2D to 3D image visualization and filter application

Alexander Raytchev

100938966

Summary: The application will allow users to upload a saved picture, once the picture is uploaded various filters can be applied to it if chosen so. After modifications are made the application will use Harris edge detector to remove the focus of the image from its background, this image will then be transformed into a grayscale image and be plotted into an XYZ graph to create a 3d visualization based on depth(0-255). The final goal is to be able to export the raw data and use the 3d model into other programs such as animation or video editing.

GitHub repository: https://github.com/raytchev3004/comp4102

Background: The initial idea comes from the wanting to use the many available scientific python libraries that are available and open source.

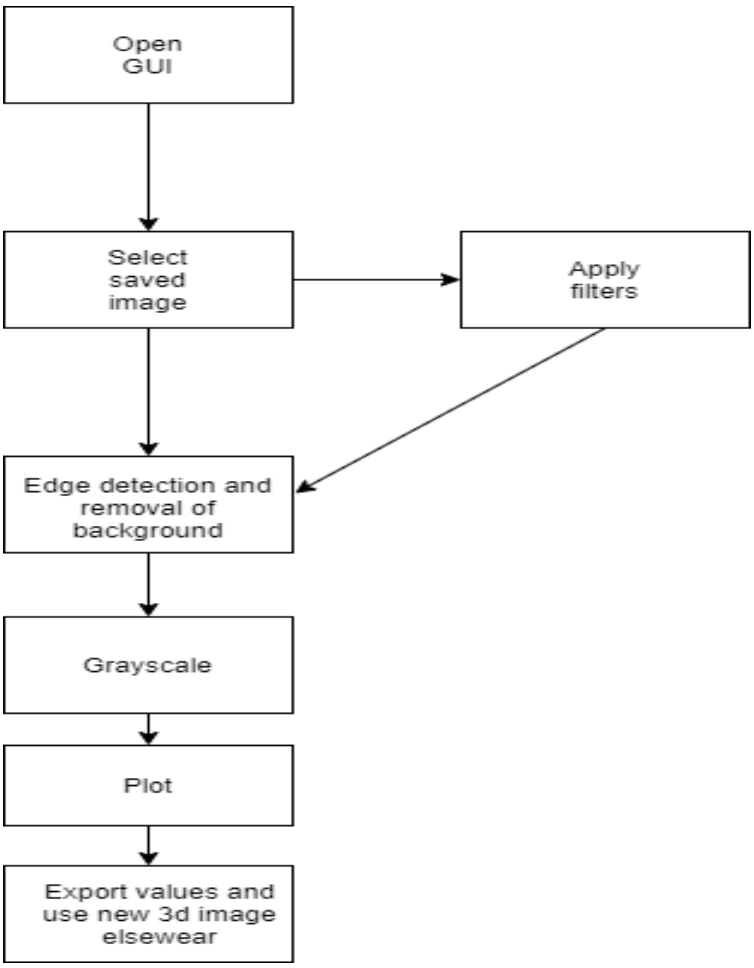
Some of the more basic libraries will be acquired by installing the bundle Anaconda which contains numpy, algorithm, matplotlib etc.

Other libraries such as Mayavi(3d plotting visualization), cv, xlwings(excel tool) will be used in addition.

The background idea stems from the material learned in the first 3 weeks of school. If prior applications that resemble this exist, it is not to my knowledge. It is also stemming from the desire to have new material in my work as a content creator. If objects in 2D pictures can be given depth and some sort of form then I believe it will be of great use to anybody who doesn't have the time to use more sophisticated software that might be out there that does something similar to my application.

The Challenge/goals and deliverables: The challenge is that all this information is very new, I have never worked with these algorithms nor attempted anything of the sort. The idea stems from the first few weeks of lectures and the goal of the project is to put those ideas presented into fruition. The challenge will be modifying what I had original thought would create my application into what algorithms, transformations and steps are

the correct implementation. I'm hoping to see if my preconceived thoughts about computer vision will materialize in front of me, that the algorithms learned in class will be able to modify the image the way I want and if the data I collect from it could possibly transform a 2d image into some sort of 3d representation. Finally, the last challenge will be to see if the final model I create can be used into other software or have any purpose.



I plan to achieve everything that has been mentioned, I believe that with some modifications and with more information that I learn along the way that this project is completely doable within the time frame given. The only one that I am not certain about is having the 3d plot values and not being able to use them in any other sort of software, so the best bonus for me would be able to 3d print one of the transformed images used in my software.

Success in my software is modifying your selected image in any way you want and then it being plotted on a 3d graph, which could then be used for other purposed once exported. Success would be if you are later able to get that in a video, 3d printed, in some sort of animation etc.

If I was to estimate I would say there is an 80-90% chance my team(just me) would be able to complete this as is explained here.

Schedule:

- February 1st – 7th Create working skeleton of the GUI that lets an image be uploaded
- February 8th – 15th Allow Image to be modified by various filters (blur, noise, etc) and convert to grayscale
- February 16th – 23rd Properly model grayscale image
- February 24th – 29th Revamp GUI and work on edge detection
- March 1st – 15th Use grayscale values to graph a 3d image, touch up all previous filters/algorithms,
- March 16th – 30th Add more filters, create export data feature, testing, use data in other software successfully.