This project is based on the book Invisible man.

Packages you need: OpenCV
pip install opencv-python

Matlab
pip install matplotlib

Pillow:
pip install Pillow==2.2.2

azure stuff:
pip install --upgrade azure-cognitiveservices-vision-face

Here is a description of what our project does:

We expect 2 arguments of 2 images. One image is supposed to of the person, one image
is supposed to of the background. We run some complex computer vision algorithm
to remove that person from the image, giving you image 2.
The algorithm is as follows:
We apply the grayscale filter, then the gaussian blur by multiplying the image with the following matrix:

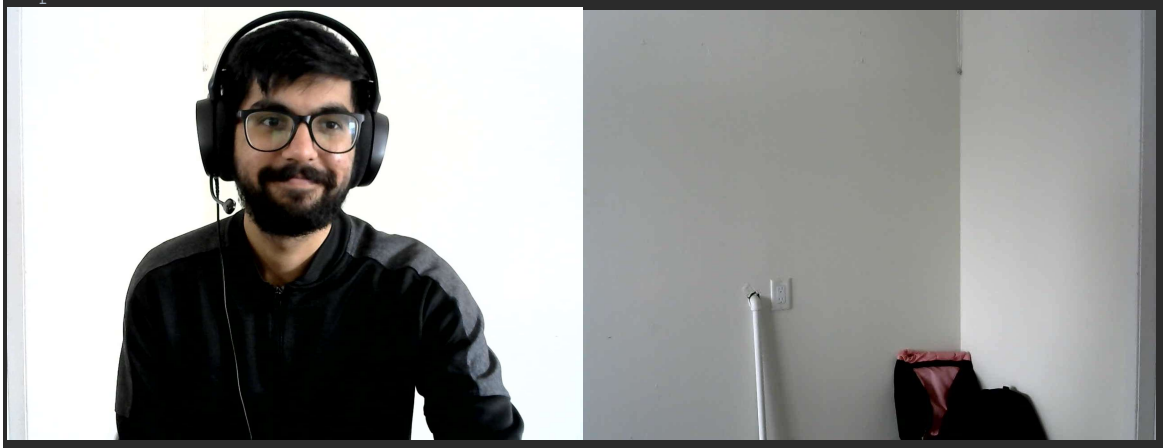
$$\begin{bmatrix} 0.00000067 & 0.00002292 & \mathbf{0.00019117} & 0.00038771 & \mathbf{0.00019117} & 0.00002292 & 0.00000067 \\ 0.00002292 & 0.00078633 & 0.00655965 & 0.01330373 & 0.00655965 & 0.00078633 & 0.00002292 \\ \mathbf{0.00019117} & 0.00655965 & 0.05472157 & 0.11098164 & 0.05472157 & 0.00655965 & \mathbf{0.00019117} \\ 0.00038771 & 0.01330373 & 0.11098164 & \mathbf{0.22508352} & 0.11098164 & 0.01330373 & 0.00038771 \\ \mathbf{0.00019117} & 0.00655965 & 0.05472157 & 0.11098164 & 0.05472157 & 0.00655965 & \mathbf{0.00019117} \\ 0.00002292 & 0.00078633 & 0.00655965 & 0.01330373 & 0.00655965 & 0.00078633 & 0.00002292 \\ 0.00000067 & 0.00002292 & \mathbf{0.00019117} & 0.00038771 & \mathbf{0.00019117} & 0.00002292 & 0.00000067 \end{bmatrix}$$

This is generated with the gaussian filter kernel of 0.8408. We then apply the canny edge detection algorithm with a 5x5 gaussian filter as follows:

$$\mathbf{B} = \frac{1}{159}\begin{bmatrix} 2 & 4 & 5 & 4 & 2 \\ 4 & 9 & 12 & 9 & 4 \\ 5 & 12 & 15 & 12 & 5 \\ 4 & 9 & 12 & 9 & 4 \\ 2 & 4 & 5 & 4 & 2 \end{bmatrix} * \mathbf{A}.$$

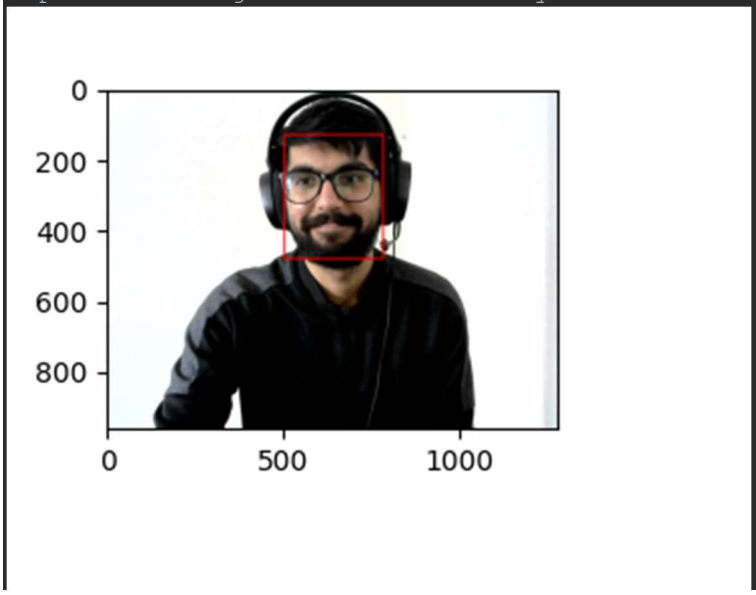
We do the same with the image of the background, and then cross reference the background image with the one with the person, and running a basic scanning algorithm from both sides of the image, weed out false positives. Then we fill in the colours.

Input:



And the output is:

We also made use of Microsoft’s API to analyze image to look for faces and improve our algorithm’s efficiency.



It’s not perfect. But,