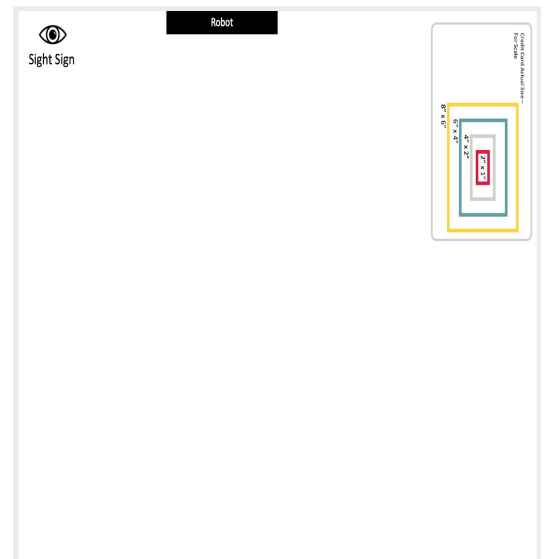


# Sight Sign

Instruction Manual  
V1.0.0 May 2020



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## Safety Instruction

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1. Please **don't put your hands between the arms** when the uArm is moving.
2. Please use the **official power supply** for safety reasons.
3. Please **clear a space for uArm**, in case of knocking down anything.

## Introduction

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### 1. What is Sight Sign?

Sight Sign is a Windows 10 application that utilizes a Tobii 4C eye tracker, and UArm Swift robotic arm to translate an digital signature into a physical signature. In other words, it will bring what's on the screen to life! The Sight Sign application was an initiative from Team Sight Sign at Microsoft, and Team Gleason to provide individuals with ALS and other motor neuron diseases with the ability to sign any physical material. The project was then handed to a team of 4 software engineering students attending Washington State University who were responsible for making the application more user-friendly, and ready for the world.

The Sight Sign application enables users to create their own signatures on the ink canvas, and when hooked up to a robot via USB, it can instruct the robot to reproduce the signature writing in a variety of different sizes. In addition the entire application is “eye gaze” friendly, which means users can control the robot with their eyes (or mouse). The application also provides users with the ability to adjust the size of the signature produced by the robot, as well as save and load ink signatures with their eyes.

### 2. Hardware



#### UArm Swift Pro

<https://store.ufactory.cc/products/uarm>

The UArm Swift Pro is a robotic arm made by the company UFactory. The arm is very smart and capable of performing many different tasks, with a variety of different parts. In our application the only part we will need is called the **UArm Pen Holder**.

#### Pen Holder



## Tobii 4C Eye Tracker

<https://gaming.tobii.com/tobii-eye-tracker-4c/>

The Tobii 4C Eye Tracker is currently the world's most advanced eye tracker with head tracking support. This eye tracking technology is widely used for gaming, streaming, and Windows features and applications. Currently the Tobii 4C is the only eye tracker that is supported and tested with Sight Sign. The Sight Sign application supports eye gaze functionality, and allows for eye tracking navigation. Different parts of the application such as tracing images, importing images, or calibrating the robot are not eye tracker compatible.




## Installation

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### 1. Download Sight Sign

Sight Sign is a Windows 10 application, so you **must have** Windows 10 installed.

1. Go to the **Start**  button, and then from the apps list select **Microsoft Store**.
2. Visit the **Apps** tab in the Microsoft Store.
3. In the **Search bar** search for **Sight Sign**.
4. Select Sight Sign, and then select **Get** to start your download. Make sure you are logged in to your **Microsoft account** to ensure success.

## Setup

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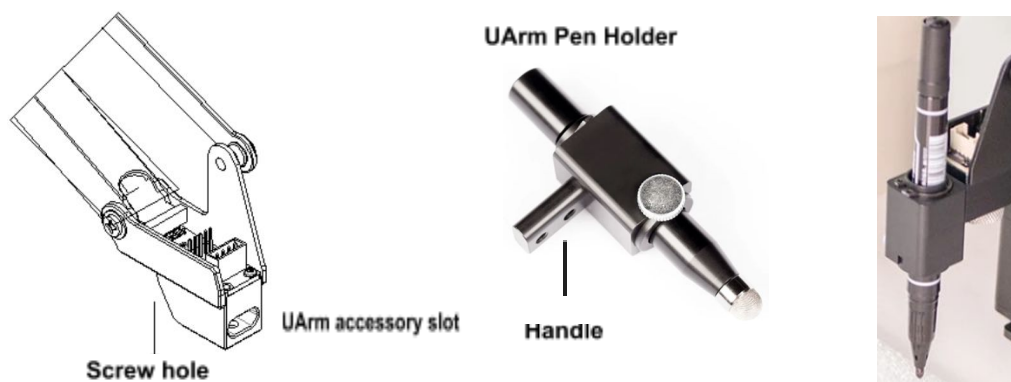
### 1. UArm Swift Pro

In this section we will be explaining how to setup the UArm Swift Pro. Depending on the UArm Swift Pro package you buy, you might have a different variety of UArm accessories. For this setup **you will need** have the following:

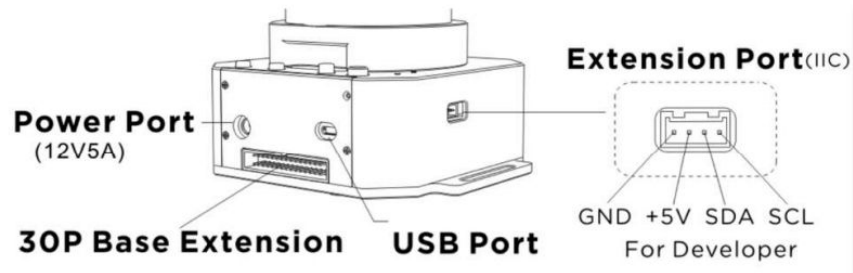
- UArm Swift Pro
- Official UArm Swift power supply
- UArm Pen Holder

**Steps:**

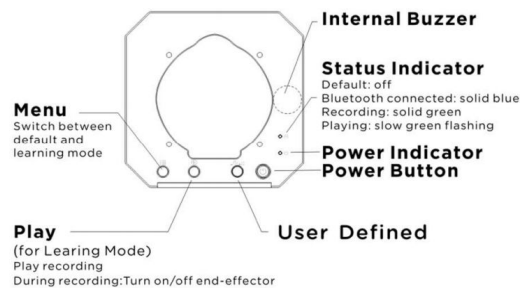
1. Unpack the UArm and place it on a **flat surface**, with the base **completely** on the surface, near an outlet.
  - i. The surface **must be a minimum** 12" x 12".
2. Be sure to **clear the surface** of any items that may potentially be knocked over, or get in the way of motion.
3. Unpack and attach the **UArm Pen Holder** into the **UArm accessory slot**.
  - i. Insert the **Pen Holder Handle** into the Uarm accessory slot.
  - ii. Screw the placement screw into the screw hole to secure the Pen Holder in place.



4. Plug the UArm Swift power adapter into the wall outlet, and the other end into the Power Port
5. Plug the Micro USB adapter into the USB Port on the base of the UArm Swift, and the USB end into your computer.



6. Turn on the UArm Swift by pressing down the Power button. Also, be sure that the User Defined button is up, and not pressed down (indicates USB).

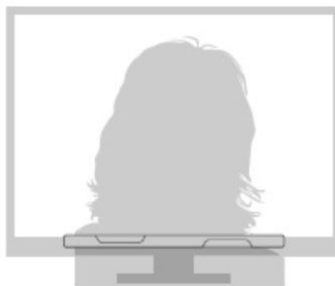


## 2. Tobii 4C Eye Tracker

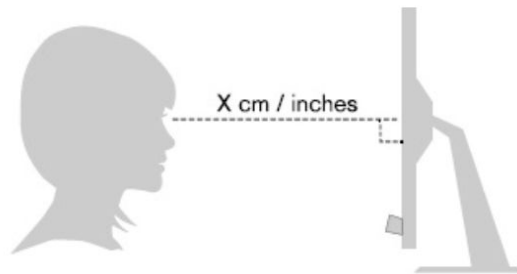
In this section we will be explaining how to setup the Tobii 4C Eye Tracker with a Windows 10 computer. In order for the eye tracker to function properly, you will need to ensure the lighting in the room is bright enough with minimum glare on the eye tracker.

### Steps:

1. Connect the eye tracker to your computer running **Windows 10** via the USB port.
2. [Click here](#) or type in the link found in **appendix A** to install the core software and follow the get started guide.
3. Mount eye tracker onto the **bottom of the screen frame**.



4. Ensure you are placed **50-95 cm** from eye tracker and at a proper height for your eyes to be detected



### 3. Sight Sign

In this section we will be explaining how to set up the Sight Sign software onto a Windows 10 computer.

#### Steps:

1. Download and install the Sight Sign software. Detailed instructions can be found in the **installation** section.
2. Open software and ensure the robot and eye tracker are connected via USB.
3. Ensure the “connect to robot” setting is clicked (**edit->settings**) and that the robot button in the bottom right corner has a check mark.

## Usage

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### 1. Stamp

Stamp does not require the user to trace the translucent yellow dot with their eyes to write the entire signature. Just look at the large, translucent circle at the start of the signature, and the entire signature will be traced without any further user input.

### 2. Write



Write will allow the user to actually trace the signature by following a translucent yellow dot with your eyes. The circle will stop after each stroke in the signature. Look away and then look back at the circle to make the circle advance to the next stroke. The robot arm will be replicating the trace of the circle. Once the signature has been completely signed, the robot will stop and the application will return to the home screen.

### 3. Area

**Important:** We only support 4 drawing zone sizes. Seen on Calibration Paper

The Area button allows you to change the scale of the signature that you want to write. This way you can write your signature on something as small as an index Card, or as big as a football jersey.

The current drawing zone your signature will be written within will be indicated by the colored border around the edge of the application window (The default is Yellow). **The colors, and their corresponding zones will be displayed on the Calibration Paper. This way you can easily tell how big your signature will be.**

#### 3.1. Increase Drawing Zone ( + )

Clicking the ( + ) (plus) button will increase the drawing zone of the Signature. The current drawing zone you are on will be represented by the color of the border around the application. You can also determine the drawing zone you are using by the dimensions displayed in the top right corner.

#### 3.2. Decrease Drawing Zone ( - )

Clicking the ( - ) (minus) button will decrease the drawing zone of the Signature. The current drawing zone you are on will be represented by the color of the border around the application. You can also determine the drawing zone you are using by the dimensions displayed in the top right corner.

#### 3.3. Draw

Clicking the Draw button will make the UArm Swift draw the four corner of The currently selected draw zone.

**Important:** Make sure you place the robot on the calibration paper.

1. **Use this feature when you want to determine where to place the object you are trying to sign.**
2. If the object you want to sign covers the entire drawing zone then you will have 100% certainty of signing the object correctly.

## 4. Edit

### 3.1. Draw New Signature

Create new signatures by drawing in the ink canvas located at the center of the screen. Draw by using either **a touch screen**, or by **mouse**.

### 3.2. Clear

Clear signatures and drawings in the ink canvas by **gazing at the Clear button**. This will then create a blank ink canvas that you can **load, or draw signatures** into.

### 3.4. Save Signatures

Save the current signature on the ink canvas into the signature bank by **gazing at the Save button**. When the buttons progress indicator has completed the current signature will be saved to the **Signature Bank** where it will be accessible by **loading a signature**.

**Warning:** only the 4 most recently saved signatures will be loadable from the Signature Bank.

### 3.5. Load Old Signatures from Signature Bank

Load in previously saved signatures by **gazing at the Load button**. A **Signature Bank** will then appear with thumbnails the 4 most recently saved signatures. To select one simply **gaze at the signature image**. The selected signature will then be loaded onto the ink canvas, and is ready to be signed by the robot.

**Warning:** only the 4 most recently saved signatures will be loadable from the Signature Bank.

### 3.6. Import Images to Trace, or Signatures from your Computer

**Warning:** The Import Button is gaze clickable, but it will open a file finder that is does not have eye-tracker support

#### 3.6.1 Import A Signature from your Computer

Click the import button in the **top right corner** of the application in the Edit Screen. A file finder will pop up; navigate to the signature file you want to import, select it, then click Open.

**Important:** The signature file **MUST** be of type **.isf**.

#### 3.6.2 Import an Image to Trace

Click the import button in the **top right corner** of the application in the Edit Screen. A file finder will pop up; navigate to the image file you want to import for tracing, select it, then click Open. The image will be loaded into the background of the canvas for you to trace.

**Important:** We only support **.jpg**, **.jpeg**, and **.png** image types.

## 5. Robot Status

The status of the robot (whether the application detects the UArm Swift Pro or not) is shown by the **Robot Settings Button** located in the bottom right corner of the screen. The Robot Button has two status indications that can be seen from looking at it.

#### 1. UArm Swift is NOT Detected

If you see an “**X**” in the robot status button, the uArm is **not** connected to the software. If this is the case you **will not** be able to write any signatures with the UArm Swift.

#### 2. UArm Swift IS Detected

If you see a check mark “**✓**”, the uArm **is** connected to the software. If this is the case you **will** be able to write any signature with the UArm Swift.

## Calibration

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## 1. Calibrate the UArm Swift

Calibrating the UArm Swift Pro is a **critical step** in the performance of the robot arm being able to produce a signature. Before you can calibrate the robot arm, you **MUST** ensure that the arm **is detected** by the Sight Sign application (see the Usage section, 4 Robot Status).

### Steps: (ensure the robot arm is already set up)

1. Print out the **Calibration Paper** [here](#) or (in **Appendix B**), and place the robot on the indicated “**robot**” marker as precisely as possible.
2. Click the **Area Button** and select **Draw**. The robot will then attempt to draw the corners of the current drawing area. If the robot successfully placed all four corners of the drawing area on the Calibration Paper, then you are ready to go. Otherwise, continue to step 3.
3. Click the **Robot Settings Button** and adjust the height of the robot arm with the **z-up** and **z-down** buttons to raise and lower robot arm. Once the robot arm is at a good height to place a dot on the Calibration Paper, repeat steps 2 and 3 as necessary.

**Warning:** The z-up, z-down buttons are not eye-tracking supported

## Uninstall

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1. Go to Microsoft Start menu - Settings.
2. Open the Apps settings.
3. Find SightSign in the list of Apps and Features.
4. Click Uninstall.

## Appendix

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**Appendix A:**

<https://gaming.tobii.com/getstarted>

**Appendix B:**

[https://drive.google.com/file/d/1MaKuRvffwWN2OAsAYUQjR6Ldsa4npW\\_e/view?usp=sharing](https://drive.google.com/file/d/1MaKuRvffwWN2OAsAYUQjR6Ldsa4npW_e/view?usp=sharing)