DECREASING THE F.Q.

SURVEILLENCE, ART, AND YOU.

MAC PIERCE

[In which he explains a bit about himself]

Day job – large scale AV systems

Kaedama – Newark NJ

As We Are – Columbus OH

Hard Rock Hollywood – Hollywood FL

At the Asylum – Art

Just Outside Your Window
2017

Just Outside Your Window responds to an onboard dataset of Boston PDs responses from the past year (2016), and whenever a time and date line up with real-time the lights activate to display a flashing red and blue light that emits from the house body that plays across any wall it is directed at.

Microcontroller, 3D Printed Enclosure, Boston PD Dataset

Back to the Drawing Board
2018

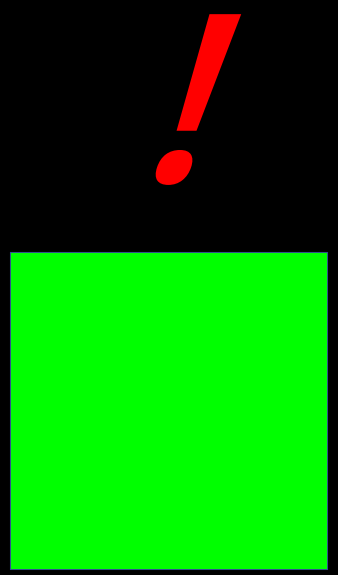
An interactive kinetic art that invites participants to add in messages to a continuously scrolling roll of transparency. The drawings are then projected through a high powered projector setup and expanded to an architectural scale.

A group effort by Jake Kassen, Phil Knodle, & I. Photo by Aram Boghosia (2018)

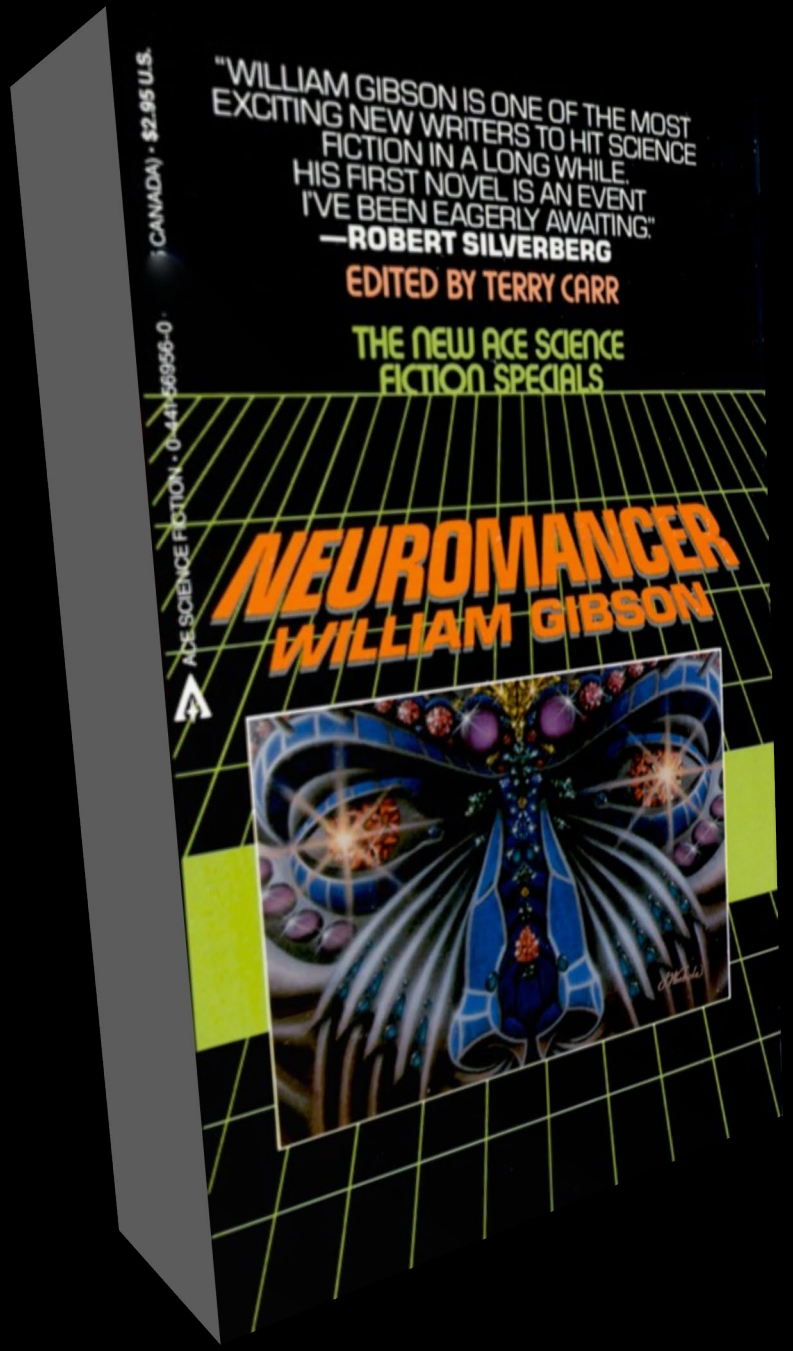
Including the Kitchen Sink !
2018

A racing sculpture that takes the form of a kitchen countertop with wheels. When pushed forward a copper kettle on the countertop moves back and forth. The direction the kettle points instead is a binary sequence that over a ¾ mile displays the ASCII encoding of the message “HELLO WORLD!”

A Kitchen Sink, 3D Printed and Laser Cut Gears, Welded Aluminum Frame



So what about recently . . .



Gibson, in a 2019 New Yorker Interview…

On how he comes up with the futures written in his novels…

"…I've commenced with a sort of deep reading of the f@%#edness quotient of the day,"
"I then have to adjust my fiction in relation to how f@%#ed and how far out the present actually is."

https://www.newyorker.com/magazine/2019/12/16/how-william-gibson-keeps-his-science-fiction-real

More on the F.Q. of the day…

Thinking about the F.Q. of the day...

Can we analyze the present using the same tools used to write about the future?

YOU BET WE CAN !

F.Q.

Now lets take a look at a few of topics I've been noticing around facial recognition...

Although it's been around since the 1960's[1], Facial Recognition (FR) has been having a moment as the prevalence of cameras has exploded and the algorithms / models to process the subsequently generated images has greatly improved.

Both France and the UK are in the process of rolling out country-wide FR systems. [2]

Israel has installed 1,700+ FR cameras to surveil Palestinians in the West Bank, of which are tied to a system that monitors their social media in an effort "to deter terror attacks". [3]

The FBI has compiled an enormous database of faces from state DMV's and Mugshots, an estimated 50% of US Adults are in a law enforcement FR database. [4]

Police agencies in the US have repeatedly used altered images or photos of celebrity lookalikes to get matches in FR systems, which can then be used as cause leading to an arrest. [5]

And then there's China....

F.Q.

1 - *The History of Information Security: A Comprehensive Handbook*. Amsterdam: Elsevier. pp. 264–265.
2 – UK Link – Daily Mail / France Link - Bloomberg
3 – NBC News
4 - https://www.perpetuallineup.org/
5 – Washington Post

China has readily welcomed the use of FR technologies, and has readily folded them into their state security apparatus. China also produces the majority of cameras used for FR.

All protests in Hong-Kong after the first couple days were unsanctioned, and thus everyone participating in the latter protests are guilty of participating in an unlawful assembly. Masks were banned to make it possible to ID participants after the fact. [1]

The Chinese gov. has employed a FR system specifically designed to racially profile individuals from the Uyghur minority, and then record their doings to then be later reviewed. [2]

A similar FR system is currently in use, and is designed to identify any Uyghur persons and alert Government officials if they leave so called “Safe Areas.” [3]

These are all Governmental examples as well, private companies can operate in similar ways with little to no accountability or supervision.

F.Q.

1 - CNN
2 – NYT
3 - RFA

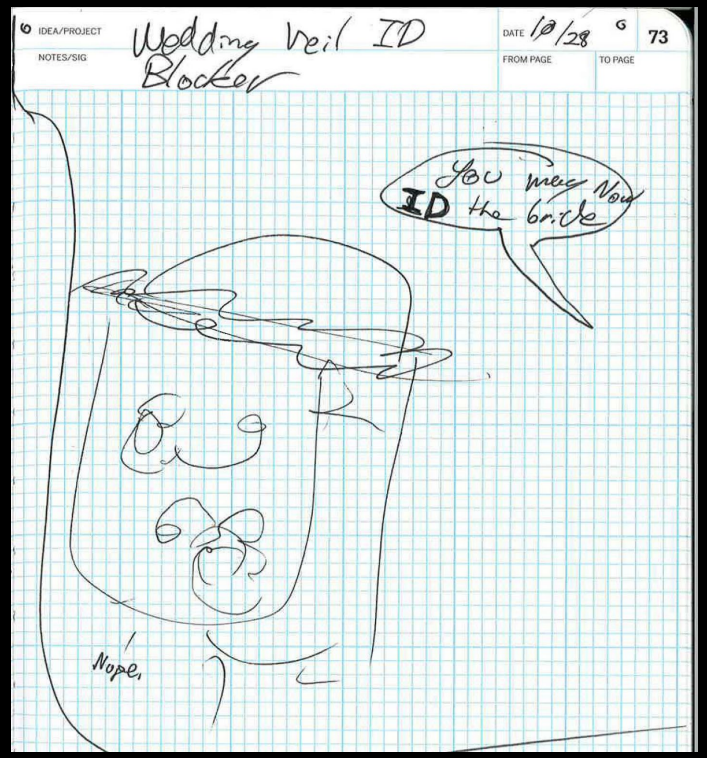
The F.Q. on Facial Recognition tech is very high, and seems to only be on the rise.

These systems are oblique, often unregulated, and all encompassing. Cat's out of the bag, and it doesn't seem like there's much to be done about the ways FR tech has been headed.

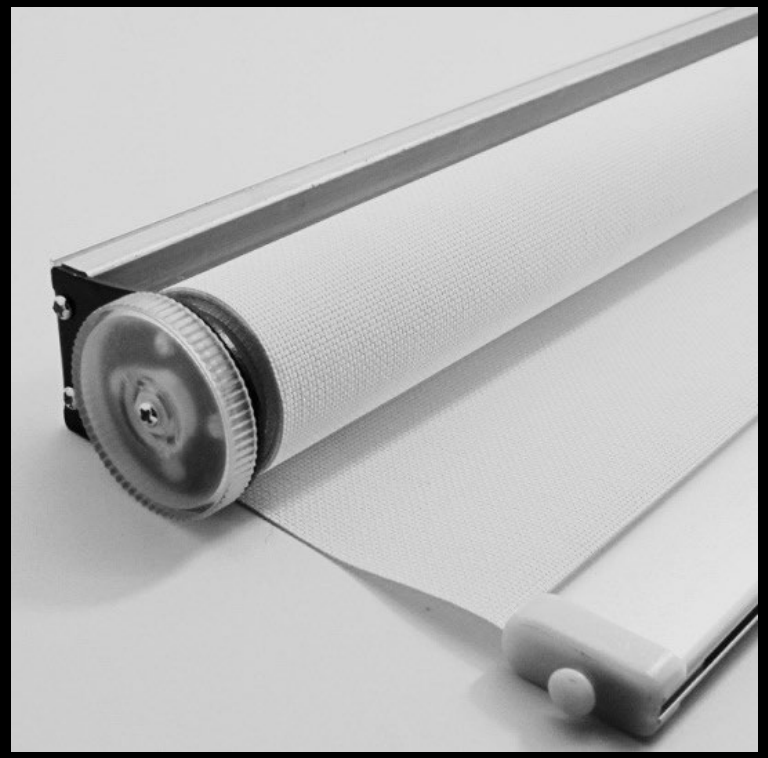
But what if it up to was us to say that we don't want to be included in these systems. What if we had a choice.

F.Q.

And with that in mind, I started working on what became *The Opt-Out Cap.*
Giving the individual the option to Opt-Out of FR systems, even if no option is readily given.



The initial idea around a wedding veil used to block identity… Not quite a fully formed idea.



Spring loaded curtains loaded into the brim that could be pulled down to conceal the face, but that solution is bulky and relies on mechanical components.

Zero History, the third book in Gibson's *Blue Ant* series, there is a plot device called "The Ugliest T-Shirt in the World." So named because it has a giant face on it, misdirecting CCTV facial recognition systems.

Given the uses of FR currently, I wanted to put together something that would be relatively cheap and easy to assemble, be effective against all kinds of FR systems, and could be easily concealed and deployed.

This first sketch of the cap, showing the mesh flaps in action and being worn in a baseball cap.

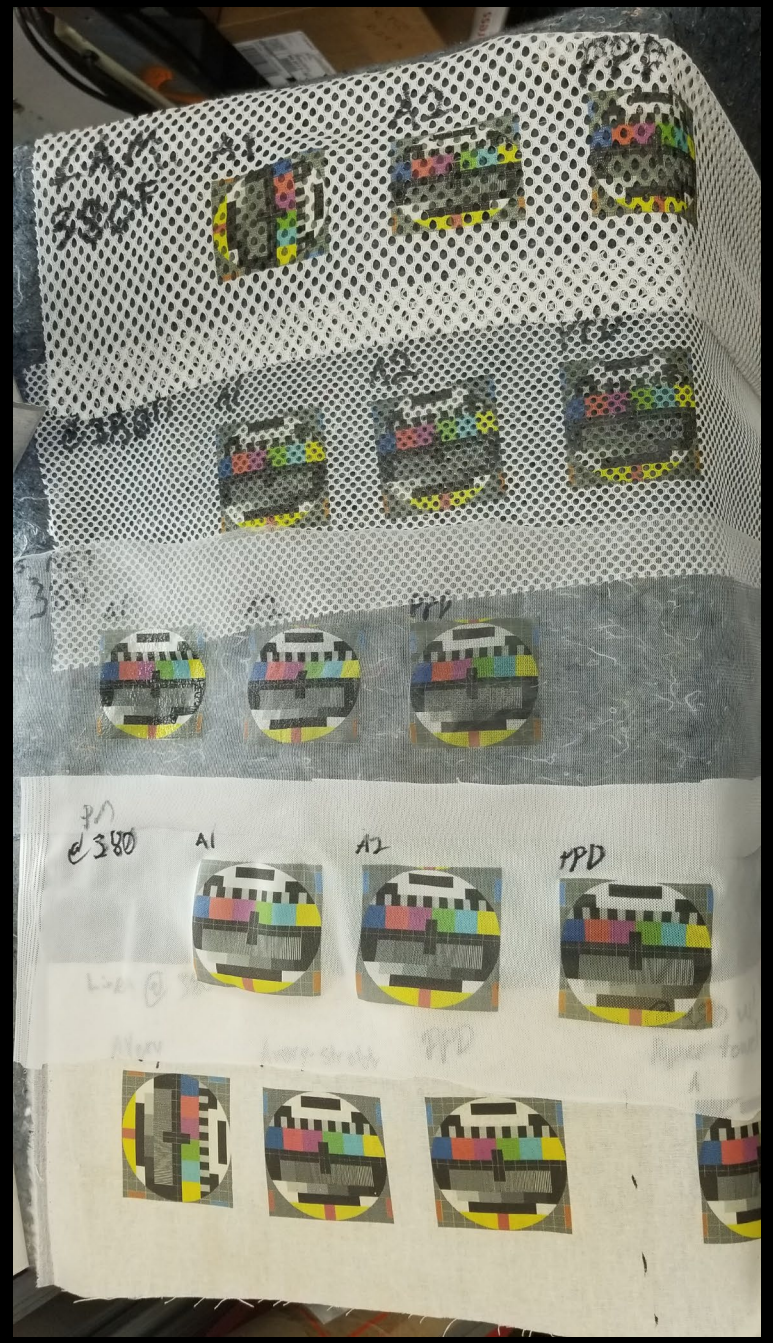
Next up came materials selection and testing.

Using a mesh for the face flaps

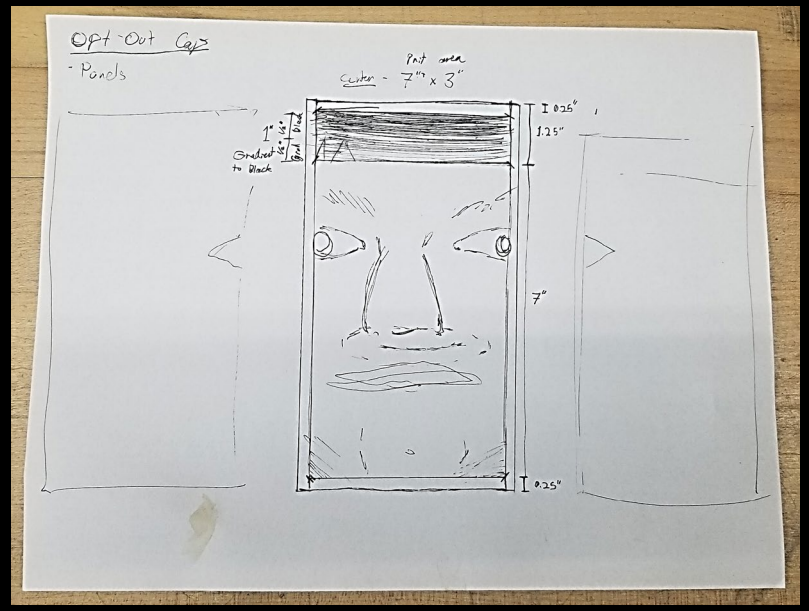
- Tested out 5 mesh types, from large hole jersey mesh to a fine mosquito mesh.
- Some were too fine to allow the t-shirt transfers to open up, others deformed under the heat of the transfer, and others just showed too much of what was underneath.
- A stretch Power Mesh ended up working the best of all options, allowing for moderate visibility while still covering the face.

T-Shirt iron-on transfers for the graphics

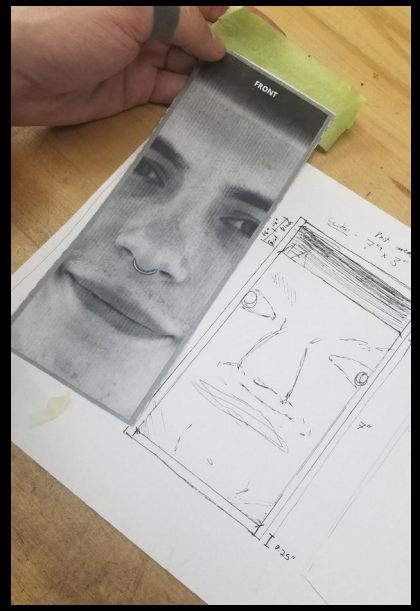
- Cheap and relatively simple to do at home
- Can be customized as needed
- Readily available product
- Stretch transfers are available, perfect for a stretch mesh.
- The Avery 3302 Stretch transfers performed the best of all tested.



After materials testing came the face template design...



Laying out initial panel sizes to fit on standard letter sized paper.



Test print.

An *alpha build* printed on paper

Done.

- ✓ Cheap and Easy to make? Yup, $20 in materials and 1 hour to make using common tools.
- ✓ Completely blocks the face while providing an alternate? Yup.
- ✓ Easy to conceal and deploy? Very.

All that was left was to write out the assembly instructions and share them...

The Opt-Out Cap

A tool for facial recognition obfuscation.

These instruction will cover how to assemble the Opt-Out Cap as well as a few tips for personalization and use.

Please use for good.

Mac Pierce 2019

Section 0 – Why

With the rapid implementation of advanced facial recognition for both commercial and governmental purposes, individuals are unwittingly incorporated into a state of total surveillance by simply showing their face in public. Your face is your identity and is the thing about your body that most identifies who you are to those around you. The individual needs a way to disengage with those systems at will.

Ideally, this would be a solution with low barriers to entry, easily sharable and distributed, and without complicated production methods. The solution also needs to be practical to utilize and not draw further attention to the user when not in use.

The Opt-Out Cap serves this purpose using common materials that are easily assembled. The cap also conceals it purpose by hiding the panels inside the cup of the cap when not in use.

Section 1 – Materials and Tools

To assemble the Opt-Out Cap, you'll need the following materials and tools:

1. **Baseball Cap** - $5
   Where to Source – Big-Box Stores, Online, Thrift Stores
   Alternatives – Any hat with a brim, beanies.
   Notes - Any hat with a brim will work best for the cap, as it will also serve to partially block the view of overhead cameras. Caps with recognizable logos or flashy colors should be avoided, as these will serve as points of reference for further identification. The exception to that is a hat that is exceedingly common in the intended area of use, such as a cap with the logo for a local sports team or for the city.

2. **Power Mesh** - **9" x 12" (About 230mm x 305mm)** - $12 per yard
   Where to Source – Fabric / Craft Stores, Online
   Alternatives – Mosquito netting.
   Notes – After testing various sorts of available readily available meshes, Power Mesh was found to work the best for The Opt-Out Cap. Its stretch and relative transparency work well with the transfer sheets. Mosquito netting can work, but is very transparent and may react badly to overheating during the application of the transfer sheet. 1 yard of power mesh at 60" cloth width is enough material to make 12 caps, so buy a quarter yard if possible.

3. **Stretchable Print Transfer Sheets – US Letter sized** - $12 for a 5-pack
   Where to Source – Fabric / Craft Stores, Online
   Alternatives – Non-Stretch Transfer Sheets, Textile Printing Service.
   Notes – Transfer sheets are commonly used for applying graphics to T-Shirts and other textiles, and come in a variety of different types. The main 2 distinctions are whether they're printed on an inkjet or laser printer, and whether the transfer will be applied to a material that is light or dark. When tested, the stretchable transfer sheets worked best on the Power Mesh, and retained the most detail of all the options tested while not warping the mesh. An alternative to printing yourself is to purchase the prints from a textile printing service. Typically these services use specialized techniques (Such as dye sublimation) to print directly onto textiles.

Section 1 Continued...

The following tools are needed to assemble to Opt-Out Cap:

1. **Color Inkjet or Laser Printer**
   Notes – Select your transfer sheet type based off of the type of printer most available to you. Color printing drastically improves the quality of the finished digital print, so use it if possible. Assumed in this tool is a computer available that can output to

2. **Household Clothing Iron**
   Alternatives – Textiles Heated Press.
   Notes – Most transfer sheets require an iron to be heated to around 380°F (about 194°C) to transfer well onto textiles. Most irons will be able to reach this temperature readily, but a good metric is an iron that consumes 1400 watts of power or more.

3. **Scissors**
   Alternatives – Textiles Roller-Cutter, A Sharp Knife
   Notes – As power mesh is relatively difficult to cut cleanly textiles scissors will provide the best results, second only to a textiles roller cutter.

4. **Needle and Thread**
   Alternatives – Sewing Machine, Paper Stapler.
   Notes – Thread color isn't important, and due to the low stress on the panels themselves, any standard thread will work. If available, a sewing machine could work for this purpose, but there's relatively little sewing involved in the construction. If sewing isn't an option, a common office paper stapler can be used to affix the printed panels to the cap in a pinch.

Optional Tools -

- One piece of clean construction paper or card-stock slightly larger than the section of mesh to print onto.
- One piece of PTFE / Teflon paper.

Section 2 – Assembly

Upon assembling the required tools and materials, follow these steps to make the Opt-Out Cap.

1. **Print the Face Graphic onto the Heat Transfer Paper.**
   - **Load the transfer paper into the printer.**
     - Make sure to load the transfer paper oriented correctly for the direction the printer prints in.
   - **Print the face graphic.**
     - Print at 100% scale for US Letter Paper (8.5" x 11")
     - Print in color at the highest resolution (DPI) available.
     - It is suggested that you do a test print on normal paper prior to using the transfer paper.
   - Face Graphics and templates are available on page 12 & 13 of this document as well as in the attached media.
   - When in doubt, follow the instructions on the Heat Transfer Paper for best results.

2. **Pre-Heat the iron and lay out the Transfer Paper onto the Mesh.**
   - **Power on the iron and set the temperature.**
     - Set the iron to the temperature recommended by the transfer paper selected.
     - If the iron has no temperature readout set to the Cotton setting.
   - **Lay out the mesh onto a flat and hard work surface.**
     - **DO NOT USE AN IRONING BOARD**, they are cushioned and uneven which can cause warping of the graphic transfer.
     - (Optional) Put a piece of construction paper or card stock between your work surface and the mesh. When the graphic is pressed onto the mesh, it can sometimes reach through the meshes holes and leave residue on the work surface.
     - Make sure to lay out the mesh flat and un-stretched, otherwise the graphics to the mesh will be distorted after transfer.
     - Not all work surfaces can handle the temperatures of the iron.
   - **Center the transfer sheet on the mesh face down.**
     - Make sure the transfer sheet is flat against the mesh.

Section 2 Continued...

3. **Use the heated Iron to transfer the Graphic to the Mesh.**
   - **Apply the iron to the center of the back of the transfer paper**
     - Do not hold it in any one spot for too long
   - **Working out from the center, move the iron around to every spot on the back of the transfer paper.**
     - Follow the instructions for the transfer paper for the length of time to do so. When in doubt, 3 minutes is a good amount.
   - **Allow the transfer to slightly cool, then peel the backer of the transfer paper off the mesh to expose the applied graphic.**
   - The transfer of the graphic to the mesh may have filled in some of the holes in the mesh. To fix, stretch the mesh in every direction to open the holes up again.
   - The face graphic may be slightly warped at this point after stretching, but will even out over time or after an optional setting press.

4. **Cut out the Graphics Panels from the Leftover Mesh.**
   - **Using scissors, cut along the dotted line along the outside of the printed area, removing any white area left over.**
   - **Cut along the 2 dotted lines between the 3 panels to separate the panels.**
   - At this point in the process, you should have 3 panels labeled Left, Right, and Center, each showing a different area of a face.

5. **(Optional) Set the Print and flatten the Panels.**
   - When the mesh is cut into the panels, some of the internal stresses applied by the transfer paper transfer will cause the mesh to warp and curl slightly.
   - **To fix, iron the flattened panels printed face up and using a heat-resistant anti-stick paper (Such as PTFE / Teflon paper) as a layer between the iron and the printed mesh.**
   - Follow the same guides as used in step 2 for setting up this step.

Section 2 Continued...

6. **Attach the Printed Panels to the inside of the Hat.**
   - **Position the CENTER panel to be aligned with the center of the sweat band in the interior of the baseball cap.**
   - **Make sure that the print is facing out, towards the bill of the cap.**
   - **Using a needle and thread, use small stiches to sew along the top of the panel to attach to the sweat band of the baseball cap. Sew along the full width of where the printed panel contacts the sweat band.**
   - Alternatively, use an office stapler in place of the needle and thread. This has the advantage of not relying on any pre-existing sewing skills, but the metal staples be uncomfortable against forehead if the hat is too tight.
   - **Do the same for the LEFT and RIGHT panels, aligning the long sides of each to the outside edges of the CENTER panel.**

Done.

Section 3 – How to Use

- **To use facial recognition blocking panels, unfurl them from the bowl of the cap and let them hang loosely in front of your face.**
  - When unfurled, the panels may be slightly crooked when hanging. This is likely due to them being caught between the cap and your head. Give them a gentle pull to unstick.

- **To convert the Cap back to a standard Baseball Cap, take the cap off and tuck the panels into the bowl of the cap, then wear as a standard baseball cap.**
  - If the cap is to be worn with the printed panels tucked away for long periods of time, tuck the panels into the bowl of the cap flat to prevent them from getting a permanent crease from being folded.

- **Points to keep in mind while in use...**
  - The best concealment is to blend in with a crowd.
  - When unfurled, the cap will look "off" to anyone scanning the crowd upon close inspection. It's best to stay 30ft (10m) away from anyone that would scrutinize it too closely.
  - **Some areas ban masks, which is often defined as anything that blocks the view of the face. Keep that in mind while in use.**
  - As with any hat, long hair will stick out from underneath where it rests on the head. If you have recognizable hair, pair the Opt-Out Cap with a hoodie to conceal your identity further.
  - Any clothing with logos or distinct silhouettes can be used to identify you.
  - The mesh panels will partially block your view when unfurled. They're mostly transparent, but in low light situations details will be difficult to see.
  - As the panels are unweighted and not pined at the bottom, they will move when blown by air or when brushed. This can cause the face of the wearer to be show. To avoid, try attaching the bottoms of the printed panels together with a safety pin.

Section 4 – Extras and Reference

Inspirations

The Opt-Out Cap was originally inspired by **The Ugliest T-Shirt Known to Man** from William Gibson's novel *Zero History* (Published 2010), the third and final book in the *Blue Ant* trilogy. In the book, characters are tasked with making their way through London's streets without being recorded within the CCTV system. **The Ugliest T-Shirt Known to Man** displays a graphic of a human face printed across its entire exterior, that when worn is then tracked by CCTV systems in place of the wearer. The face on the Ugly T-Shirt is registered within the CCTV facial tracking system, and due to a clandestine agreement is coded to then be erased from the system automatically.
While the characters in *Zero History* have access to the self-erasing system, we in the real world aren't quite as lucky. Instead we can work with misdirection and obfuscation.

Another interesting approach to this problem is Adam Harvey's *CV Dazzle*, a facial makeup and styling scheme made to block facial recognition systems from capturing the landmarks on the face used to identify individuals. This is a useful technique to employ when there is harsh restrictions on masks.

Finally, the courageous efforts of the people of Hong-Kong, protesting for human rights in a country trying to strip them away.

You don't have anything to hide until someone in power decides you are the enemy.

Usage Rights

The Opt-Out Cap was designed and published by Mac Pierce in 2019. You can find more of his work at www.macpierce.com

Section 4 Continued...

How to make your own Face Graphic.

Although this guide includes 2 distinct face graphics to use on the printed panels (Pages 12 and 13), they may not suit your use case or preferences to display. If this is the case, follow these instructions on how to make your own. Note: These steps require a computer and some mid-level knowledge on how to produce digital graphics. Please use only the visages of public figures or individuals that have consented to this process.

1. **Import the OptOutCap_PrintTemplate_Blank.pdf into your photo editor of choice.**

2. **Select 2 photos of the face of the person that will be represented on the printed panels on the cap.**
   - These photos should be relatively high resolution (at least 1000px x 1000px) and have similar lighting in both shots.
   - One photo (used for the center) should be a straight on portrait of the person showing their full face, the second photo should be of the same person at a 3/4 view (Turned about 45 degrees from facing the camera).

3. **Align the front facing portrait photo to the layer underneath the CENTER panel outline.**
   - Position the center line of eyes 1/3rd of the way down panel, and scale the photo so that the face fills the frame.
   - Final positioning should place the eyes at the line distinguishing the top 1/3rd from the center, with the pupils of the eyes just inside the visible edge of the center template. The mouth should land somewhere in the bottom 1/3rd, with the nose in the middle.
   - Crop or mask the portrait image to only appear within the center panel area.

Section 4 Continued...

4. **Align the 3/4 view portrait to the layer underneath either the LEFT or RIGHT Panel.**
   - Scale and position the 3/4 photo as needed to align with photo within the center panel.
   - Some color correction may be needed to account for the differences in lighting and contrast.
   - Crop or mask the 3/4 portrait image to only appear within the center panel area.

5. **Duplicate Mirror the image used in step 4 and place it in the yet unused panel.**
   - Follow the steps in Step 4.
   - If in doubt, use the attached images as reference.

Done.

Premade Face Graphics

Use as you'd like.

Plans are now published for free to the public domain at macpierce.com/the-optout-cap

And with that, I think I've helped decrease world F.Q.

(maybe)

web - macpierce.com
ig - @Transistor_Resistor
tw - @TRANS_RES