Usage

1. Fork the code repository into the IDE of your choice
2. Find an image to draw. Images with quiet backgrounds, high contrast, and little texture are best
3. Select the image in the GUI
4. Run guiMain.py
5. Select the image from the dropdown and the to Gcode treatment
6. Edit the parameters until the output looks right
7. Upload the Gcode to the printer using an SD card or software (we use pronterface)

Technical Details

All code is in Python. The PIL library is used to assist with applying kernels and copying images. Tkinter is used to create the GUI and turtle is used to simulate the drawing. Code is divided into a script for the GUI and an image processor class (a new object is created for each submit)

Image Processing Procedure

1. Convert to greyscale

2. Apply gaussian blur variable number of times based on user input
3. Round the colors in the image. The number of buckets is based on the roundness parameter
4. Applies either a Laplacian Adjacent (using four nearby pixels) or All (using nine nearby pixels) kernel to find edges
5. Deletes all pixels that are alone
6. Converts the remaining image to Gcode by recursively finding lines of pixels

a. Lines under the specified pixel length are ignored
b. Minor gaps are deleted
c. Also creates an identical file readable by turtle to show what it will look like

Graphical User Interface

Processing options:

Image select: allows the user to select any image from their computer

Treatment: includes all processing options for debugging

Roundness: determines the amount of rounding in regards to the colors in the image. Lower numbers will ignore less detailed parts of the image, removing noise.

Blur times: the number of times the blur is applied. Helps remove noise.

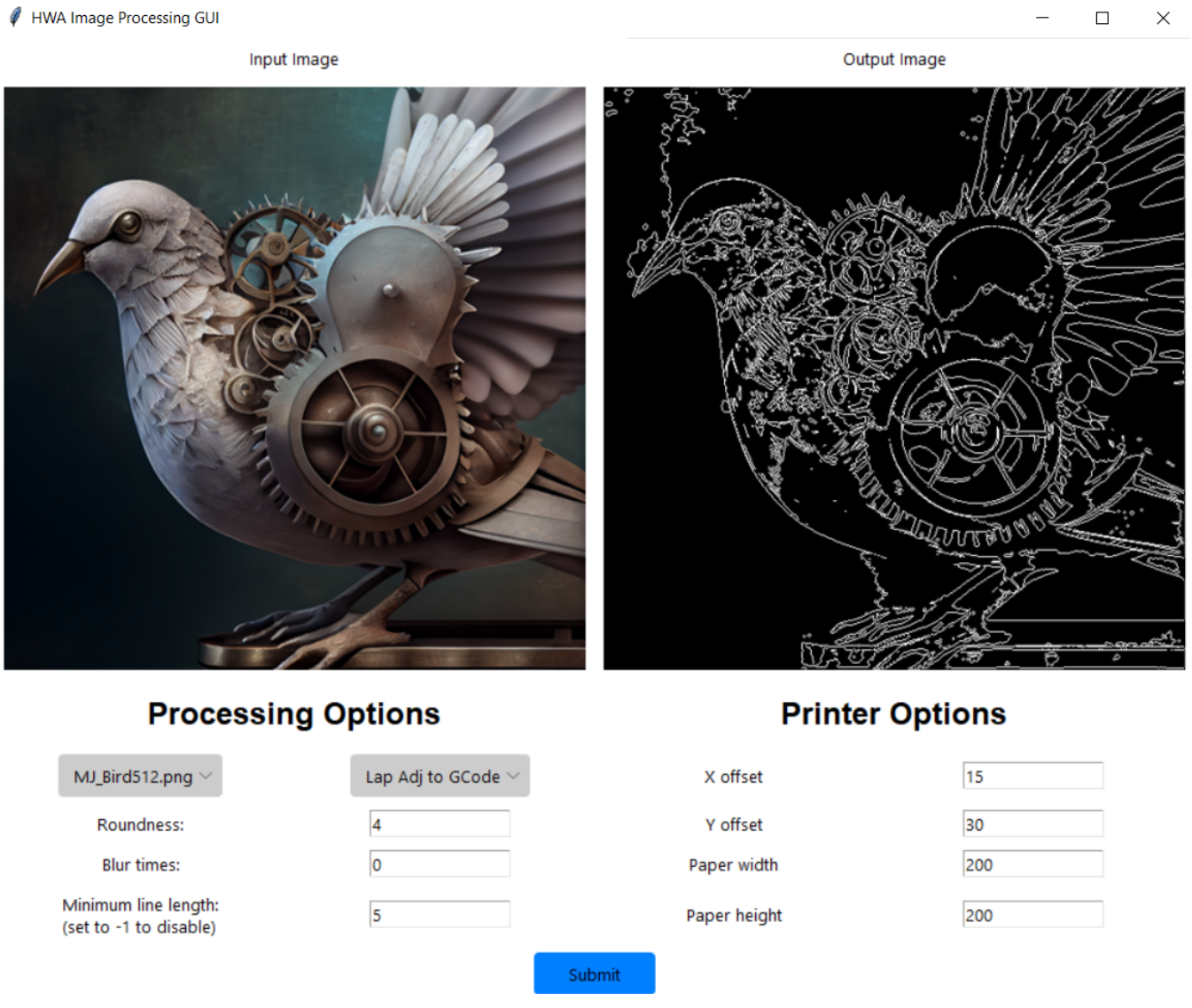
Minimum line length: minimum length in pixels of a line, otherwise it will be ignored

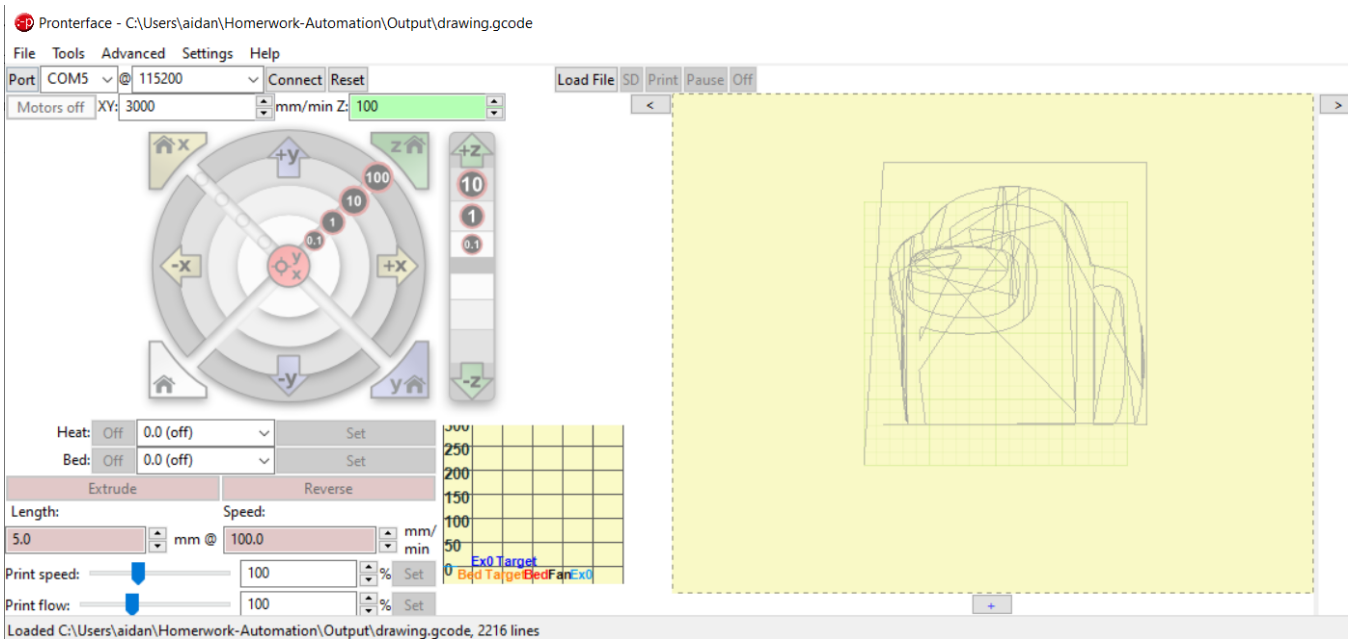
Printer options:

X/Y offset: how many millimeters from the origin the image starts at

Paper width/height: max size of the printed image in millimeters

When submit is pressed, the processed image is shown and turtle draws the image (more accurate than the output image as all lines are equal weight)




Pronterface - C:\Users\aidan\Homerwork-Automation\Output\drawing.gcode
File Tools Advanced Settings Help
Port COM5 @ 115200 Connect Reset
Load File SD Print Pause Off
Motors off XY: 3000 mm/min Z: 100
+y -y -x +x +z -z
100 10 1 0.1
Heat: Off 0.0 (off) Set
Bed: Off 0.0 (off) Set
Extrude Reverse
Length: Speed:
5.0 mm @ 100.0 mm/min
Print speed: 100 % Set
Print flow: 100 % Set
250 200 150 100 50 0
Ex0 Target
Bed Target Bed Fan Ex0
Loaded C:\Users\aidan\Homerwork-Automation\Output\drawing.gcode, 2216 lines