Methodology

# Installation

## Compatible Operating systems

* 64-bit Modern operating system (Windows, MacOS, Linux)

## Initial Program Download

The program can be installed directly by navigation to the programs GitHub page the selecting the green “code” button. Here you will have the option to install the programs files with GitHub file manager or to download a zip file directly to your downloads folder. For those who do not use advanced or custom software the zip file download is recommended. The download folder with be called “SD-OCT-Points-Based-master” and later be renamed.

Once the files have been downloaded move them to a visible place on your computer, I would suggest placing the “SD-OCT-Points-Based-master” on the desktop before proceeding with the rest of the instructions.

Optional: For advanced operation using the terminal you will need to create both a “Data”, “Images” and “SmoothingLine” folder to properly load and interact with your date, but this step is not required for using the program through its user interface.

If any of the files become damaged, missing reloading the file from GitHub is the best course of action. **Note, you will not need to perform the Pre-requisite installation more then once on one computer.**

## Pre-requisite installation

This step will ready your computer for the use of the program and will be install some pre-requisites including python and some of its related packages. This operation will mainly take place using python package manager pip. As this program uses python3 please ensure that the commands “Pyrhon3” and “pip3” are used and not their equivalent to avoid using the wrong version of python installed on your system.

### Navigation:

The firs step of this process is to open the terminal then navigate to the folder that you have moved to your desktop. The terminal will be the command prompt on windows and the terminal utility on MacOs

This can be done by entering the command “cd Desktop/SD-OCT-Points-Based-master”. After pressing enter the names of the file should be found before the “%” in your terminal denoting the start of the command line input. All python files will be denoted by the ending ”.py”. Note: when entering names into the command line you can use autocomplete by pressing the tab key while entering a word.

### Installation:

Now that we are in the correct folder in our terminal, we can now look at the contents of the “requirements.txt” file. This file contains the names of individual python packages to by installed in the terminal and saved in your operating system python distribution. Note: these files will not appear on the desktop after installation. This file contains the name of the package followed by the “~=” which denote an equivalent or compatible software version to be requested in reference to version number feature at the end of each line.

The following python packages will be included in this file:

* matplotlib 3.1.0
* numpy 1.17.0
* opencv-python 3.4.4.19
* Pillow 6.1.0
* XlsxWriter 1.1.8
* Xlwt 1.3.0
* wxPython 4.0.7.post2

Each of these packages can be installed one at a tile using the command “pip3 install “package” i.e. pip3 install numpy. To install all of the packages in a single command we can use the following. The command “pip3 install -r requirements.txt” will get each of the files from the requitements file and install them in the terminal individually. If you are concerned with the possibility of previous versions of some python packages interrupting your download you can install these packages with the command “pip3 install -U requirements.txt” which is especially useful for those running the MacOS operating system.

## Running the program

The program can be run by selecting the one of the program files. The “Z” before some of the files denotes the use of Zebrafish instead of the Lumpfish. To use the program with a user interface you can select the “Program.py” for Lumpfish or “ZProgram.py” for zebrafish. On windows a double click of this file when properly installed will launch the program. On other operating systems you will need to navigate to the program folder in the terminal first using the same command as in the installation folder each time you close the terminal in order to open the program. Once there you can use the “python3” before the name of the file you wish to open including its “.py” ending. Alternatively, to use the command line version of the program with the command “python3 ImagePointsBased.py” or “python3 ZPointsBased.py” for Zebrafish.

## Program Settings

The programs feature’s many setting to allow the users to control the algorithm key variables. The following settings will be shown on upon opening the UI based software.

• Starting image height (UI mode only)

• Ending image height (UI mode only)

• Starting image width (UI mode only)

• Ending image width (UI mode only)

• Starting image number

• Ending image number

• Image set number (starts at zero)

• White value threshold

• Minimum gap value (Must be negative in command version)

• Maximum gap value (Must be negative in command version)

• Minimum pixel gap value

• Storage type (Classic = xls, Modern = xlsx, CSV = csv)

• Heat map setting (A for automatic or provide a number in pixel to compare sets of heat maps)

• Smoothing line (S = smoothing line, N = turn off smoothing line)

To use the command line version of the program you will be editing the “setting.txt” file which will give the user access to the above-mentioned setting in order from left to right. The command prompt version may be used to computer larger datasets as a faster speed.

## Program Output

The program output from the UI based program will appear in the same folder as the program files featuring the same name as the original data.

If you have chosen the command line base method file will appear in their respective folder for “Images” and “SmoothingLine” with the measurements file and heatmap appearing in the software folder.