



"Texas Big Face"

A 3D Face Projection How-To

Create "living statues" by projecting your face onto sculptures.

A How To By: [David Sutherland](#), [Kirk Moreno](#) in collaboration with [Graffiti Research Lab Houston](#)



Texas Big Face 2009
Graffiti Research Lab Houston

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Texas Big Face is the projection of a person's face onto any object or three dimensional sculpture(s) to transform that object into interactive art. A person positions their face within a jig and their image is captured via camera. The camera is connected to a projector and the image is projected onto a sculpture. The video documentation will be exhibited as part of the Graffiti Research Lab exhibition in Yokohama, Japan at the CREAM International festival for Arts and Media Yokohama. The exhibition will occur from October 31st through November 28th at the Shinko Pier Exhibition Hall.

How-To "Texas Big Face" Documentation

In this document we will give a high level overview of what is needed in order to implement "Texas Big Face". To implement facial transfers both for sculptures and persons you need to accomplish several steps. Setting up a system that keeps the persons face stable, a system to capture the the persons face, connect your capture device to your projector and finally align your projection with the target of your choice. In this document we will cover each step. Some of these steps are highly customizable and have many solutions for implementation so this document will give an a detailed explanation of the process without getting to detailed on specifics on our implementation of the jig due to the fact that there are unlimited alternatives to keeping a persons face still for projection onto an object.



Texas Big Face Vs Texas Face Off

Implementations In This Document:

Texas Big Face - *Superimpose a person's face onto any 3 dimensional object in this case one of David Adickes [2] ' 20 ft tall sculptures.*

Texas Face Off - *A projected facial transfer whereby a material is used to cover a persons head. That and superimposing another person's face.*

Materials List

- **Digital Projector** *(we used a 1200 ANSI Lumens projector)*
- **Video camera** *(any camera with a digital connection to a projector)*
- **Jig** *(any tool allowing you to exact duplication for reproduction, in this case for face projection)*
- **A target** *(any object, sculpture or statue)*

Step 1: Setup your Jig - the tool, not the dance

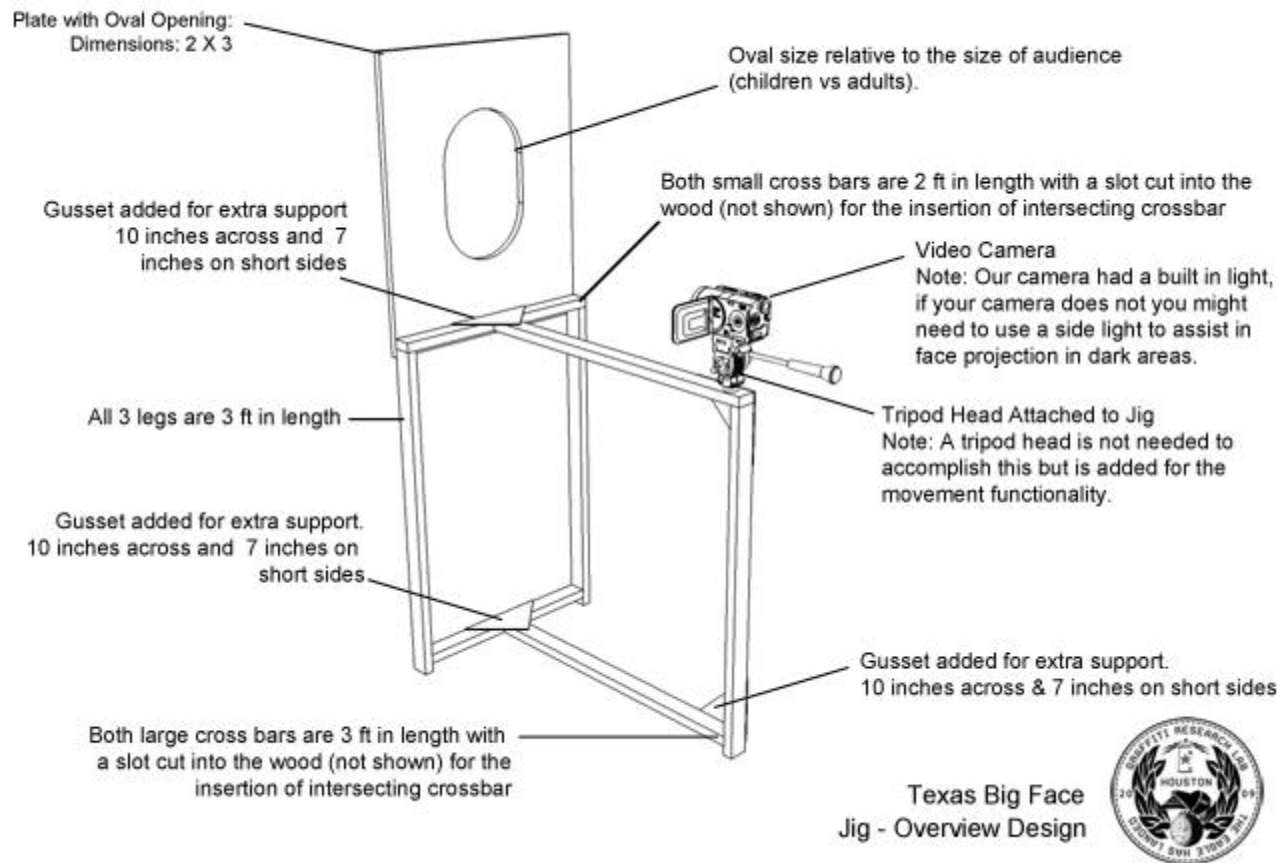


Figure 1.1 - Texas Big Face Jig Overview Design.

From [Wikipedia](#), "A **jig** is any of a large class of tools in woodworking, metalworking, and some other crafts that help to control the location or motion (or both) of a tool. The primary purpose for a jig is for repeatability and exact duplication of a part for reproduction."

For interactive facial projection, we require a jig to perform all of the above stated functions: control motion of the face, control camera placement, and reproduce results consistently.

Your jig can look like anything. It can be as simple or as complex as you feel like making it. The jig we have created is simply a stand with an oval hole mounted on one end and a camcorder mounted on the other end. The hole is just large enough for an average adult to put their face into, but not large enough to allow the entire head to pass through. A camera, which we cover in step 2, is positioned on the opposite side of the stand to capture video of only the hole. Once the video is aligned to the hole, the camera is firmly attached to the stand. With both the hole and the camera correctly aligned and firmly mounted to the stand, any number of individuals may insert their face into the hole and the result will be an instant, stable, and consistent facial image ready for output to the projector.

To mount the camera to the stand, We used the head from a broken tripod. This is not necessary, but a tripod head mounted to the stand allows for small camera adjustments which is not possible if one

mounted the camera directly to the stand. You may be able to improvise an adjustable camera bracket with wood, brackets, and bolts with wing-nuts. You must purchase a bolt with a 1/4 - 20 thread pitch to screw into the tripod mount on most cameras.

Additional notes:

[Graffiti Research Lab Houston](#) uses a wide board painted flat black for the facial opening. This will create a crisp image of only the face and eliminate the background from inadvertently appearing on the target. You will typically not project in a well lit area. Be sure your camera has a light, or you bring an additional spotlight such as an adjustable desk lamp or flashlight to illuminate the face. When running lights off of batteries, try to use compact fluorescent bulbs to extend battery life. A jig is **not** required for face projection, but it makes the process infinitely easier.

As an option, attach a microphone to the jig so that the person who is projected can be heard! Place the speakers under the statue for maximum effect. (see **Future Versions**)

Step 2: Connect your camera & projector

Any camera will work for facial projection. The key is that the camera's output must match an input on the projector. [Graffiti Research Lab Houston](#) uses a recycled, broken camcorder. The camera is no longer useful for recording as the tape deck is damaged, but the camera can still acquire an image and output to composite RCA or S-Video. The camera also includes night vision for low light images or images with a green tint, an integrated light, and a flip out LCD view-screen.

Most digital photography cameras include a projector ready video-out cable and can be used in the place of a camcorder. A security camera can be used if the projector accepts the output. One can even use a USB web-cam, so long as the web-cam is first attached to a laptop. Use the monitor port on the laptop to then connect the video feed to the projector.

Your camera may not have a LCD, but a flip out LCD view-screen is very helpful. Our LCD also flips around backward so that the person projecting their face can watch themselves in real-time on a "monitor". We have applied a thin strip of tape, vertically running down the center of the subject's face and horizontally just beneath the nose onto the LCD screen. The tape functions as guides to help the subject better align their face for projection. Again, a "monitor" is not mandatory, but can be improvised if you desire one. One suggestion is to add a splitter to your camera's output cable. One cable then goes to the projector while the other goes to a small television set, LCD display, or some other display in which you can then add tape guides. For basic information on connecting a digital camera or video camera [3] to a projector see the Reference section of this document. We still recommend doing some internet research for your specific brand of camera or video camera.

Additional Notes for Cameras

Most battery powered cameras will go into standby or demonstration mode if not recording. On some cameras, these modes can be disabled. For battery powered cameras, it is best to operate with the optional A/C adapter. Remember, if your camera runs out of juice, then the show is over!

Step 3: Camera and Projector Alignment

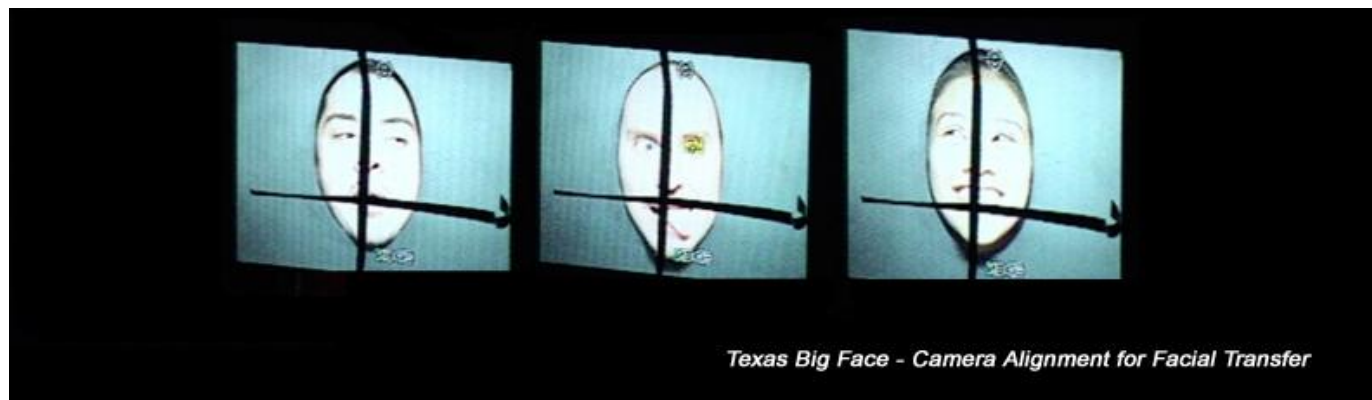


Figure 1.2 - Texas Big Face - Camera Alignment for Facial Transfer.

The final step in facial projection is to align the projected face to the target face. The camera should already be aligned in the jig as seen here in figure 1.1., so all that remains is aligning the face on the target.

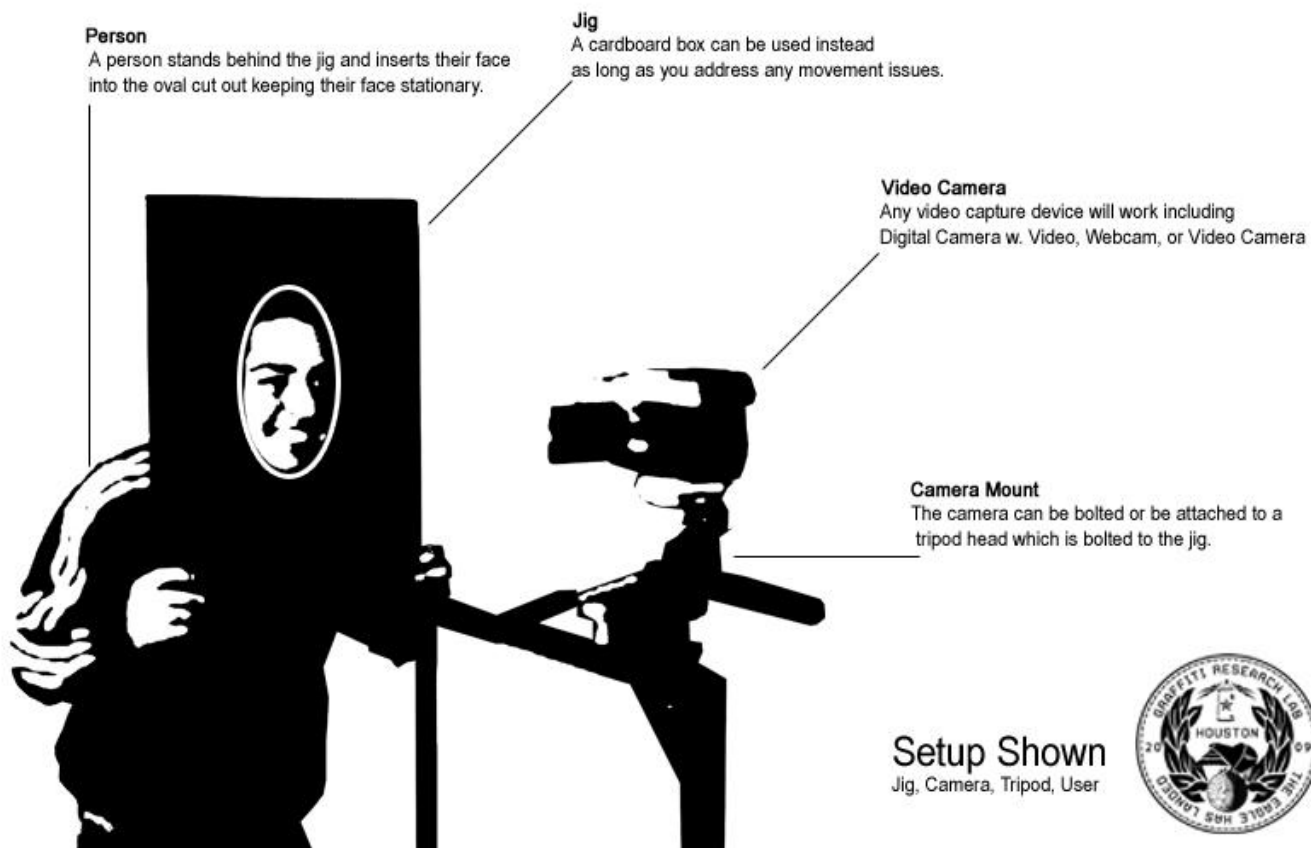


Figure 1.3 – Person facing the camera with face in the jig. Camera is shown attached & aligned with the jig.

First, size the projection so that the top of the head and the bottom of the chin match that of the target. You may need to adjust the focus and zoom on the camera, and/or the throw of the projector, until you dial the image in correctly. It is best to project directly onto the face from the same height. Projecting upward or from the side may or may not produce favorable results.

Next, align the facial features of the projection to those of the statue. This should either be the eyes, the tip of the nose, or wherever you placed your tape guides on the "monitor". Superimpose as many points of reference of the projection onto the points of reference on the target. The eyes should line up with the eyes, the nose with the nose, the lips with the lips, etc. Every face has different proportions, so getting close is usually good enough.

Once you are aligned, try not to further adjust anything else. Let the jig [1] and person projecting their face (using the "monitor's" taped-off guides) do their job. Everyone's face has slightly different proportions, so mileage will vary. We have found that constant tweaking for each new face in the jig will slow down the overall process and is not as fun as just going with the flow.

Step 4: Finding The Target

Get creative. You can use anything for a target. Projecting a moving face onto the face of a 3-D statue creates a living statue with the blended characteristics of both the target and the living person being projected. The more human-like the target, the more surreal and lifelike the effect.



Figure 1.2 - Images found by performing an internet search for David Adickes Sculptures

The best target is white with a matte finish. Your projected image will appear dim on reflective or dark surfaces. Some painted surfaces can be very glossy. Colored surfaces will tint the color of the projected image - which may look good or may ruin the projection. If projecting onto a colored surface, it may be best to project your image in black and white.

Typical statues are either made of white marble, concrete, or bronze. White marble is ideal, but not as common as bronze. Normally, bronze statues are too dark and too reflective to accept a projected image. For bronze statues, one can clip, tie, or tape a white T-shirt over the head of the statue to create a surface ideal for projection. Other ideas are taping a white plastic bag or wrapping the head in white shrink-wrap. Light graffiti is intended to be non-destructive, so please don't vandalize any bronze statues with painting or any other permanent or damaging alterations.



Figure 1.3 - The relative size of presidential sculptures compared to vehicles.

[Graffiti Research Lab Houston](#) performs interactive facial projections on giant, 20' tall statues of the heads of U.S. Presidents. These statues are created by the local artist David Adickes. These sculptures are located in several locations around Houston, TX. Some of the work for Texas Big Face was accomplished outside the studio of David Adickes using his sculpted presidential busts.

Texas Face Off - Implementing on smaller sculpture

[Graffiti Research Lab Houston](#) has also experimented with facial transfers. One person wraps a T-shirt around their head, then sits as still as possible while another person's face is projected over the top of theirs. Another option is for the target to apply white make-up to their face. It is not recommended the target open their eyes or in any way look into the projector during this time! Also, it is crucial that the target remain perfectly still during the performance as any slight movement will misalign the projection. Seating the target in a chair with a high back will help reduce micro movements [1].



Figure 1.3 - Pre-Facial Transfer, person use T-shirt to in order to begin projection



Figure 1.4 - User image using the jig is projected onto the subject.

Step 5: Have Fun & Take Back the Public Space

Draw a crowd! Set up Texas Big Face and give everyone a turn! We'd love to see what you do with this, so we invite you to send photos, videos or links to hi@grlhouston.com or contact us at <http://grlhouston.com>

Future Versions & Possible Implementations:

Adding Audio - Adding a microphone and speakers will give this concept even greater impact and an additional dimension of interactivity by giving a booming voice to the already larger than life visuals.

Materials:

(Optional) A tripod head

(Optional) A microphone and speaker system

References:

[1] Micro Movements - The unconscious, involuntary, tiny movements of the human body. Even while attempting to remain perfectly still, our bodies will continue to move. These movements are typically associated with breathing, balance, or simply tiny, imperceptible muscle spasms. This movement is perceived by humans on a subconscious level, but will become apparent when specifically searching for them. If an observed individual lacks micro movements, our brain may interpret the person as being artificial or perhaps dead. For example, when a person who is sleeping appears to be dead, it is because our brain is not perceiving the micro movements associated with that of a living person. In the world of robotics, scientists attempt to create micro movements in humanoid machines to subconsciously trick the mind into believing that the robot is indeed alive. Conversely, "Living Statue" artists study the art of eliminating micro movements in order to appear more statuesque, or artificial.

Micro movements become a problem in facial projection as we are attempting to project a face which is in motion onto an inanimate object which is perfectly still or a living object which is also moving, but in

different directions. These movements will create the illusion of a face which drifts around on the head, or a face which becomes misaligned over time. If the projected face is enlarged, then otherwise unnoticeable face and head movements are exaggerated and become quite noticeable and distracting. One solution to the problem of micro movements is to create a jig of some sort to hold the head still.

You can learn more about the relation between micro movements and robotics here:

<http://www.wired.com/science/discoveries/news/2006/07/71426>

[2] David Adickes - is a Houston artist who has sculpted the bust of every U.S. president, the Beatles, and several other historic figures. His work can be found around the United States including President's Park, South Dakota near Mount Rushmore, Huntsville, TX., and several are on display in the Houston, TX. area.

[3] How to connect a digital camera / video camera to a projector - Many cameras will come with a cable usually Composite Video (denoted by Red = right, White = left, Yellow = video). Plug the TV-out video cable into the TV-out port on the digital photo camera. If implementing the audio implementation and no red color-coded connection exist the device will not accept a stereo signal bu. In this case, connect just the white audio connector for mono (one channel) audio. Connect the other end of the cable to the composite video connector on your projector. Power on the projector then power on the camera. For specific connection instructions see your camera's documentation to determine if it can be used as a video camera and how to connect it to a video projector.

Texas Big Face Project Links:

[Graffiti Research Lab](#)

[Graffiti Research Lab Houston](#)

[TheSeventhWard.com](#)

[KirkMoreno.com](#)

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Project Inspiration by David Sutherland

Contemporary Arts Museum in Houston - I don't know the artist(s) (write me if you do), but he/she/they created half-scale dummies of people in different perilous positions such as having their head trapped under a couch. The dummies then had faces projected onto them. Just as you would start feeling sympathy for the poor figure, they would speak to you - mostly cursing at you.

The work of David Adickes:

<http://atlasobscura.com/places/david-adickes-sculpture-gallery>

<http://hubpages.com/hub/The-Legacy-of-David-AdickesTexas-Artist-and-Sculptor>

<http://www.facebook.com/group.php?gid=6159792710>

BurningMan - I learned more about interactive face projection while at Burningman from the L.A. video sculpture artist, Matteo. Learn more about Mateo's work by visiting these links:

<http://thehollywoodinterview.blogspot.com/2009/05/matteo-video-sculpture-for-21st-century.html>

<http://blogdowntown.com/2009/06/4411-faces-of-downtown--matteo>

Walt Disney's Haunted Mansion - as they have been doing this with film projectors for decades.

<http://www.youtube.com/watch?v=OFtbSYt80P4>