Image processing

Graphical User Interface

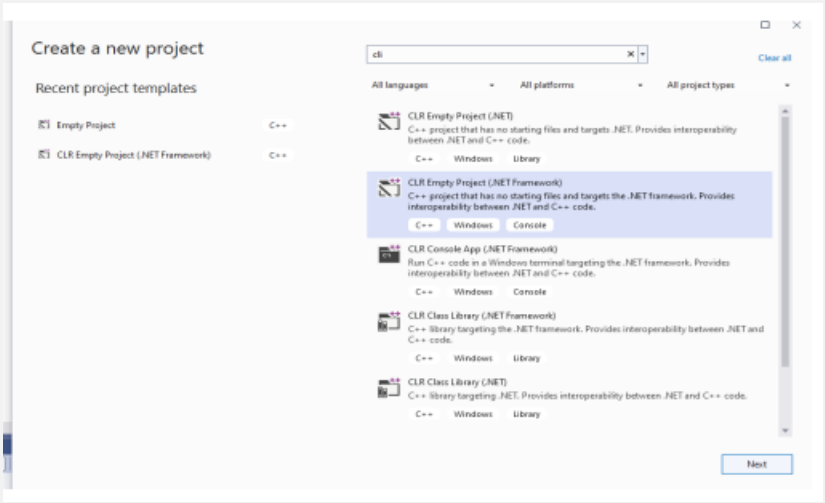
Tasneem Sherif

LEVEL4 SEC 3

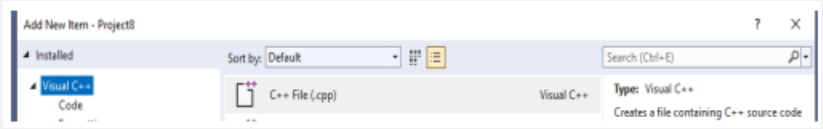
Table of Contents

Steps of Creating GUI Project:

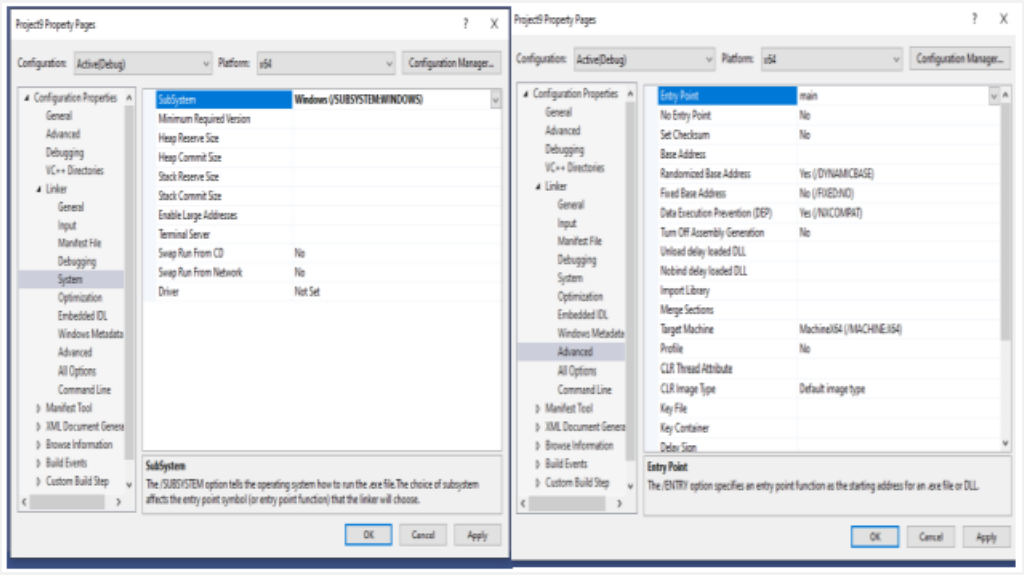
1) Create New Project



2) Add C++ File Project -> add new item



3) Project -> properties -> linker -> system

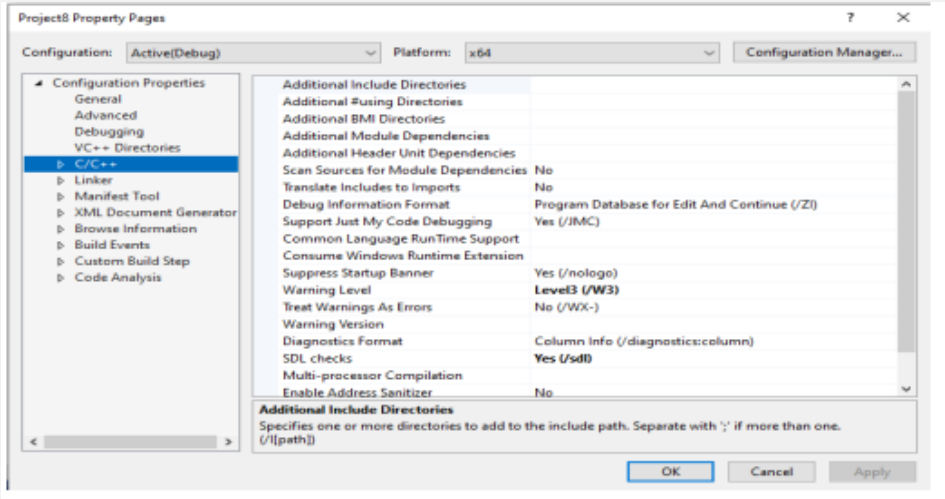


4) Add OpenCV files

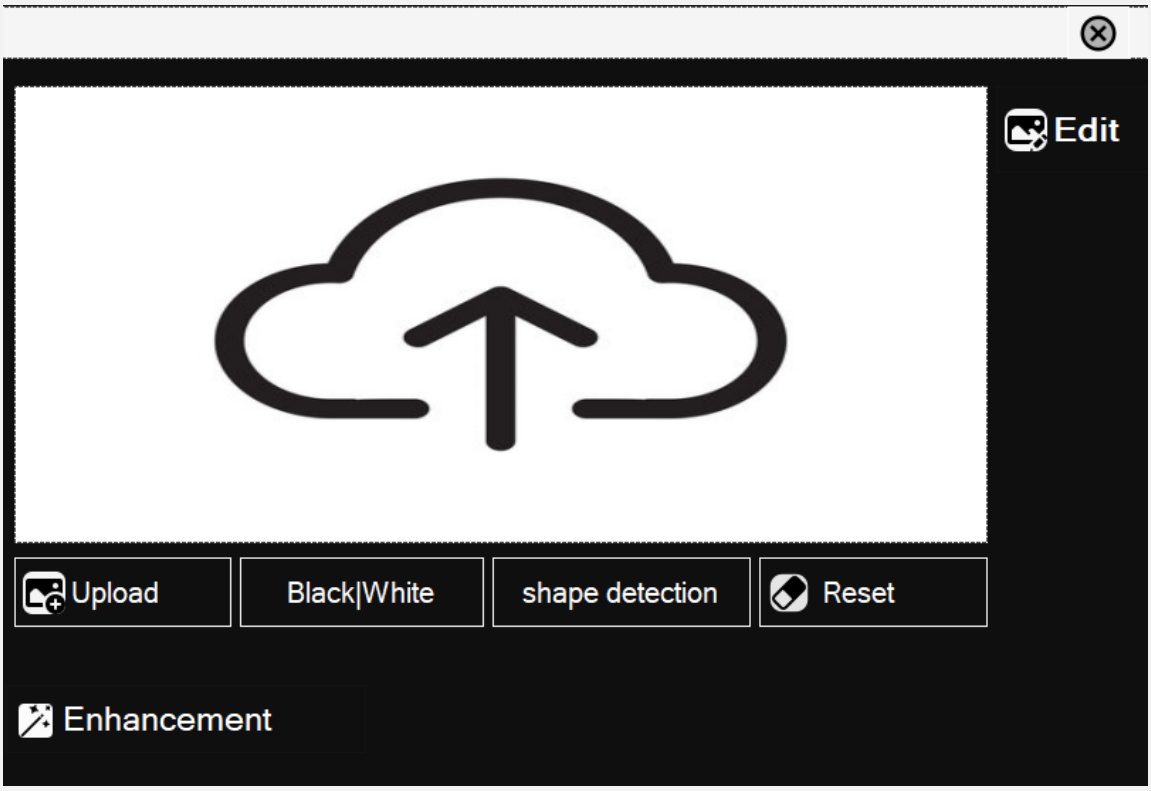
Project -> properties

- Configuration -> all configuration and platform ->x64

- C/C++ ->General : Additional include directory -> C:\Users\Update\Downloads\opencv\build\include
- Linker ->General : Additional library directories -> C:\Users\Update\Downloads\opencv\build\x64\vc15\lib
- Configuration-> Debug and platform -> x64
- Linker -> input : Additional dependencies -> opencv_world430d.lib
- Configuration ->Release and platform ->x64
- Linker -> input : Additional dependencies ->opencv_world430.lib



GUI:



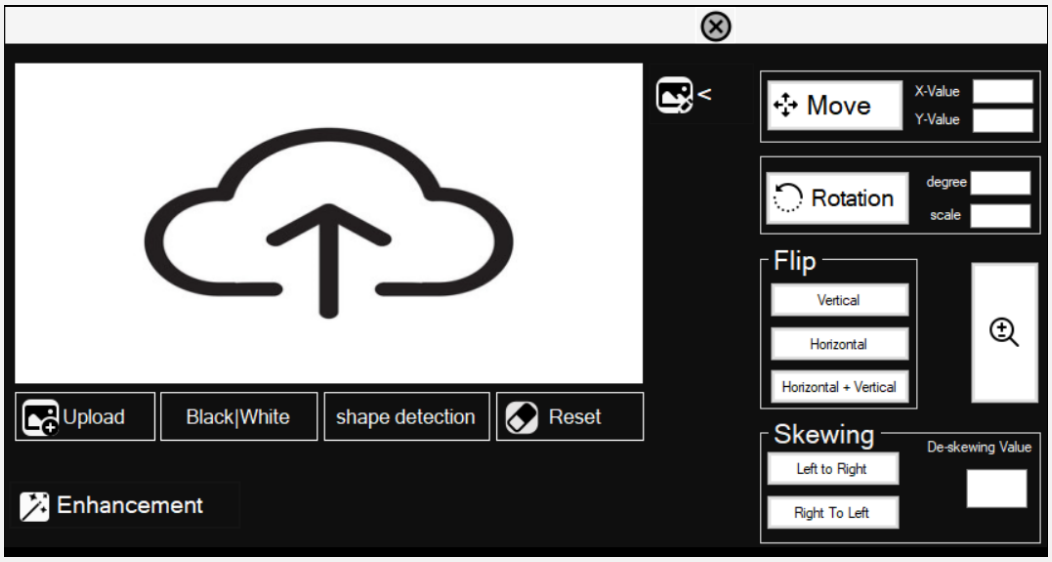
(fig 1)

This project is for making some functions in your images like (Rotate, Zoom, Move, etc.).

Screens:

Screen 1: The first screen that will be shown to the user is shown above (fig 1), this screen has sections like the edit section, enhancement section, and 4 main buttons in the application.

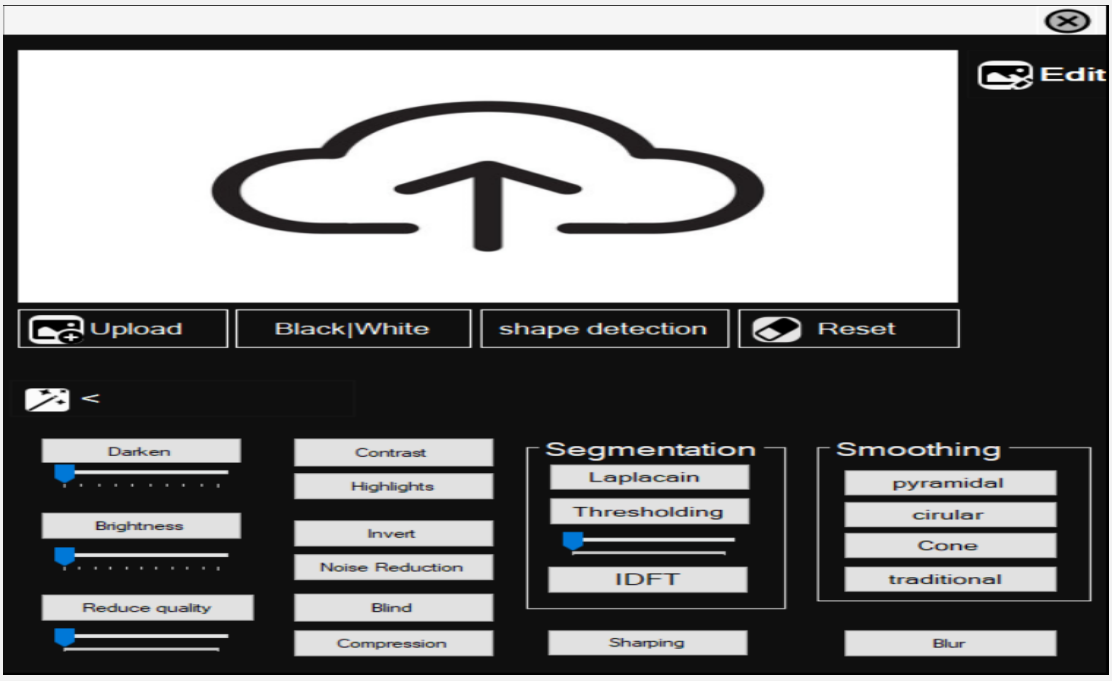
Screen 2: This new screen has a whole new button for editing showing below in (fig.2)



(fig 2)

Screen 3:

For making enhancement in an image click on the enhancement button and a whole new window will appear shown in the fig below (fig. 3)



(fig. 3)

Controls:

Screen 1:

Upload: for uploading the image

Black and white: you can make your image black and white which is needed for the enhancement then you will find the

shape detection button for getting shapes like rectangles, circles, etc.

reset button: to get back your original image

the edit button that opens a new menu is shown below in (fig 2)

the enhance button that opens a whole new menu is shown in (fig.3)

screen 2:

Move: for moving the image right and left by adding a value to the x-value box, for moving the image up and down add a value to the y-value box

Rotation: for rotating the image with a degree added by the user in the degree box, and a scale for zooming while the rotation

Flip: for mirroring the image in the y-axis by the horizontal button, for mirroring the image in the x-axis by clicking the vertical button, for making both click on the Horizontal + vertical button

Zoom: for zooming in on the image

Skewing: for skewing the image with two options that are left to right or right to left

Screen 3:

- **Darken:** by the power transformations function and playing with gamma value you can make your images darker
  function used is -> $s=c*r$ (gamma)
- **Brightness:** by the Logarithmic Transformations Used to map a narrow range of dark input values into a wider range of output values
  The transformation function used is -> $s = c * loge (1 + r)$
- **Reduce quality:**
- **Contrast:** by using histogram equalization for increasing the contrast in an image
- **Highlight:** by the gray level function the user can increase the highlight in an image
- **Invert:** by using negative functions which invert the black to white and the inverse
- **Noise reduction:**
- **Blind:** for mixing two images together
- **Compression:** using the bit plane concept for compressing the image size
- **Segmentation section:** multiple buttons for making segmentation on an image
- **Sharping:** try to find an edge by finding sharp changes in intensities
- **Smoothing section:** multiple buttons for making various smoothing edit in the image, Remove spark noise, and blurring edges.
- **Blur:** with the help of the midden blur function for reducing the image without losing the image edges

Theme:

The overall theme and color pallet are chosen for the user's comfort, simple colors like black and white if any user has color blindness, and a small number of buttons on the first screen to not let lead the user to confusion and for our interface accessibility that is made for all kind of users.

User flow:

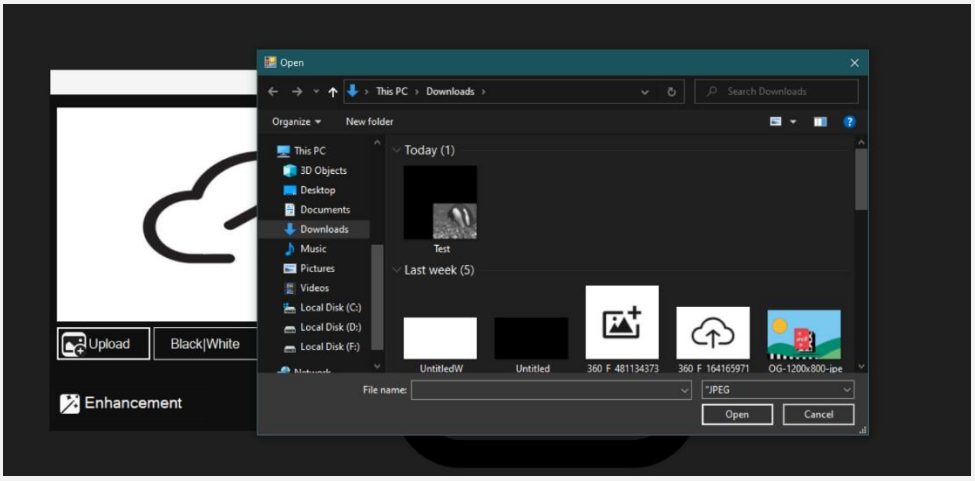
the user starts with uploading the desired image, then making the image black and white, editing the image by opening the edit menu and choosing the edit wanted, then making enhancement by opening the enhancement menu, the image will be saved by default and the user can access to it anytime

example:

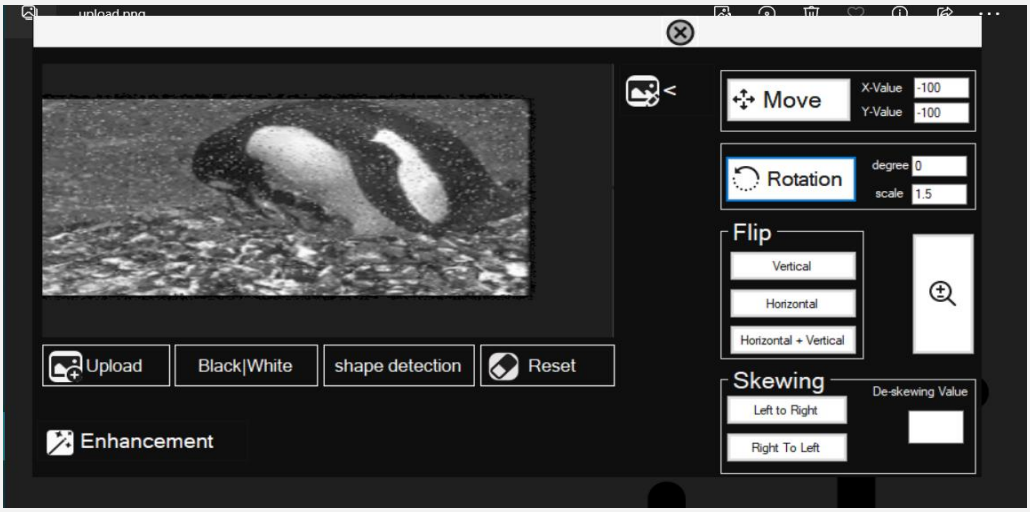
the input image:

Steps for enhancement:

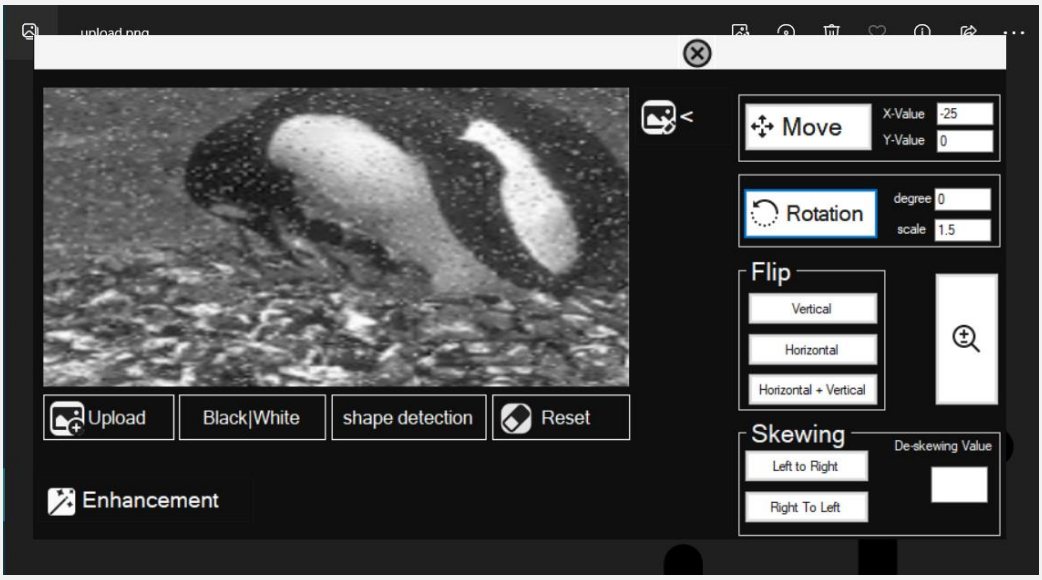
1) First will click on the upload button for uploading an image



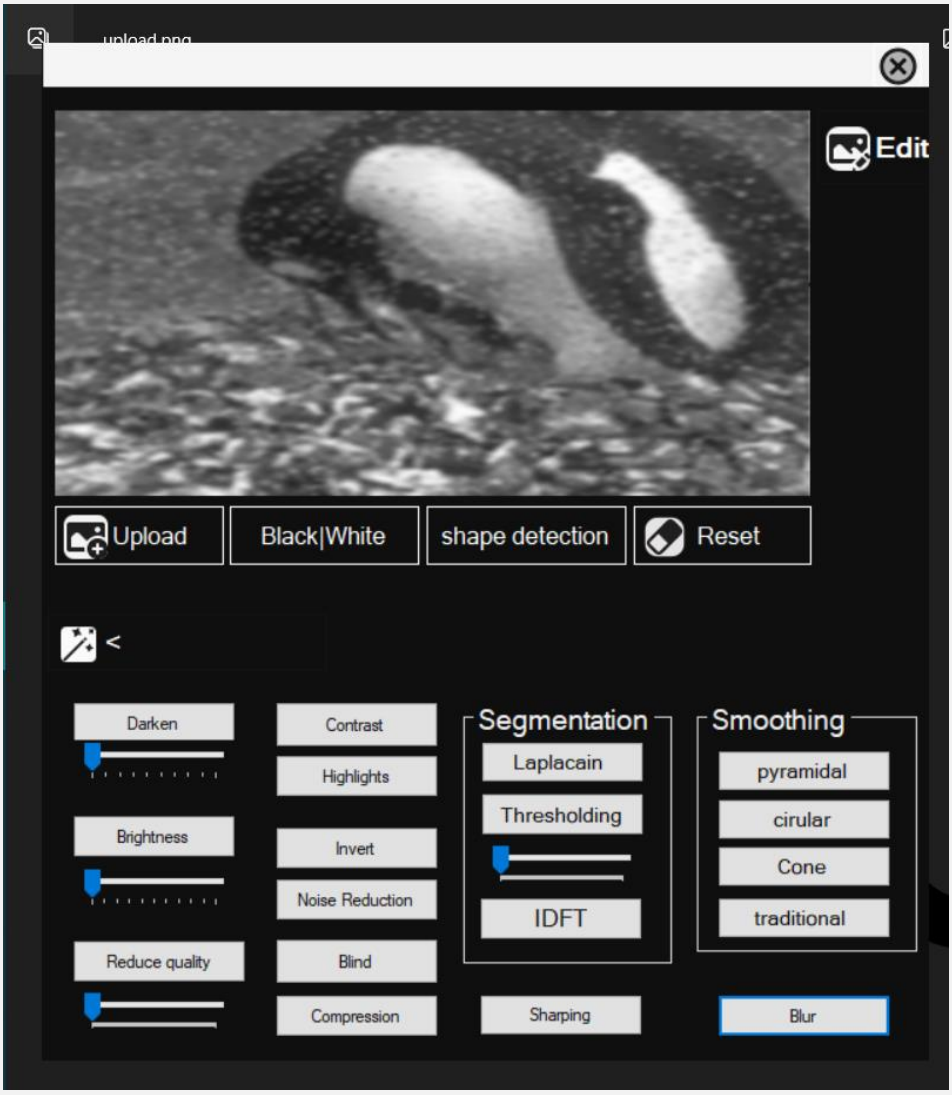
2) The second step is move the image to the middle



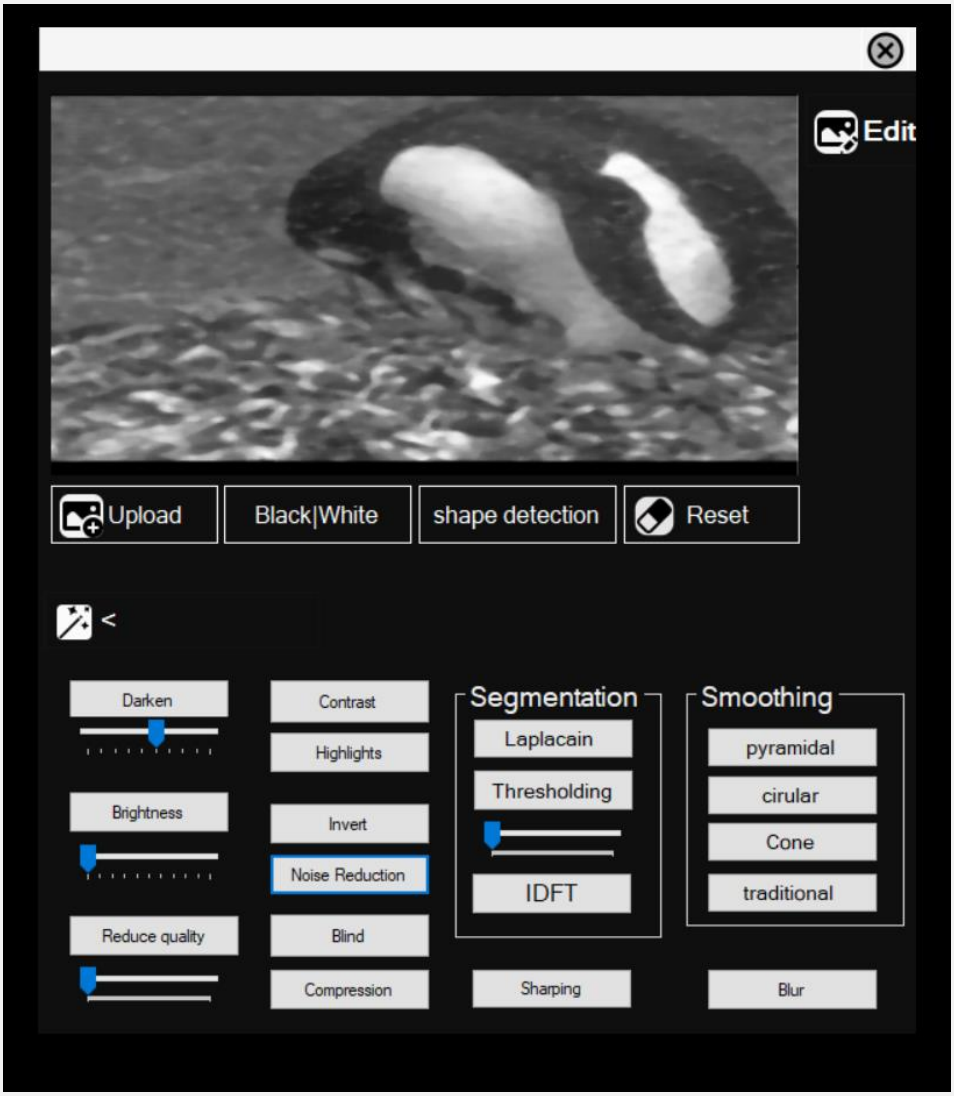
3) Zoom on the image to make the image full screen



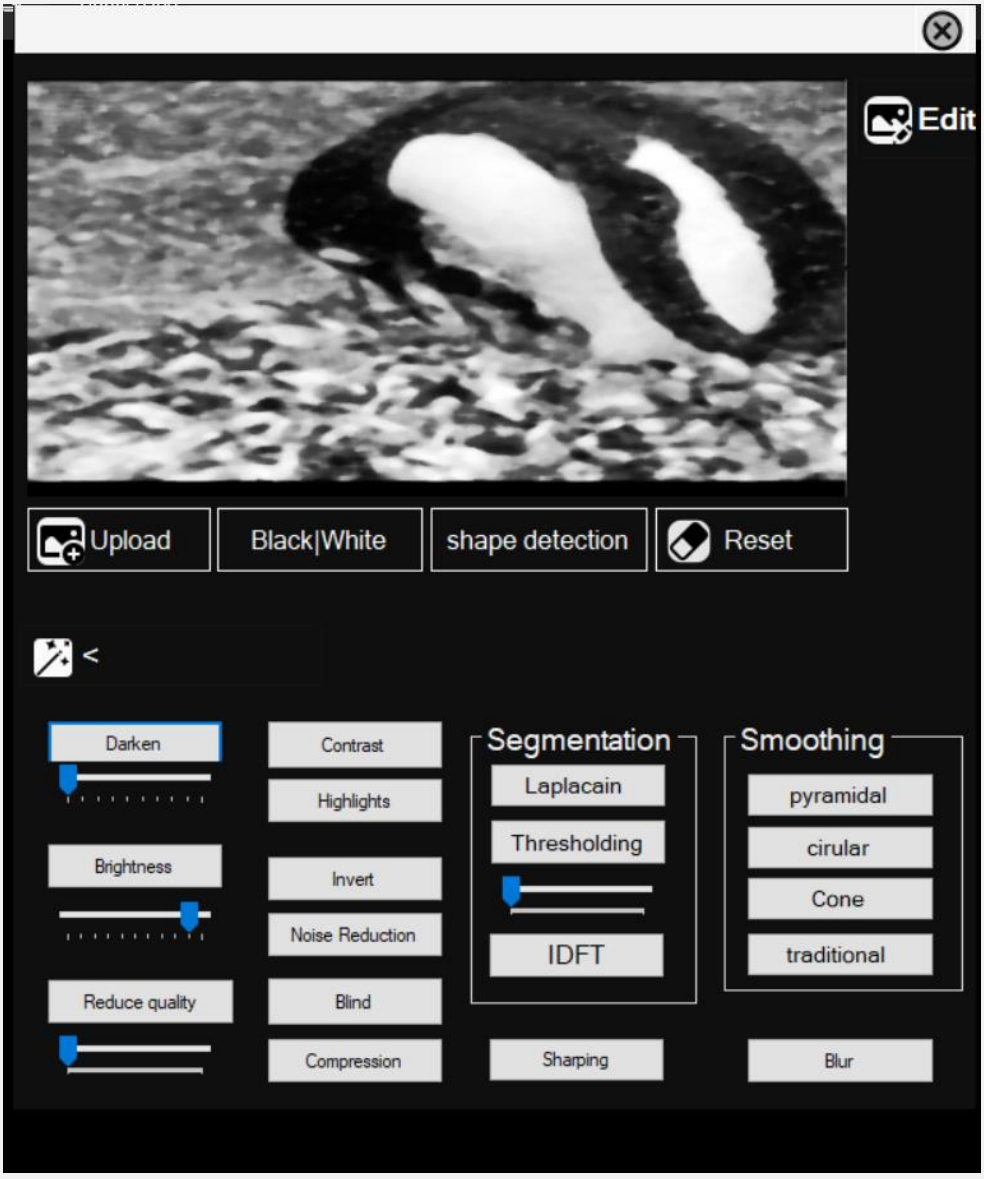
4) Now we will start to make some enhancements starting with blurring



5) Then we will reduce noise by clicking on Noise reduction button



6) Next step is increasing the contrast by clicking on the contrast button and darkening the image a little bit by selecting a darken value and clicking on the darken button.



7) The image will be saved automatically to give the user access to it if the PC is turned off suddenly.