

LEVEL OF CONFIDENCE

BY RAFAEL LOZANO-HEMMER



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GENERAL IMPORTANT INFORMATION

This short section must be read for proper operation.

LEVEL OF CONFIDENCE (2015)

BY RAFAEL LOZANO-HEMMER

Technique

Facial-recognition algorithms, computer, screen, webcam.

Description

Level of Confidence features a facial-recognition camera that has been trained with the faces of the 43 disappeared students from Ayotzinapa school in Iguala, Mexico. As a participant stands in front of the camera, the system uses algorithms to find which student's facial features look most like theirs, and provides a percentage or "level of confidence" on the accuracy of the match. However, the piece will always fail to make a positive match because the students can never appear before the camera, having been murdered and burnt. The commemorative aim of the project is to continue relentlessly searching for the missing students, and overlap their features with the public's.

The project software is available to download for free (through the studio's website) so that any university, cultural centre, gallery or museum can set up the piece and re-exhibit it. After downloading the software, an institution only needs to provide a computer, a screen, and a webcam to exhibit the artwork.

The project also exists as an open source software, which can be modified by any programmer with knowledge of OpenFrameworks, so that he or she can make their own version, with different content. For example, someone can edit the algorithms with images of missing and murdered Indigenous women in Canada.

All proceeds from artwork sales are directed to a fund to help the affected community, such as establishing scholarships for new students at the normalista school.

Operation

Please refer to [APPENDIX I - Installation](#) for detailed system information and wiring diagram.

1. Press the power button on the Mac Mini to turn the computer ON. The software should start up on its own after a few minutes.
2. To shut down the artwork, a simple press on the computer's power button for a maximum of one second. This should launch a proper computer and artwork shutdown. That said, in most recent OSX computers, you will need to use the keyboard to manually turn off the computer.

***** The computer could be set with power options in the Operating System to automate the turn On/Off sequences. Another technique would have the monitor's operating hours scheduled automatically *****

General Artwork Behaviours

When a viewer's face is not viewable by the camera the grid of student faces is displayed. The grid is panned over at intervals an individual student's picture will be zoomed in on. Their image will fill the screen for a few seconds and then the image will zoom back out to reveal the full grid and the sequence will repeat until the camera is able to track a viewer's face.

Interacting with the Artwork

When viewers approach the screen the camera will track their face and show a camera view on the lower left hand side of the screen with an added box and white tracking lines. Their faces will then be matched with the student they most closely resemble. The student's photo will appear in the lower right hand side of the screen and information about their match will appear at the top.

Maintenance

Please do not clean the display surfaces with Windex or soap. Use a lint-free cloth and LCD screen liquid cleaner, such as Kensington Screen Guardian found in most computer stores. While cleaning the camera, avoid applying too much pressure onto its surface, otherwise the camera could move on its mounting base and get misaligned or the lens can be rotated and go unfocused.

The camera lens shouldn't be cleaned with the same product: please air an air puffer to remove the dust from the lens, if need be. We recommend cleaning the piece at least every two months.

Placement Instructions

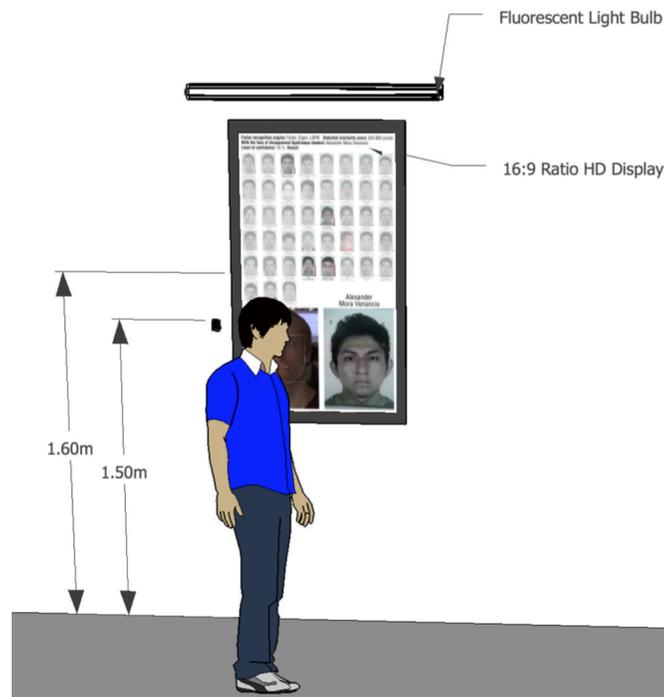
The display for this artwork can be any flatscreen with a native HD resolution of 1920x1080 pixels, hung in a portrait (vertical) orientation. This can be anything from a small 15-inch computer screen to a large LED screen. The centre of the display should be hung 160 cm from the ground.

A small USB webcam should be hung at a height of 150 cm (measured from the centre of the camera), positioned in a vertical orientation. Any USB web camera that works with Skype or other video applications should work with this software (we have successfully tested the following cameras: Logitech C910, Logitech QuickCam Pro 9000, Logitech C930E.)

A diffused light is necessary to illuminate the participant standing in front of the screen, so that the camera can clearly capture the details of their face. Typically, a fluorescent or quartz halogen wash light is hung over the display, on the same wall.

Ideally, the piece is shown with the camera facing a blank wall so that the system can concentrate during facial-recognition, not a window with natural light, or else the sunlight will overpower the camera. This helps the system concentrate the faces research to an area closer to the screen.

Last, an informative text must be placed beside the artwork. The following image illustrates these placement instructions.



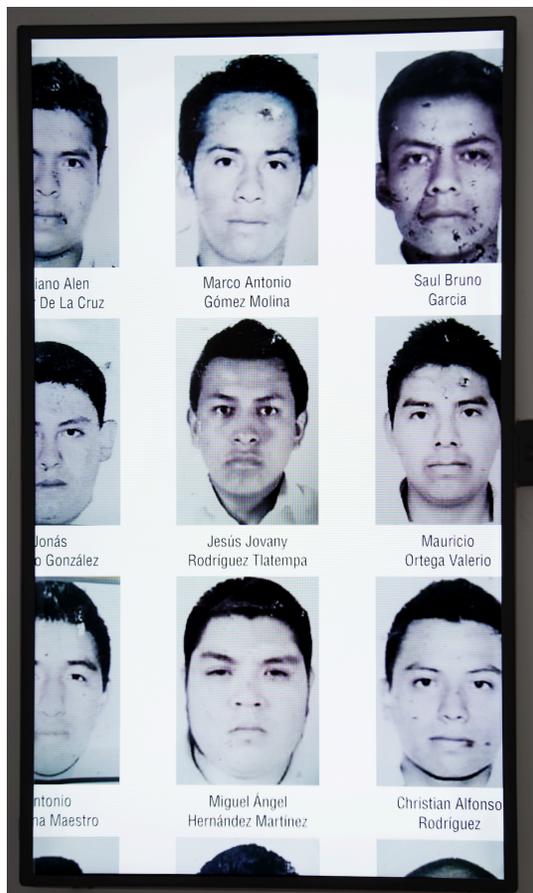
DETAILED TECHNICAL INFORMATION

Normal Software Operation

If the studio has provided the computer then the artwork is set to automatically start when the computer is powered on. If you have instead completed the software install steps detailed in [Installing The Software From the Web](#) to access the piece you will need to manually click the software to start it. We recommend turning off the artwork when you don't plan to use it for a longer period, to extend the lifetime of the components.

When the software starts, the live camera view will be visible for 10 seconds. You can use this time to position and point the camera. After these 10 seconds, the camera view disappears and the artwork will be displayed. If you need more than 10 seconds, simply press the **tab** key on the keyboard and the timer will reset, giving you another 30 seconds.

The following images provide reference images of functional software. The image on the left hand side shows the piece when a face is not being tracked while the image on the right shows the software while a face is being tracked. The third image shows a close up of a tracked face.

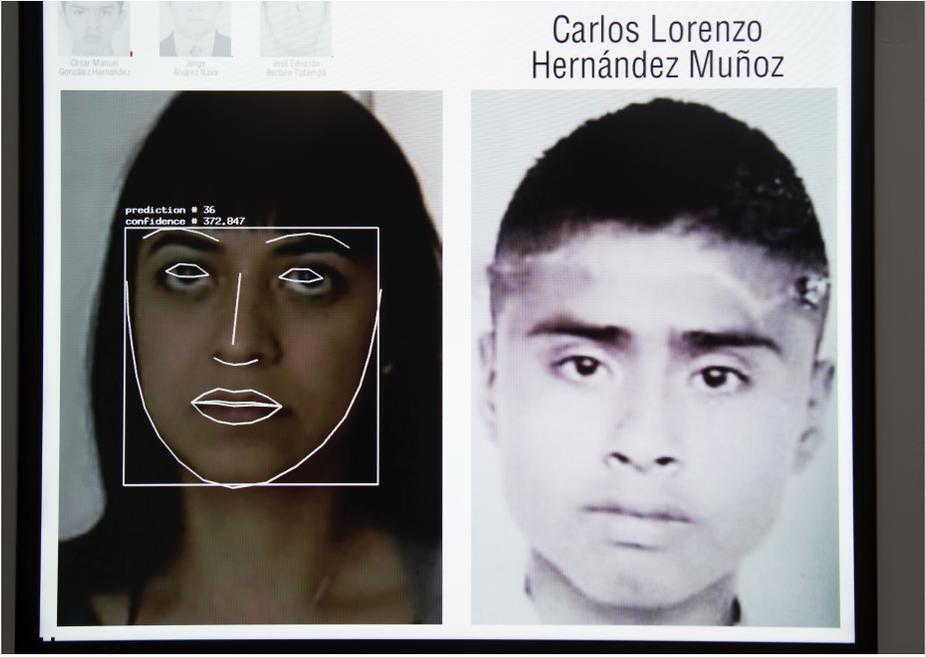


Facial recognition engine: Fisher, Eigen, LBPN **Detected similarity score:** 334.692 points
With the face of disappeared Ayotzinapa student: Alexander Mora Venancio
Level of confidence: 16 % Result:



Alexander Mora Venancio





Manual Software Operation

Each piece of software can be adjusted on site as needed. The section below outlines the name and function of main parameters to configure the application.

The following hotkeys can be used to complete useful actions:

- spacebar** - toggle the application between spanish and english
- g** - show and hide the GUI menu containing sliders for adjustment
- esc** - quit the application
- f** - toggle the application to become fullscreen

Some controls are available to adjust this software. To pull up the GUI for the piece press the **G** key. To exit the menu, simply press the **ESC** key. If settings are changed, press the **G** key again to close the GUI and save the settings. The image on the next page shows the GUI pulled up on the piece.



The following table shows the values you are most likely to need to change. Other GUI settings should not be changed without consulting Antimodular.

Setting	Description
RAW camera	Displays the camera feeds received by the computer. Can be used to confirm that the camera is properly connected.

Remote Access to Artwork's Computer

If you have purchased Level of Confidence from Antimodular Studio, the computer running the artwork has a software installed on it that allows the studio to connect remotely to the artwork. This feature is helpful when you require assistance from the studio, as we can remotely connect to it, do a quick inspection, and do a debugging session of your components, if needed. In order to enable this feature, the computer has to be connected to the internet at all times. Depending on the computer's operating system (Windows 7/8/10, OSX), the procedure to set the computer online will vary. Please look online for tutorials, if necessary.

If you have downloaded Level of Confidence for free, this software is not available, and the studio cannot log into your computer remotely. Please [contact the studio](#) if you are experiencing problems with your piece.

Preliminary Troubleshooting Steps

The system doesn't react to the presence of people in front of it.

While the artwork is running, you can at all times press **g** to show the raw camera feed. If there is no image there, verify the USB cable is connected to the PC and to the camera.

The camera works but faces aren't being tracked

Press **g** to show the raw camera feed. If there is an image but no face is being tracked, rotate the camera 90 degrees at a time until a face is properly recognized by the software.

Troubleshooting Assistance

Prior to contacting the Antimodular Studio with a problem about your artwork, please ensure that you went through the preliminary troubleshooting steps outlined in the previous section.

The troubleshooting process will vary depending on the problem. In order to make the process easier, it is recommended that you collect and send the following information to the studio:

- Date and time when the problem first happened;
- Description of the problem;
- Actions taken so far and conclusions;
- Detailed photographs (or videos) displaying the problem;
- Detailed photographs (or videos) of the suspected faulty component;
- Detailed photographs (or videos) of the whole artwork and its surroundings;
- Personnel involved.

Support (Contact Us)

If you would like support for the piece, please feel free to call Lozano-Hemmer's studio in Canada:

Antimodular Research
4462 rue Saint-Denis
Montréal, Québec, Canada
H2J 2L1
Tel 1-514-597-0917
info@antimodular.com
www.antimodular.com

APPENDIX I - INSTALLATION

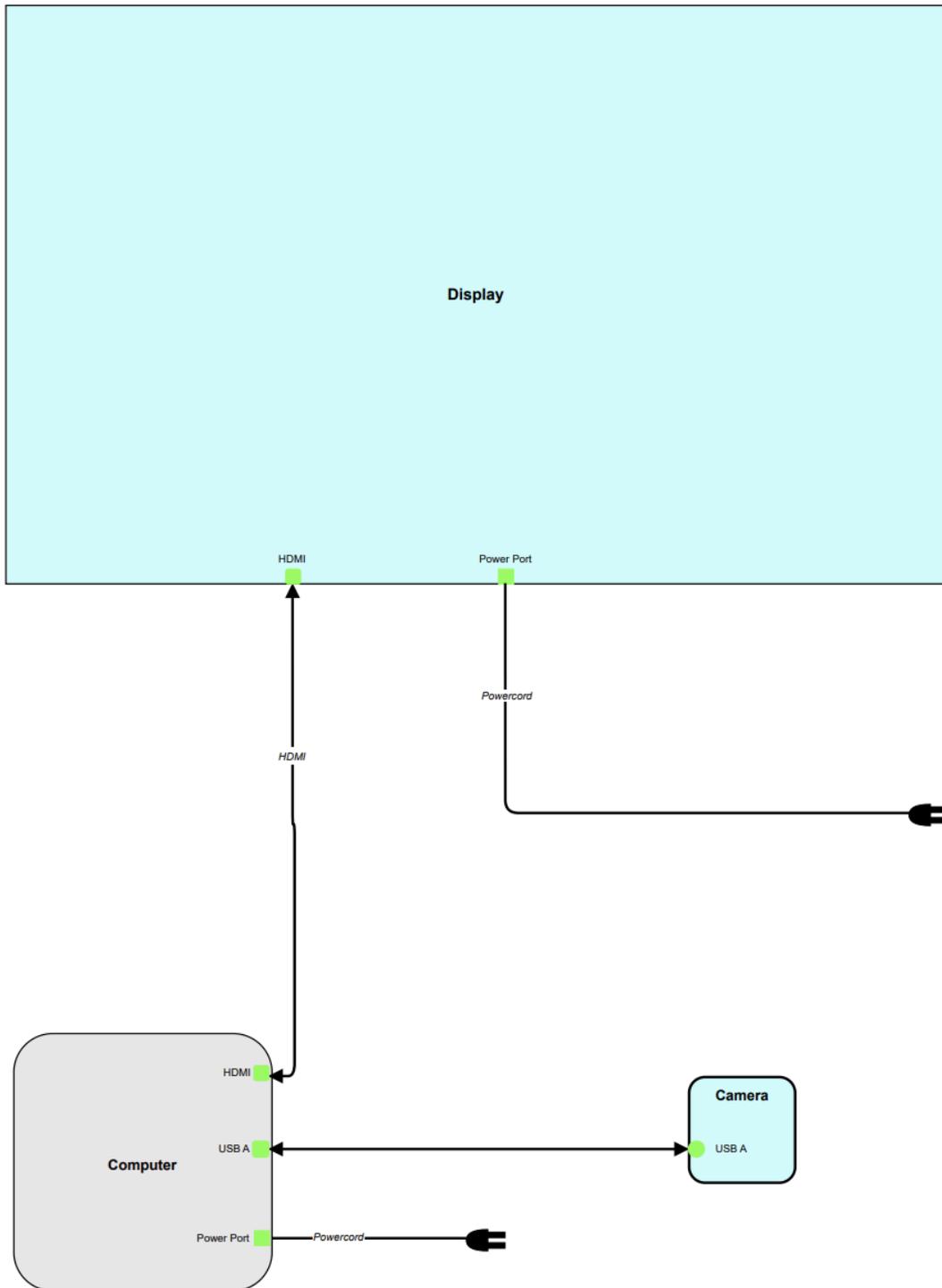
Description of Components

This artwork requires the following components:

Component	Description
Display	Any flatscreen with a native resolution of 1920 x 1080 pixels; sizes variable. Native resolution could be bigger, while keeping the same ratio (16:9), but the display should be used to display at a 1920 x 1080 resolution.
Video Cable	Connects the computer to the display, typically an HDMI, VGA or DVI cable.
Apple Computer	Apple MacMini or MacBook Pro running the software that controls the artwork.
USB Camera	Any USB web camera that works with Skype or other video applications. We have successfully tested the following cameras: Logitech C910, Logitech QuickCam Pro 9000, Logitech C930E.
Light	Diffused light: fluorescent or quartz halogen wash light suggested.

Wiring Diagrams and Connections

In order for the piece to run properly, the computer should be connected according to the following wiring diagrams



Installing the Software from the Web

Finding an Appropriate Computer

The software has been successfully run on the following Mac models:

- MacBook Pro 2.8 GHz Intel Core i7, 16GB RAM, Intel Iris Pro 1536MB graphics card;
- MacMini 2.3 GHz Intel Core i7, 4GB RAM, Intel HD 4000 512MB graphics card;
- MacMini 2.6 GHz Intel Core i5, 8GB RAM, IRIS 5100 graphics card.

The software does NOT run successfully on the following models:

- MacMini 2.3 GHz Intel Core i5, 6GB RAM, Intel GRAFX HD3000 graphics card, OSx 10.8.2;
- MacMini 2.4 GHz Core2Duo, 2GB RAM, Geforce 320M graphics card, OSx 10.8.2 / 10.10.

As a rule of thumb you will need a mac computer with an operating system of 10.14.6 or newer. The app has been successfully run on M1 and M2 chip computers. Consult the following table when determining which version of the software to download.

Software Version	OSX Version / Computer Specs
26	OS Version: TBC Apple M1 computers
25	OS Version: macOS 10.14.6
22	OS Version: macOS 10.12.6
21	OS Version: TBC

Installing The Software

You Download the software using the following link:

https://www.lozano-hemmer.com/pieces/level_of_confidence/software/Nivel_de_Confianza.zip

All versions of the software can be downloaded from our publicly accessible GitHub here:

<https://github.com/antimodular/Level-of-Confidence/tree/master>

Once you have downloaded the file, unzip the folder and place it on the desktop (or anywhere else on your computer.) Inside the "Level of Confidence" folder, locate the **LOC_xx.app** icon.

Drag this icon onto the dock, for convenience. Open **System Preferences** and go to **User & Groups - Login Items** and add the **LOC_xx.app** icon to the list of items that will automatically start upon login. Next, go to **Desktop & Screen Saver** and set your screensaver to **Start After - Never**.

Now, go back to **System Preferences**, to **Energy Saver**, and unselect **Put hard disks to sleep when possible**. Go go back to **System Preferences**, to **Displays** and set **Rotation** to 90 degrees. While still in **Display**, make sure that the resolution is set to **1920 x 1080**.

If you are using a laptop with OSX 10.9 or higher, go to **System Preferences**, then **Mission Control**, and unselect both **Automatically rearrange Spaces on most recent use** and **Displays have separate Spaces**, otherwise the software will not run on your external display.

If you get a warning that the project is from an “Unidentified developer” go to the **System Preferences**, then **Security and Privacy** and select “ **Allow apps downloaded from anywhere**.”

If you are using an **M1** or **M2** computer because of a security method introduced by Apple, you will need to do the following, otherwise the app will crash at startup. Once you have unzipped the downloaded folder, open it, find the **LOC_26.app** and move it elsewhere outside of such a folder (the desktop is ok) and then move it back to where it was.

Running the Piece

Right click on the app and select “Open” hit Ok to any dialog box that appears. After doing this once you should be able to simply double click the app and run it.

If clicking on the app results in it crashing there is a quick work around that still allows you to run the software.

- right click on LOC_xx.app
- select "Show Package Contents"
- navigate to Contents/MacOS/LOC_xx
- Right click the app and select “Open” it This will first open the Terminal.app and then the artwork app.

Refer to [Manual Software Operation](#) for information on how to use the GUI.

APPENDIX II - ARTWORK LABEL

English text

The following text must be placed beside the piece:

Level of Confidence by Rafael Lozano-Hemmer, 2015.

A facial-recognition camera has been trained with the faces of the 43 disappeared students from Ayotzinapa school in Iguala, Mexico.

To acquire or exhibit this work, please contact Antimodular Studio: karine@antimodular.com. All proceeds from artwork sales will go towards the funding of scholarships in the affected community.

Texto español

Por favor, ponga el siguiente texto junto a la obra:

“Nivel de Confianza” por Rafael Lozano-Hemmer, 2015.

Una cámara de reconocimiento facial entrenada con los rostros de los 43 estudiantes desaparecidos de la escuela de Ayotzinapa en Iguala, México.

Para adquirir o exhibir esta obra por favor, póngase en contacto con karine@antimodular.com, todos los ingresos recaudados irán a financiar becas de estudio en la comunidad afectada.