JAYPEE INSTITUTE OF INFORMATION TECHNOLOGY

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विद्या तत्व ज्योतिसमः

MINOR PROJECT

Virtual Guide

SUBMITTED TO :

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Introduction

Technology is defined as “the application of scientific knowledge for practical purposes”. Keeping this in mind we attempted to solve one of the trivial problems one faces while travelling to new places. A virtual guide which recognises the input photo and outputs user’s current position, recommends nearby places and presents a video tour of that place would certainly be a dent to above mentioned problem. Also as the project grows, it should be able to expand its database and still be efficient in its computation.

The project tends to divide its user into two categories:

1. Administrator
2. Explorer

As the name suggests , Administrator has its control domain over the database ,i.e. , is able to update it , thereby contributing to the growth and accuracy of project. This user also enjoys all the features that an explorer does. Using the “explorer feature” the Admin could test run the new update.

The explorer type user is the domain which we humbly attempted to help in virtual tour domain. The features that explorers could use include upload image and getting its current location, and get recommendation of places nearby. Also the project provides a video guide which displays the place where the photo belongs to and the recommended nearby places.

The project is entirely built using python and its libraries like

- Numpy –for matrix manipulation
- openCV – for resizing and manipulating images
- moviepy – for video guide
- selenium –for facebook login authentication
- pillow -For resizing and manipulating images
- tkinter –UI

The project also uses facebook to authenticate user based on their facebook login id and password, thereby making its features more available to larger domain owing to facebook’s social presence.

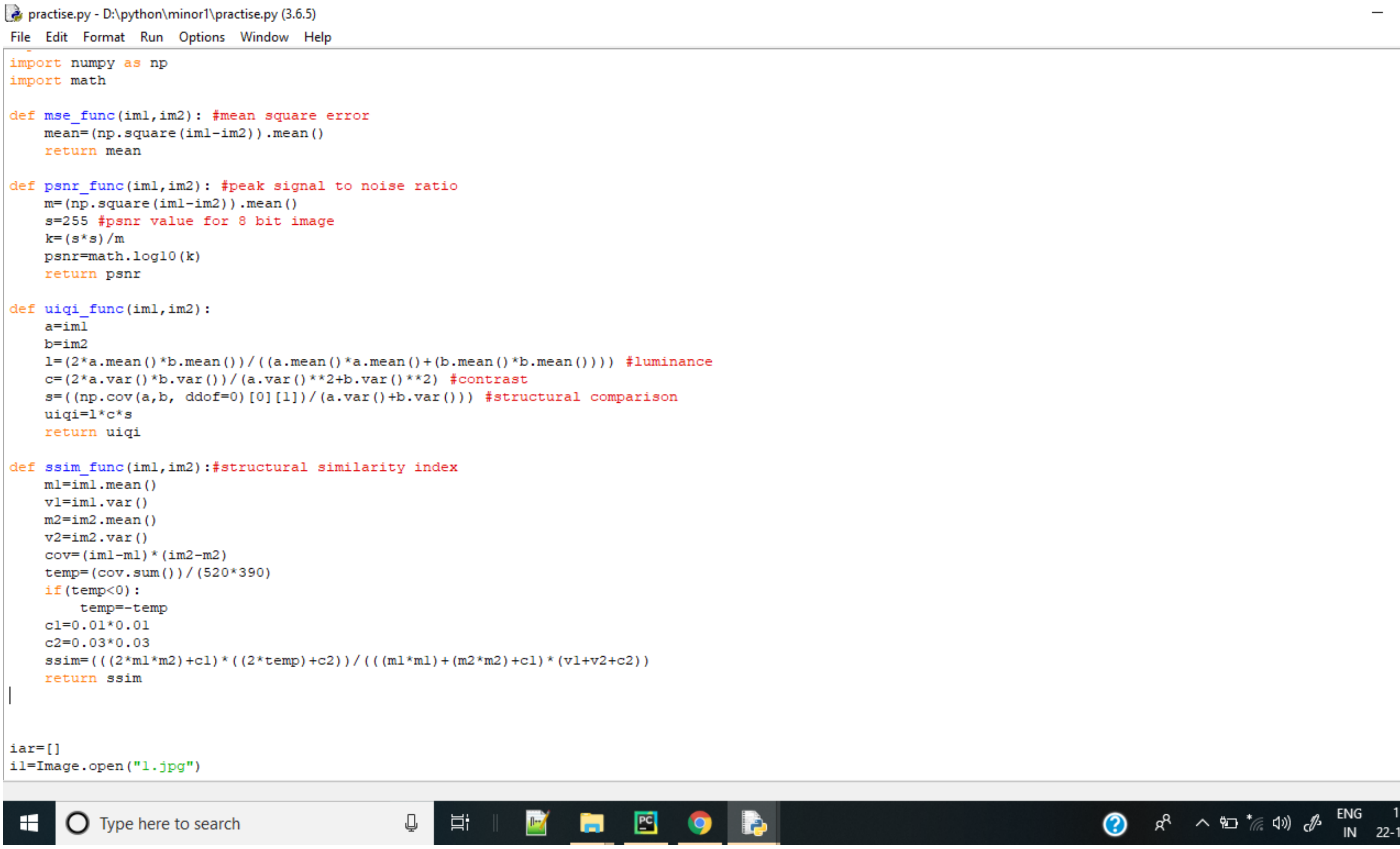
Literature Survey:

Paper name	Author, publisher and year	Algorithm and modules	Data sets used	Measurement and comparison criteria	Merits	Demerits
Comparison of Image Quality Assessment: PSNR,SSIM, UIQI	Yusra A. Y. Al-Najjar, Dr. Der Chen Soong	SSIM	JAYPEE Images 	$SSIM(x,y) = \frac{(2\mu_x\mu_y+c_1)(2\sigma_{xy}+c_2)}{(\mu_x^2+\mu_y^2+c_1)(\sigma_x^2+\sigma_y^2+c}$	• Best method for image comparisons without rescaling, rotation • Gives value between 0-1(0 for dissimilarity and 1 for perfect similarity)	• Not good for angle variations and manipulations. • Gives error when image is not of same scale.
		MSE	JAYPEE Images 	$MSE = \frac{1}{NM}\sum_{m=0}^{M-1}\sum_{n=0}^{N-1} e(m,n$	• Simple and Effective • Used for average of deviations	• Can produce differed results when image is intensified • Not efficient in real life images
		PSNR	JAYPEE Images 		• Uses bit size as constant to improve MSE	• Not efficient and accurate in case of

				$PSNR = 10log\frac{S^2}{MSE}$	efficiency • Inversely related to MSE	dissimilarity • Gives different results for similar images too
		UIQI	JAYPEE Images 	$UIQI(x,y) = l(x,y).c(x,y).s(x,y) = \frac{4\mu_x\mu_y\mu_{xy}}{(\mu_x^2+\mu_y^2)(\sigma_x^2+}$	• Similar to SSIM with less accuracy • Good for image comparison of similar configurations	• Not efficient with dissimilar images but still better than MSE and PSNR • Weaker version of SSIM
Research.txt	Himanshu Gupta, Ark Srivastava, Utkarsh Raghav, Arpit Pathak	Comparison between different methods of image comparison	Same as above	Same as above	Same as above	Same as above

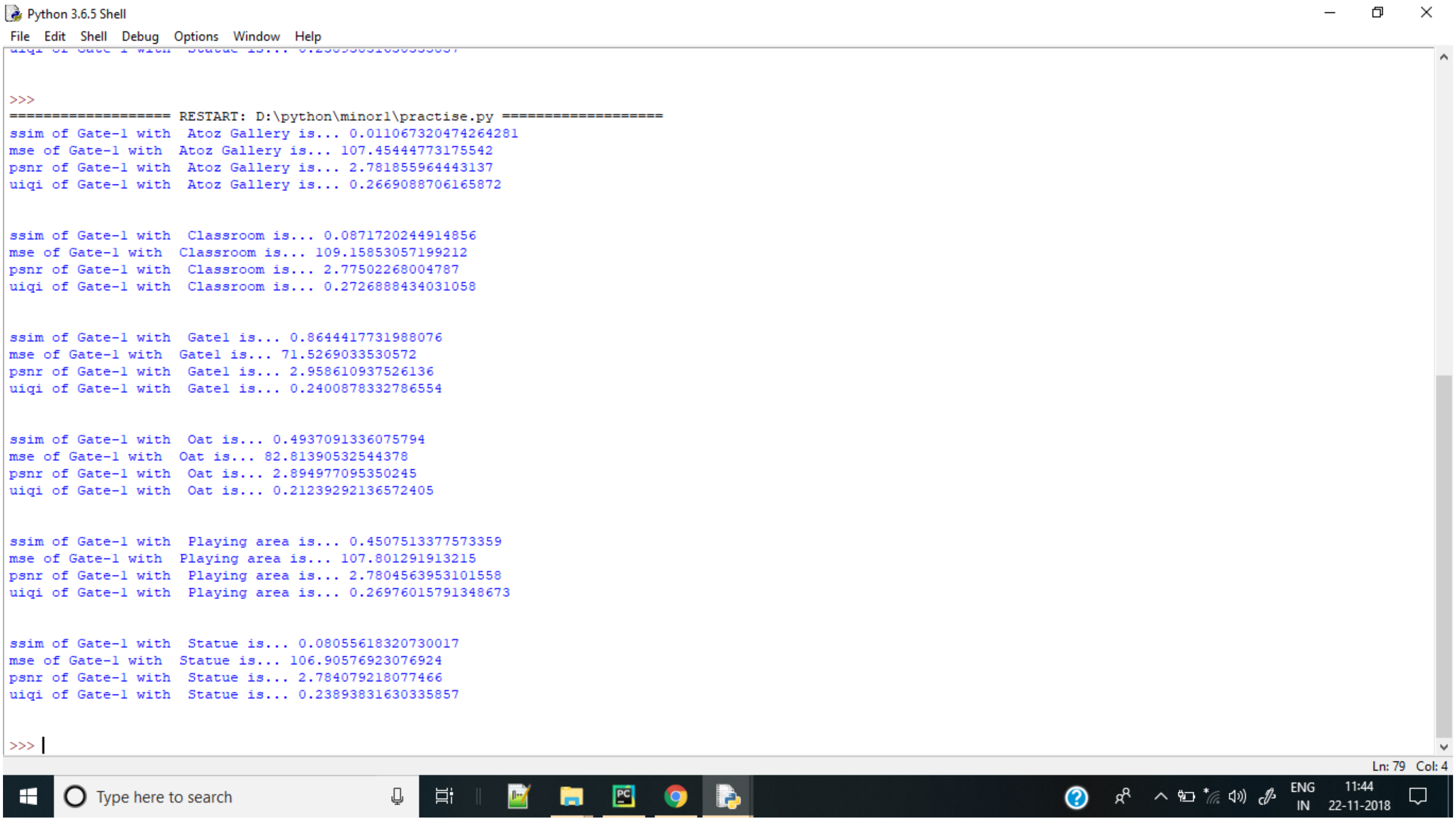
Screen shot image	**What does it do**	**Input and processing**

Research functions and Result:

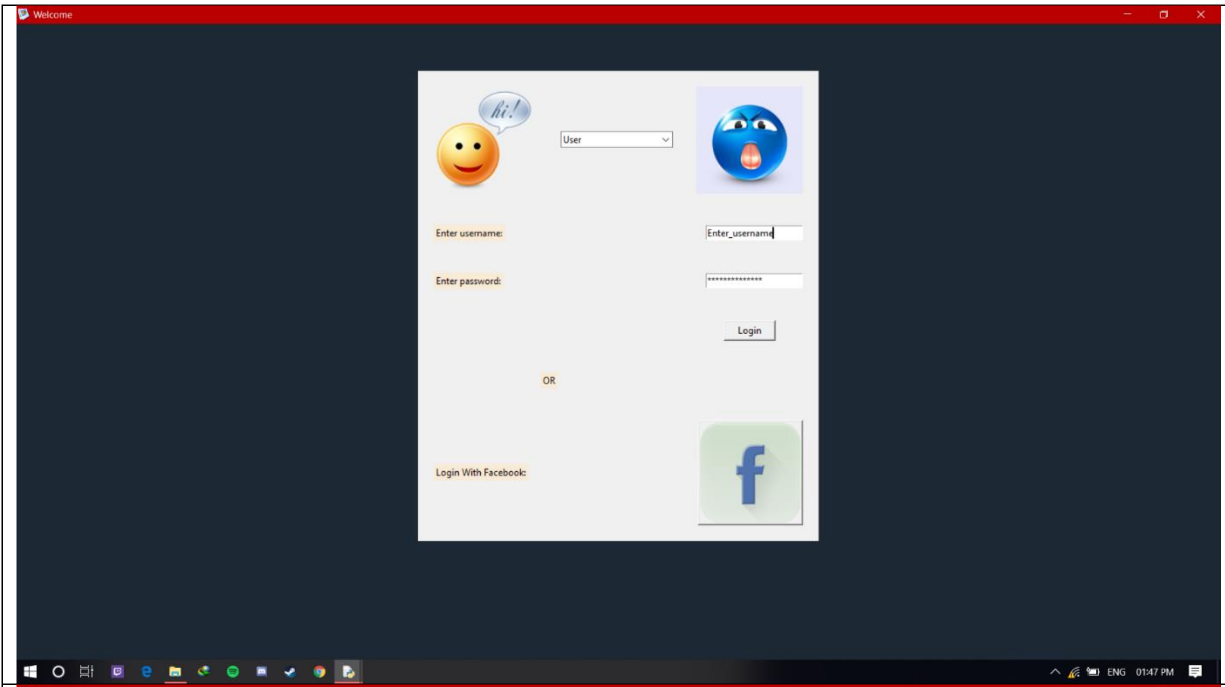
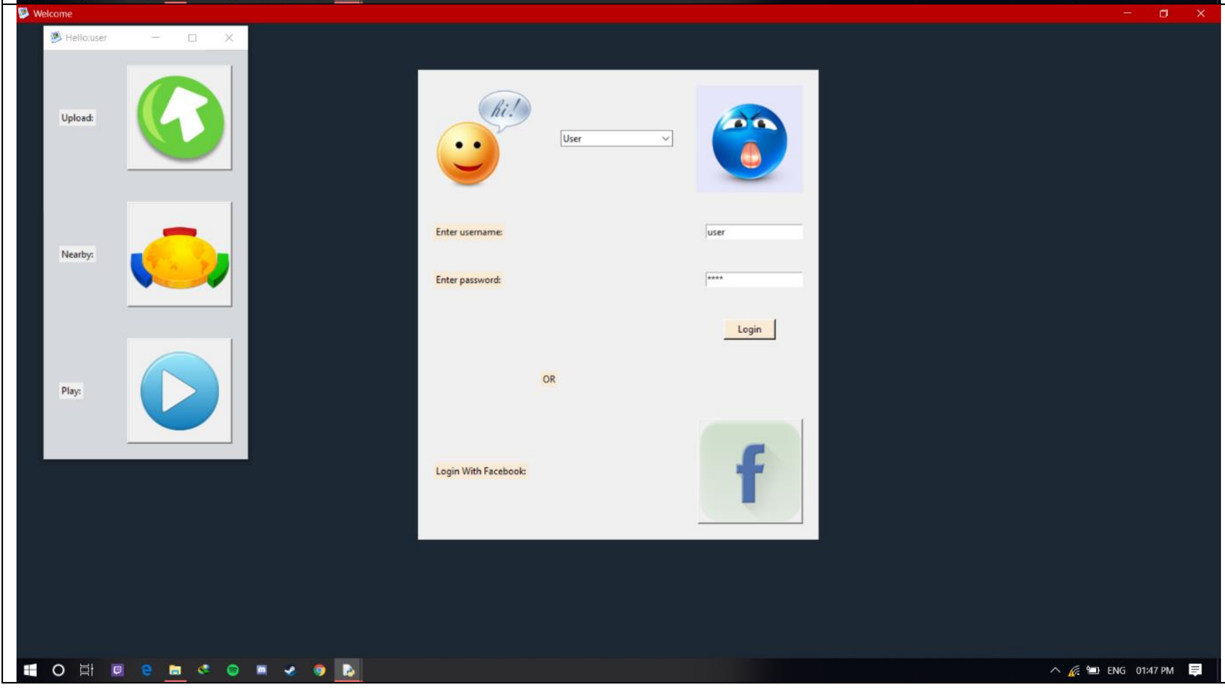


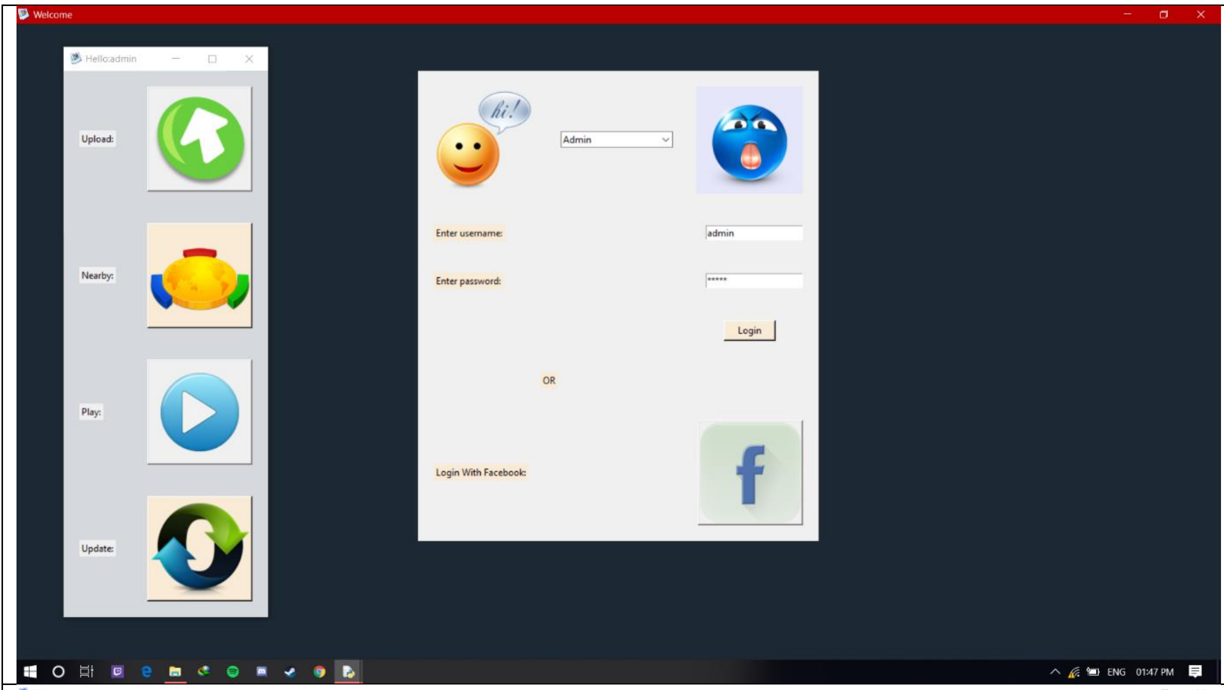
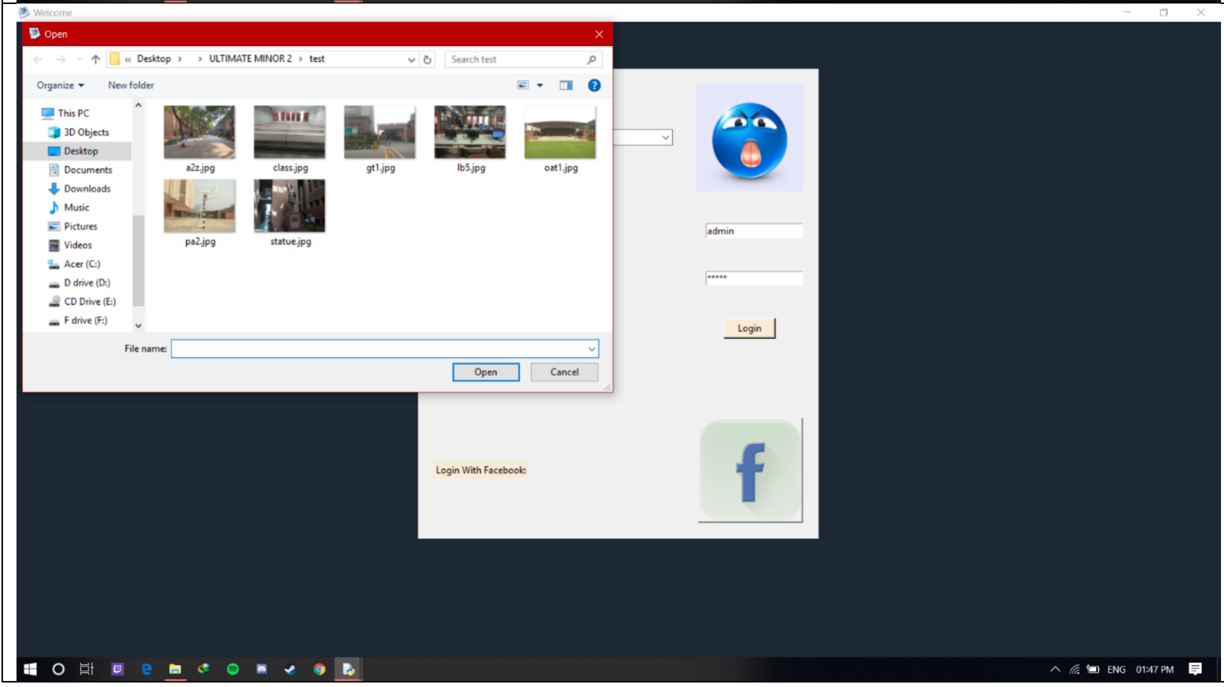
practise.py - D:\python\minor1\practise.py (3.6.5)
File Edit Format Run Options Window Help
Type here to search
ENG
IN

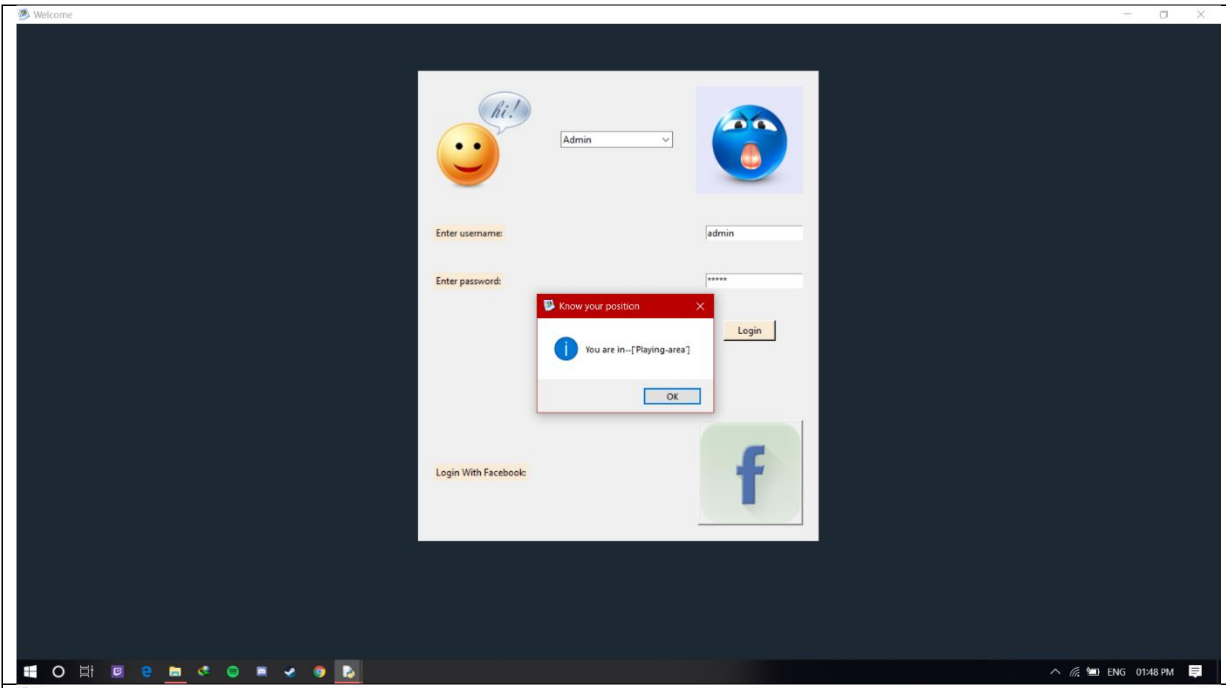
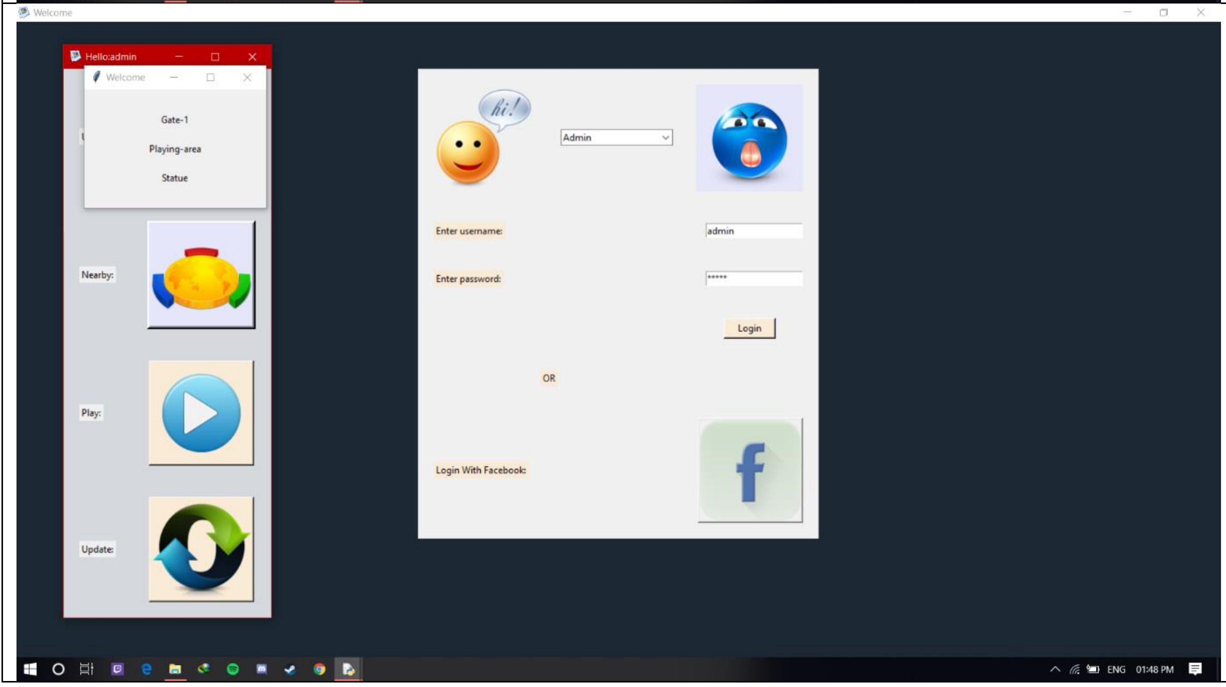
```
import numpy as np
import math

def mse_func(im1,im2): #mean square error
    mean=(np.square(im1-im2)).mean()
    return mean

def psnr_func(im1,im2): #peak signal to noise ratio
    m=(np.square(im1-im2)).mean()
    s=255 #psnr value for 8 bit image
    k=(s*s)/m
    psnr=math.log10(k)
    return psnr

def uiqi_func(im1,im2):
    a=im1
    b=im2
    l=(2*a.mean()*b.mean())/((a.mean()*a.mean()+(b.mean()*b.mean()))) #luminance
    c=(2*a.var()*b.var())/(a.var()**2+b.var()**2) #contrast
    s=((np.cov(a,b, ddof=0)[0][1])/(a.var()+b.var())) #structural comparison
    uiqi=l*c*s
    return uiqi

def ssim_func(im1,im2):#structural similarity index
    m1=im1.mean()
    v1=im1.var()
    m2=im2.mean()
    v2=im2.var()
    cov=(im1-m1)*(im2-m2)
    temp=(cov.sum())/(520*390)
    if(temp<0):
        temp=-temp
    c1=0.01*0.01
    c2=0.03*0.03
    ssim=(((2*m1*m2)+c1)*((2*temp)+c2))/(((m1*m1)+(m2*m2)+c1)*(v1+v2+c2))
    return ssim



iar=[]
i1=Image.open("1.jpg")
```

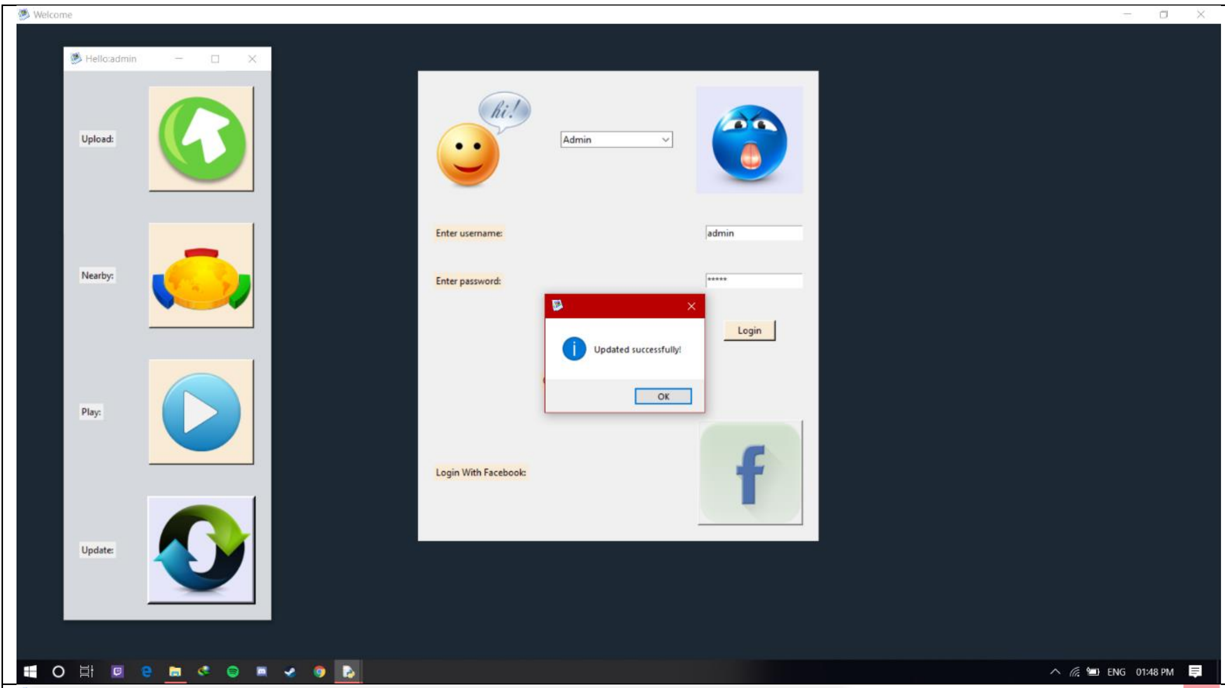
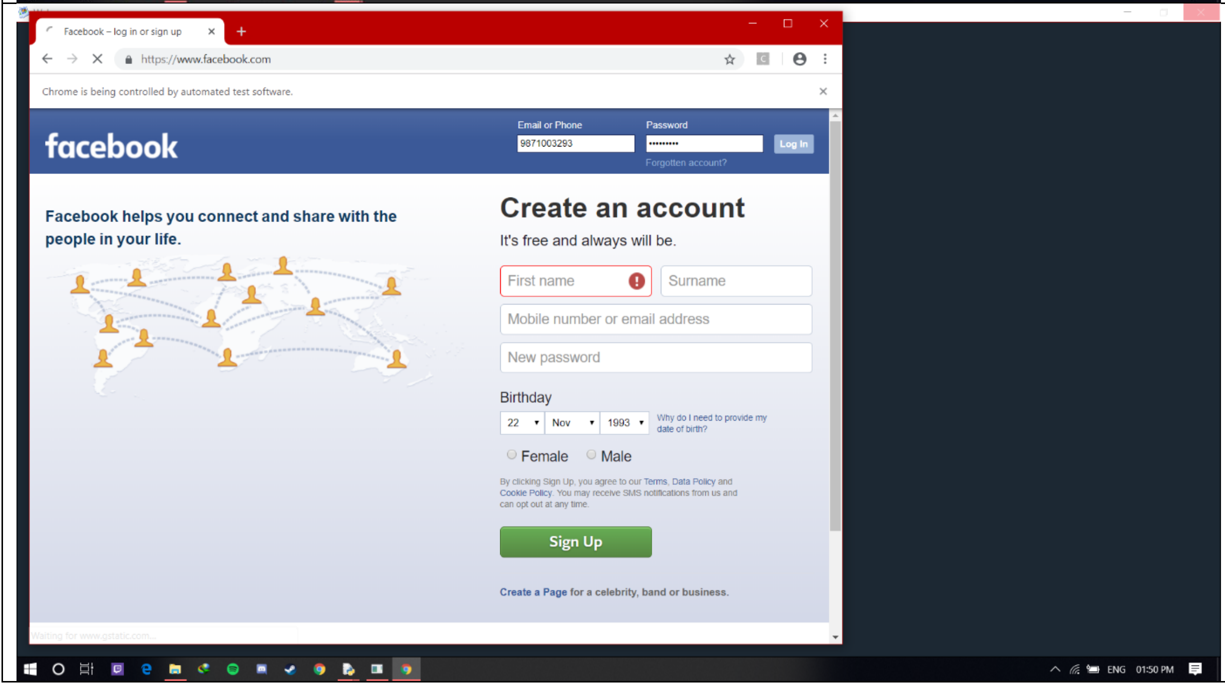


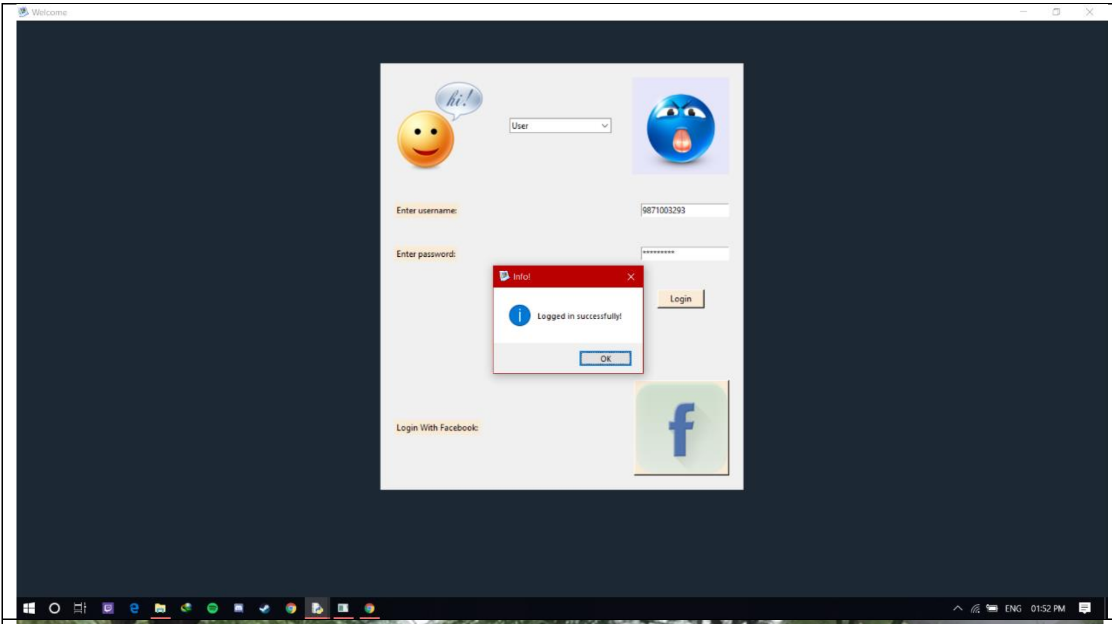
```
>>> 
=================== RESTART: D:\python\minor1\practise.py ===================
ssim of Gate-1 with  Atoz Gallery is... 0.011067320474264281
mse of Gate-1 with  Atoz Gallery is... 107.45444773175542
psnr of Gate-1 with  Atoz Gallery is... 2.781855964443137
uiqi of Gate-1 with  Atoz Gallery is... 0.2669088706165872


ssim of Gate-1 with  Classroom is... 0.0871720244914856
mse of Gate-1 with  Classroom is... 109.15853057199212
psnr of Gate-1 with  Classroom is... 2.77502268004787
uiqi of Gate-1 with  Classroom is... 0.2726888434031058


ssim of Gate-1 with  Gatel is... 0.8644417731988076
mse of Gate-1 with  Gatel is... 71.5269033530572
psnr of Gate-1 with  Gatel is... 2.958610937526136
uiqi of Gate-1 with  Gatel is... 0.2400878332786554


ssim of Gate-1 with  Oat is... 0.4937091336075794
mse of Gate-1 with  Oat is... 82.81390532544378
psnr of Gate-1 with  Oat is... 2.894977095350245
uiqi of Gate-1 with  Oat is... 0.21239292136572405


ssim of Gate-1 with  Playing area is... 0.4507513377573359
mse of Gate-1 with  Playing area is... 107.801291913215
psnr of Gate-1 with  Playing area is... 2.7804563953101558
uiqi of Gate-1 with  Playing area is... 0.26976015791348673


ssim of Gate-1 with  Statue is... 0.08055618320730017
mse of Gate-1 with  Statue is... 106.90576923076924
psnr of Gate-1 with  Statue is... 2.784079218077466
uiqi of Gate-1 with  Statue is... 0.23893831630335857


>>> 
```

 Welcome User Enter username: Enter_username Enter password: ************** Login OR Login With Facebook: ENG 01:47 PM	Login page	Takes Username And password And logs you in.
 Welcome Hello:user Upload: Nearby: Play: User Enter username: user Enter password: **** Login OR Login With Facebook: ENG 01:47 PM	User interface	Takes you to user panel

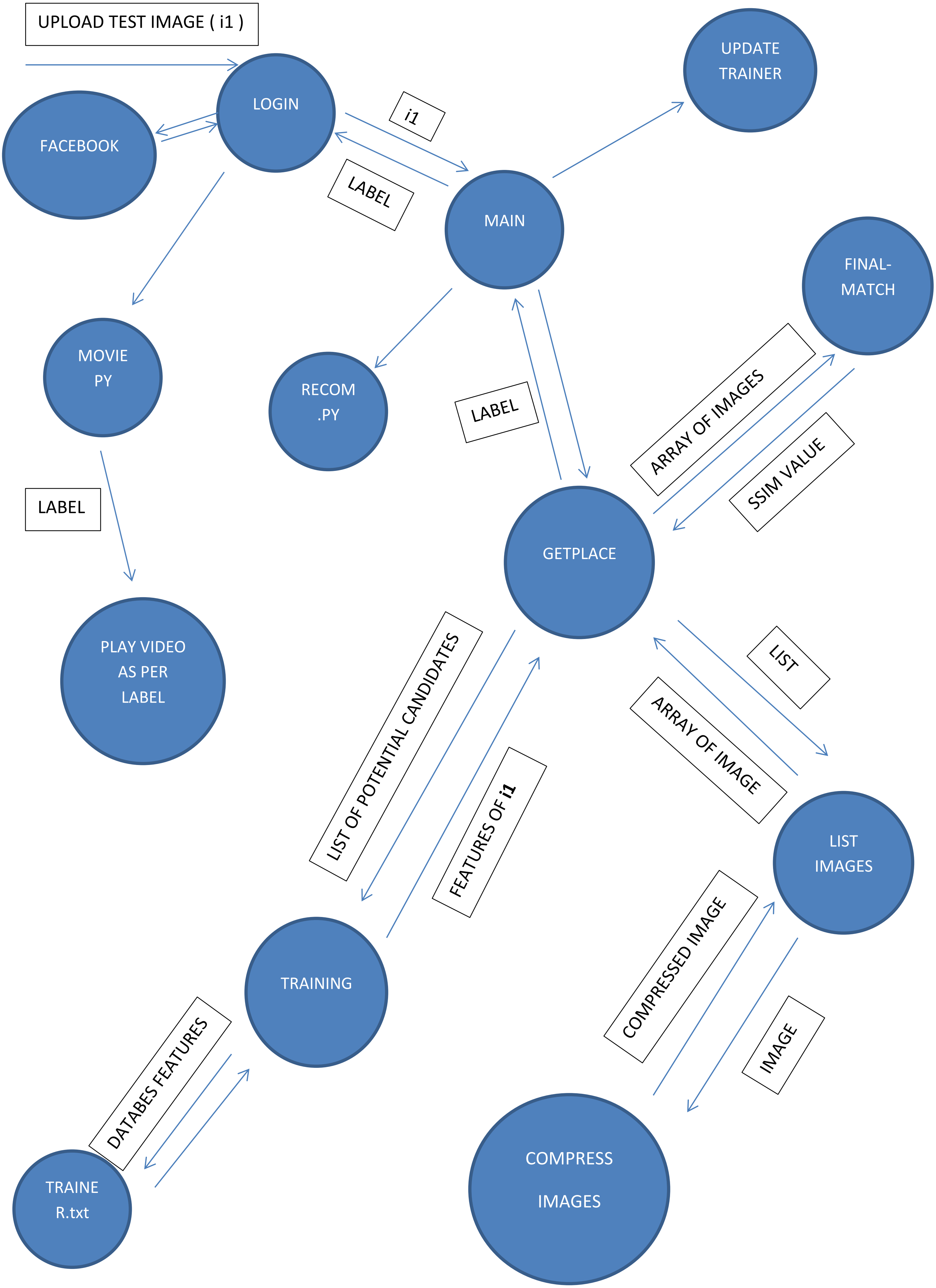
 Welcome Hello:admin Upload: Nearby: Play: Update: Login OR Login With Facebook: Admin Enter username: admin Enter password: *****	Admin interface	Takes you to admin panel
 Welcome Open « Desktop › ULTIMATE MINOR 2 › test Search test Organize ▾ New folder This PC 3D Objects Desktop Documents Downloads Music Pictures Videos Acer (C:) D drive (D:) CD Drive (E:) F drive (F:) a2z.jpg class.jpg gt1.jpg lb5.jpg oat1.jpg pa2.jpg statue.jpg Open Cancel Login Login With Facebook: File name: admin *****	Uploads test image	Returns path of this image to functions

 Know your position You are in--['Playing-area'] Enter username: admin Enter password: ***** Welcome Admin OK Login Login With Facebook: ENG 01:48 PM	pop up of location	Show location of uploaded image according to data base(using training algorithm)
 Hello:admin Gate-1 Playing-area Statue Enter username: admin Enter password: ***** Welcome Nearby: Play: Update: Admin Login OR Login With Facebook: ENG 01:48 PM	Nearby places pop up	Calculates places near us using Euclidian distance in trainer file

 Welcome Hello:admin Upload: Nearby: Play: Update: hi! Login OK Login With Facebook: Admin Enter username: admin Enter password: ***** Updated successfully! ENG 01:48 PM	Update pop up	Updates our trainer file according to database
 Facebook – log in or sign up https://www.facebook.com facebook Log In Sign Up Chrome is being controlled by automated test software. Email or Phone: 9871003293 Password: ••••••••• Forgotten account? Facebook helps you connect and share with the people in your life. Create an account It's free and always will be. First name Surname Mobile number or email address New password Birthday: 22 Nov 1993 Why do I need to provide my date of birth? ○ Female ○ Male By clicking Sign Up, you agree to our Terms, Data Policy and Cookie Policy. You may receive SMS notifications from us and can opt out at any time. Create a Page for a celebrity, band or business. Waiting for www.gstatic.com... ENG 01:50 PM	Facebook page	Authenticate username and password from facebook

 Welcome User Enter username: 9871003293 Enter password: ********* Info! Logged in successfully! OK Login Login With Facebook: ENG 01:52 PM	Success pop up	Give acess to user or admin respectively
 	Video player	Video opened after concatenation.

MODULE DIAGRAM



MODULE DESCRIPTION

1	**Vidprocess.py**	• process()	• sends the list of all the videos , their labels and the value of text file.
2	**Update_trainer.py**	• Update()-	• updates the trainer file and tells if it was successful or not.
3	**Training.py**	• mean_img()	• gives mean of the image
		• var_img()	• gives variance of the image
4		• training_algo()	• gives names of the poteintial candidates
5	**Recom.py**	• recommend()	• gives the recommended places to visit
6	**Moviepy_test.py**	• vid_play()	• plays the videos in the desired order with text and subtitles
7	**Main.py**	• get_name()	• prints name
		• update()	• calls update train
		• recommend()	• calls recommend
8	**Login.py**	•	•
9	**List_images.py**	• img_asarray()	• gives the array of the passed images
		• list_images()	• gives list of image array and list of their names

10	**Get_place.py**	- place_in()	- returns the name of best image matched
11	**Final_match.py**	- match()	- returns the value of SSIM
12	**Compress_image.py**	- compress()	- compresses the image and converts it into monochrome.
13	**Check.py**	- check()	- checks the id and password entered by the user.

CONCLUSION AND FUTURE WORKS:-

1. **Future Works:**
   - We learnt a lot from this minor as we have used python extensively by using it complex libraries as moviepy for video manipulation ,Tkinter for GUI
   - We can create an android app for this particular project through Bumble Bee and predefined APIs .
   - We can create harr cascades for much better image recognition which would also work in real life scenarios.
   - We can also link our database with that of Google's to expand it by which or app would be more useful in real world.
   - We can create a mongoDB database which would help our app to work 24x7 and can be accessed throughout the world.
2. **Conclusion:**
   - Through this project we were able to dive deeper into application development.
   - We learned various algorithms (SSIM ,PSNR,MSE), methods (File handling, compression ,etc) , apis(selenium, PIL, numpy, CV2, moviePY, etc)
   - we would like to thank Dr. Archana Purwar for her indispensible guide throughout the project

References:

- Wikipedia
- Geeksforgeeks
- Stackoverflow
- tutorialsPoint
- Research Papers

Appendix:

Uttkarsh Raghav :

- Dynamic Video Pop-up using MoviePy
- Video Manipulation

Himanshu Gupta:

- Image comparison
- File handling
- Training Algorithm

Arpit Pathak:

- GUI
- Facebook login

Ark Srivastav:

- GUI
- Training Algorithm
- Image compression