames (bar turns light green if data is savable)

Replay must be selected

Name the gesture

Hit save replay if all other criteria on this page is met.

# MILO

## Show File Button

Replay a previously saved gesture



Replay must be selected

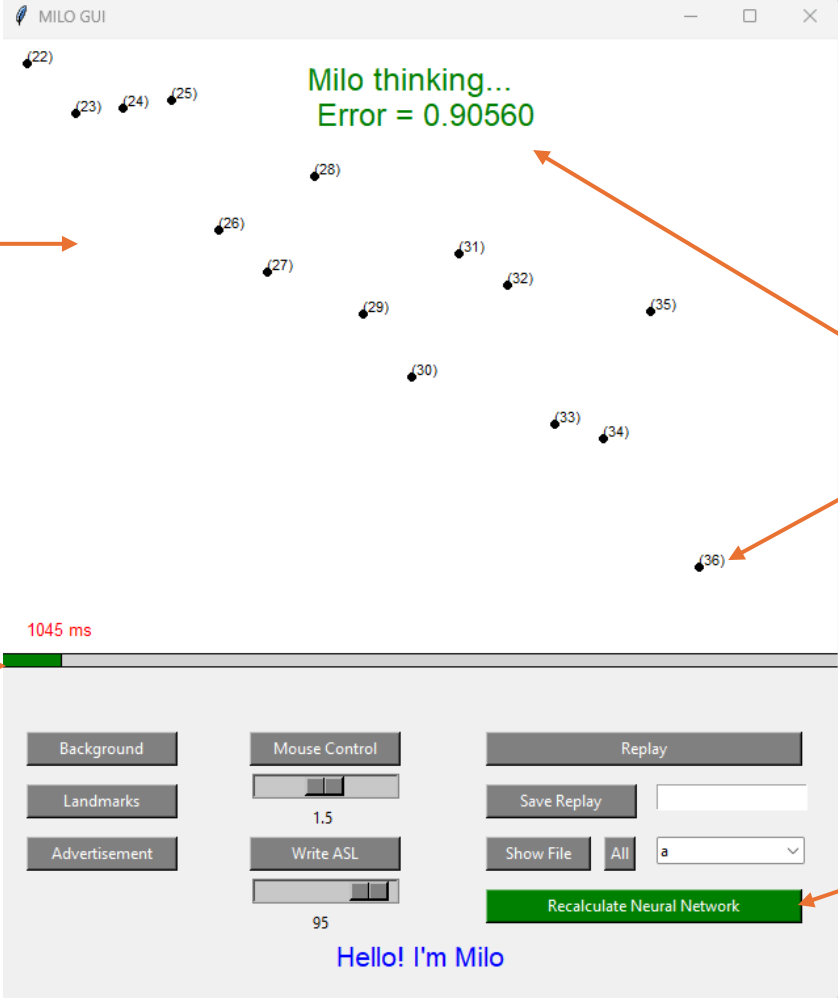
The All button displays all saved gesture iterations

Select a gesture from the drop down

Select the Show File button to replay the selected gesture

# MILO

## Recalculate Neural Network Button



The Recalculate Neural Network Button will take some time to run. Use this button after you save new gestures.

Neural network error plot

Current error

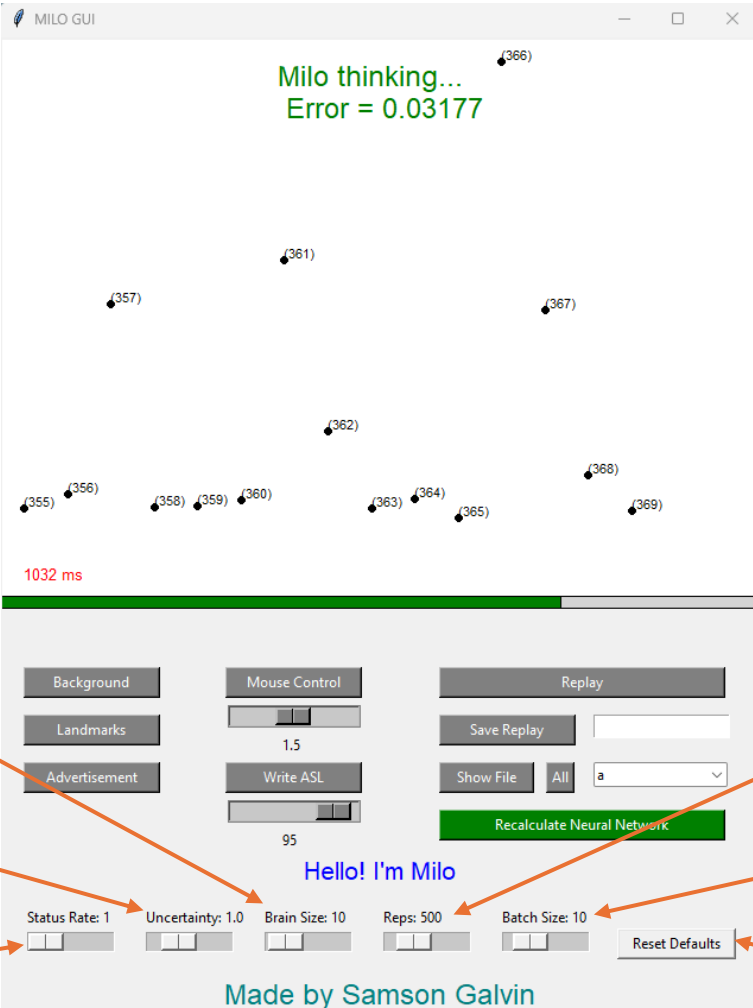
Progress bar

Recalculate Neural Network Button

# MILO

## Recalculate Neural Network Button

If you extend the bottom of the GUI, there are additional Neural Network Settings.



Increases the neural network size. Larger is more precise but takes longer to run.

Larger Uncertainty will make the neural network less confident in its guesses.

Status rate is how often your plot will update.

**TIP!**  
The Uncertainty slider will affect the current results, not just the recalculation of the neural network. If you want more confidence, slide it to the left and you will see more gestures reading 100%.

Larger Reps will take longer to run, but will make the neural network more accurate

Larger Batch Size will run faster, but will likely be less precise and accurate

Resets the Neural Network settings back to default values

# MILO

## Thanks for checking out my project!

Note: additional training may be required to get MILO to accurately recognize your gestures.

If something isn't reading, just record it and recalculate the neural network! Good Luck!

