DETERMINING SHAPE AND SIZE OF OBJECTS IN A GIVEN IMAGE

GROUP MEMBER:

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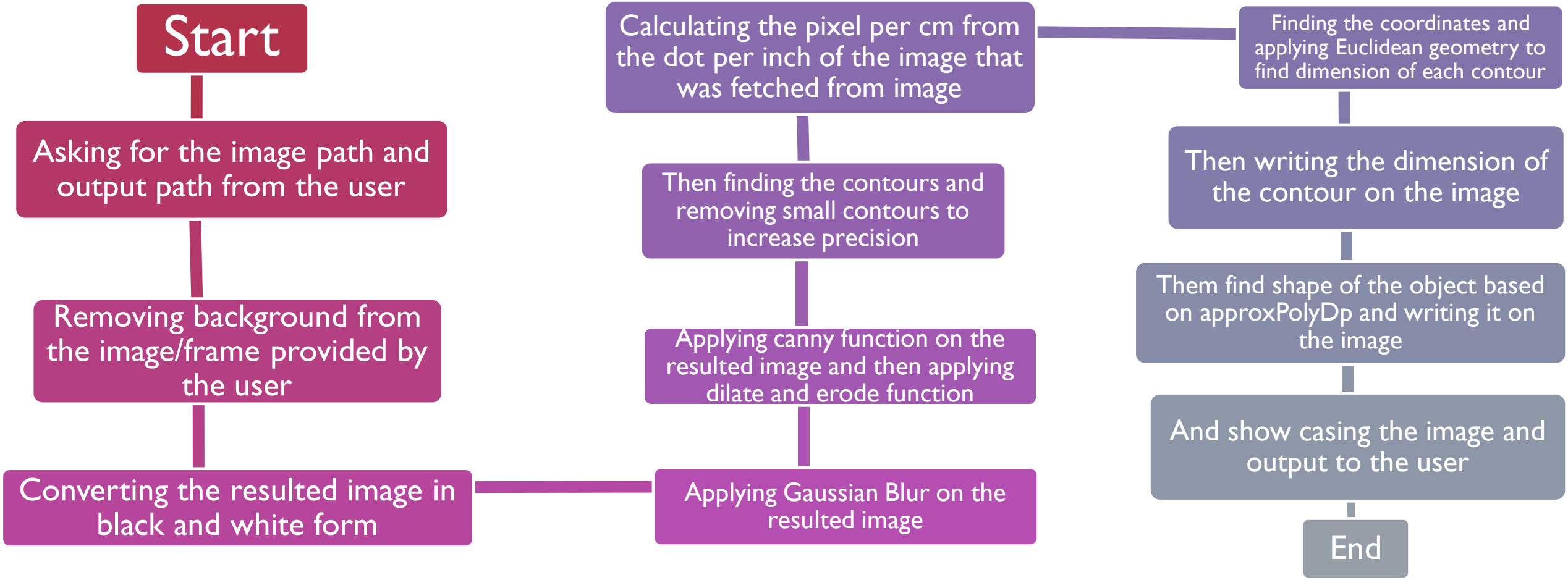
OBJECTIVE OF THE PROJECT

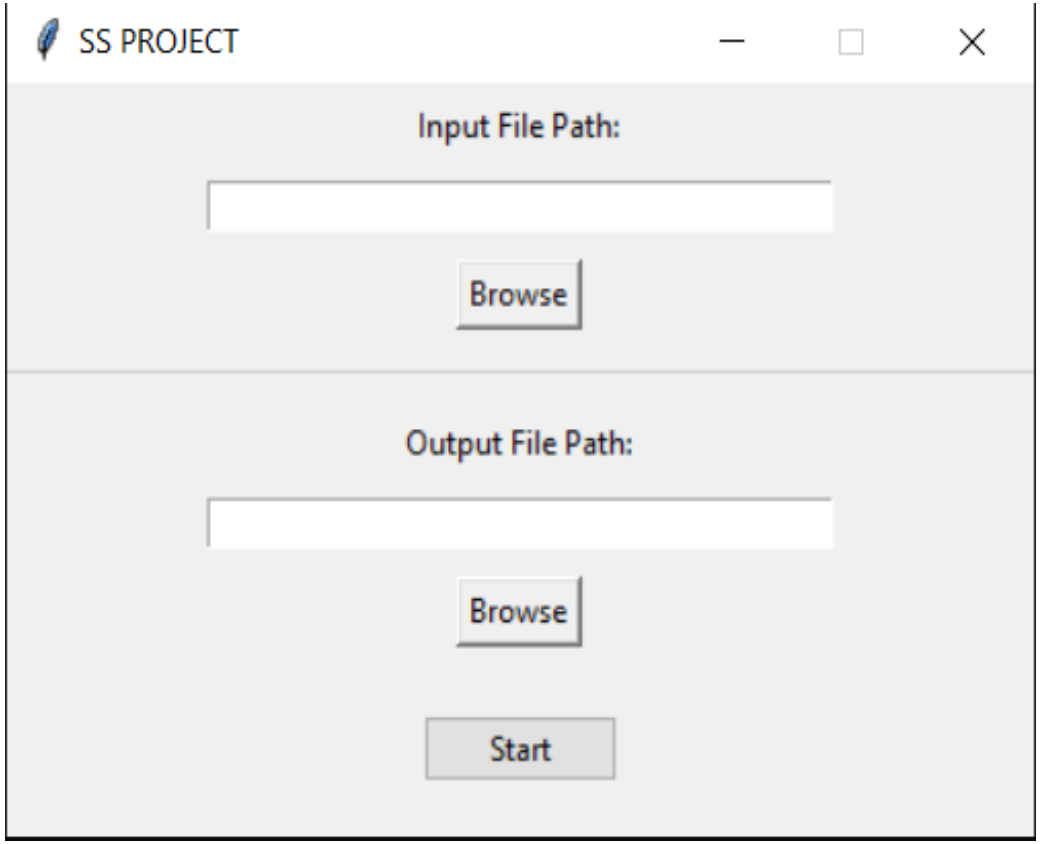
- Measuring objects within an image or frame can be an important capability for many applications where computer vision is required instead of making physical measurements.
- This application note will cover a basic step-by-step algorithm for isolating a desired object and measuring its diameter/dimension.
- It will also try to determine the 2D shape using the concept of *Contours*.
- This application can be used in determining the dimension and shape of objects in a given image or frame using the 2D image we are available with.

FLOWCHART OF THE ALGORITHM



USER INTERFACE-INPUT AND DEMO

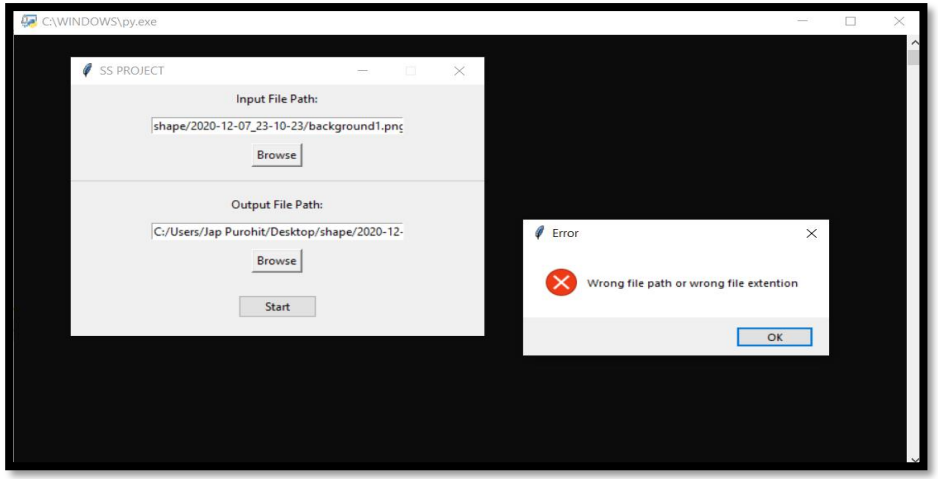
- The user interface has majorly allowed user to provide the path of the image where it is stored.
- After all image processing and the user is displayed with 5 images that are background removed image, grey image, blurred grey image, blurred image, and determined shape and dimension image.
- At last all the results output is saved in the path provided by user in a new folder with folder_name as time stamp when application was accessed.
- Images saved will included all outcome after performed each and every image processing function.



VALIDATION IN USER INTERFACE AND FACTORS AFFECTING RESULT

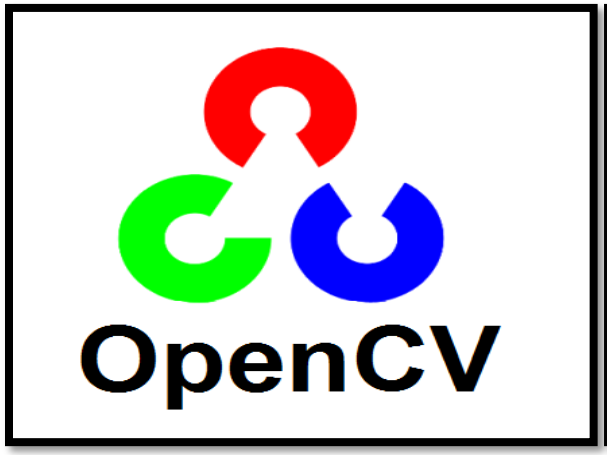
- **Validation in User Interface**
  - This application also provides validation and error detection for user input.
  - It only take .png file format or jpg file format image file
  - Check whether path provided by the user is correct or not.
- **Factors affecting Results**
  - Image should be strictly 2D image.
  - Photograph should be taken perpendicular to the plane of the object where it is placed.

```
validextension = ['jpg','png','jpeg']
inputPath = input_entry.get()
try:
    if len(inputPath.strip()) == 0:
        answer()
        return
    kind = filetype.guess(inputPath)
    kindtype = str(kind.extension)
    if kindtype not in validextension:
        answer()
        return
except FileNotFoundError:
    answer()
    return

outputPath = output_entry.get()
try:
    if path.isdir(outputPath) == False:
        answer()
        return
except FileNotFoundError:
    answer()
    return
filePathDict['inputPath'] = inputPath
filePathDict['outputPath'] = outputPath

print(filePathDict)
mainfunction(filePathDict)
```



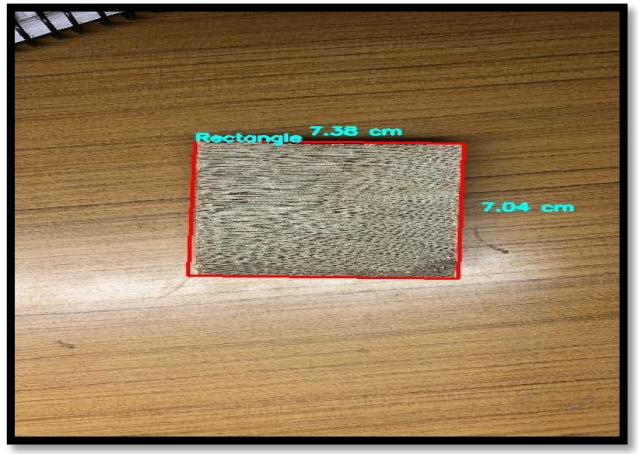
TOOLS USED IN MAKING THIS PROJECT

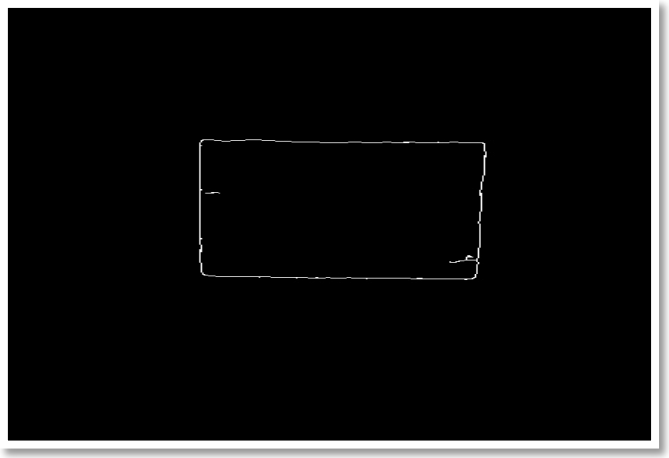
- Programming Language used for this project is **"Python 3.7.3"**
- Library used in making this project:
  - scipy for measuring Euclidean distance
  - imutiles for contours
  - remove_bg_api for removing background
  - numpy for handling image data
  - cv2 for image processing
  - tkinter for Interface creation
  - os library for handling with file system and validation of user input.
- File submission would be in the format of ".py"



RESULTS OBTAINED

- While Displaying the image:
  - Majorly five images are displayed to the user : removed background image, black and white image, blured image, edge detected image, final output image.
- Images Saved:
  - All images obtained after each step of image processing. All this image is are stored to the output path provided by user.





CONCLUSION

- On a closing note, this project was a great chance for us to learn the principles of Canny i.e. Gaussian convolution to smooth the input image and remove noise.
- In addition to the fact that we learned substantially more about it and applied into the project. In addition to this, there are many other elements for resizing of an image by decimation and interpolation.
- The big task while making this project for us was to create an user interface which would take the input and output location of the image into which validation for the image extension is also added as this was the first time we were supposed to merge the locations into a same interface.
- But apart from that, engaging with the team was a remarkable opportunity, and getting their input on how to go forward to tackle a specific challenge and eventually finished the project. Each member of the group made an equal contribution to the analysis of the project.