20BCT0261 DATE:08/12/2021

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ARTIFICIAL INTELLIGENSE PROJECT

Attendance Recording System with Facial Recognition

An Attendance Recording System (ARS) using Harr Cascade classifier for face detection and a combined Histogram of Oriented Gradient (HOG) + Linear Binary Pattern Histogram (LBPH) model for feature extraction using an Support Vector Machine (SVM) classifier for face recognition.

CODE:

```
############################################## IMPORTING
##############################################

import tkinter as tk

from tkinter import ttk

from tkinter import messagebox as mess

import tkinter.simpledialog as tsd

import cv2,os

import csv

import numpy as np

from PIL import Image

import pandas as pd

import datetime

import time


############################################## FUNCTIONS
##############################################
```

```
def assure_path_exists(path):
    dir = os.path.dirname(path)
    if not os.path.exists(dir):
        os.makedirs(dir)

##############################################################################
#######

def tick():
    time_string = time.strftime('%H:%M:%S')
    clock.config(text=time_string)
    clock.after(200,tick)

##############################################################################
########

def check_haarcascadefile():
    exists = os.path.isfile("haarcascade_frontalface_default.xml")
    if exists:
        pass
    else:
        mess._show(title='Some file missing', message='Please contact us for help')
        window.destroy()

##############################################################################
########
```

```
def save_pass():
    assure_path_exists("TrainingImageLabel/")
    exists1 = os.path.isfile("TrainingImageLabel\psd.txt")
    if exists1:
        tf = open("TrainingImageLabel\psd.txt", "r")
        key = tf.read()
    else:
        master.destroy()
        new_pas = tsd.askstring('Old Password not found', 'Please enter a new password below',
show='*')
        if new_pas == None:
            mess._show(title='No Password Entered', message='Password not set!! Please try
again')
        else:
            tf = open("TrainingImageLabel\psd.txt", "w")
            tf.write(new_pas)
            mess._show(title='Password Registered', message='New password was registered
successfully!!')
            return
    op = (old.get())
    newp= (new.get())
    nnewp = (nnew.get())
    if (op == key):
        if(newp == nnewp):
            txf = open("TrainingImageLabel\psd.txt", "w")
            txf.write(newp)
        else:
            mess._show(title='Error', message='Confirm new password again!!!')
```

```
            return
    else:
        mess._show(title='Wrong Password', message='Please enter correct old password.')
        return
    mess._show(title='Password Changed', message='Password changed successfully!!')
    master.destroy()


##############################################################################
########


def change_pass():
    global master
    master = tk.Tk()
    master.geometry("400x160")
    master.resizable(False,False)
    master.title("Change Password")
    master.configure(background="white")
    lbl4 = tk.Label(master,text='    Enter Old Password',bg='white',font=('times', 12, ' bold '))
    lbl4.place(x=10,y=10)
    global old
    old=tk.Entry(master,width=25 ,fg="black",relief='solid',font=('times', 12, ' bold
'),show='*')
    old.place(x=180,y=10)
    lbl5 = tk.Label(master, text='   Enter New Password', bg='white', font=('times', 12, ' bold '))
    lbl5.place(x=10, y=45)
    global new
    new = tk.Entry(master, width=25, fg="black",relief='solid', font=('times', 12, ' bold
'),show='*')
```

```
    new.place(x=180, y=45)

    lbl6 = tk.Label(master, text='Confirm New Password', bg='white', font=('times', 12, ' bold
'))

    lbl6.place(x=10, y=80)

    global nnew

    nnew = tk.Entry(master, width=25, fg="black", relief='solid',font=('times', 12, ' bold
'),show='*')

    nnew.place(x=180, y=80)

    cancel=tk.Button(master,text="Cancel", command=master.destroy ,fg="black"  ,bg="red"
,height=1,width=25 , activebackground = "white" ,font=('times', 10, ' bold '))

    cancel.place(x=200, y=120)

    save1 = tk.Button(master, text="Save", command=save_pass, fg="black", bg="#3ece48",
height = 1,width=25, activebackground="white", font=('times', 10, ' bold '))

    save1.place(x=10, y=120)

    master.mainloop()


##############################################################################
##########


def psw():

    assure_path_exists("TrainingImageLabel/")

    exists1 = os.path.isfile("TrainingImageLabel\psd.txt")

    if exists1:

        tf = open("TrainingImageLabel\psd.txt", "r")

        key = tf.read()

    else:

        new_pas = tsd.askstring('Old Password not found', 'Please enter a new password below',
show='*')

        if new_pas == None:
```

```
            mess._show(title='No Password Entered', message='Password not set!! Please try
again')
        else:
            tf = open("TrainingImageLabel\psd.txt", "w")
            tf.write(new_pas)
            mess._show(title='Password Registered', message='New password was registered
successfully!!')
            return
    password = tsd.askstring('Password', 'Enter Password', show='*')
    if (password == key):
        TrainImages()
    elif (password == None):
        pass
    else:
        mess._show(title='Wrong Password', message='You have entered wrong password')


##############################################################################
###########


def clear():
    txt.delete(0, 'end')
    res = "1)Take Images  >>>  2)Save Profile"
    message1.configure(text=res)



def clear2():
    txt2.delete(0, 'end')
    res = "1)Take Images  >>>  2)Save Profile"
```

```
    message1.configure(text=res)


################################################################################
############


def TakeImages():
    check_haarcascadefile()
    columns = ['SERIAL NO.', '', 'ID', '', 'NAME']
    assure_path_exists("StudentDetails/")
    assure_path_exists("TrainingImage/")
    serial = 0
    exists = os.path.isfile("StudentDetails\StudentDetails.csv")
    if exists:
        with open("StudentDetails\StudentDetails.csv", 'r') as csvFile1:
            reader1 = csv.reader(csvFile1)
            for l in reader1:
                serial = serial + 1
        serial = (serial // 2)
        csvFile1.close()
    else:
        with open("StudentDetails\StudentDetails.csv", 'a+') as csvFile1:
            writer = csv.writer(csvFile1)
            writer.writerow(columns)
            serial = 1
        csvFile1.close()
    Id = (txt.get())
    name = (txt2.get())
```

```
    if ((name.isalpha()) or (' ' in name)):
        cam = cv2.VideoCapture(0)
        harcascadePath = "haarcascade_frontalface_default.xml"
        detector = cv2.CascadeClassifier(harcascadePath)
        sampleNum = 0
        while (True):
            ret, img = cam.read()
            gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
            faces = detector.detectMultiScale(gray, 1.3, 5)
            for (x, y, w, h) in faces:
                cv2.rectangle(img, (x, y), (x + w, y + h), (255, 0, 0), 2)
                # incrementing sample number
                sampleNum = sampleNum + 1
                # saving the captured face in the dataset folder TrainingImage
                cv2.imwrite("TrainingImage\ " + name + "." + str(serial) + "." + Id + '.' +
str(sampleNum) + ".jpg",
                            gray[y:y + h, x:x + w])
                # display the frame
                cv2.imshow('Taking Images', img)
            # wait for 100 miliseconds
            if cv2.waitKey(100) & 0xFF == ord('q'):
                break
            # break if the sample number is morethan 100
            elif sampleNum > 100:
                break
        cam.release()
        cv2.destroyAllWindows()
```

```
        res = "Images Taken for ID : " + Id
        row = [serial, '', Id, '', name]
        with open('StudentDetails\StudentDetails.csv', 'a+') as csvFile:
            writer = csv.writer(csvFile)
            writer.writerow(row)
        csvFile.close()
        message1.configure(text=res)
    else:
        if (name.isalpha() == False):
            res = "Enter Correct name"
            message.configure(text=res)

##############################################################################
#############

def TrainImages():
    check_haarcascadefile()
    assure_path_exists("TrainingImageLabel/")
    recognizer = cv2.face_LBPHFaceRecognizer.create()
    harcascadePath = "haarcascade_frontalface_default.xml"
    detector = cv2.CascadeClassifier(harcascadePath)
    faces, ID = getImagesAndLabels("TrainingImage")
    try:
        recognizer.train(faces, np.array(ID))
    except:
        mess._show(title='No Registrations', message='Please Register someone first!!!')
        return
```

```
    recognizer.save("TrainingImageLabel\Trainner.yml")
    res = "Profile Saved Successfully"
    message1.configure(text=res)
    message.configure(text='Total Registrations till now  : ' + str(ID[0]))

##############################################################################
#################3

def getImagesAndLabels(path):
    # get the path of all the files in the folder
    imagePaths = [os.path.join(path, f) for f in os.listdir(path)]
    # create empth face list
    faces = []
    # create empty ID list
    Ids = []
    # now looping through all the image paths and loading the Ids and the images
    for imagePath in imagePaths:
        # loading the image and converting it to gray scale
        pilImage = Image.open(imagePath).convert('L')
        # Now we are converting the PIL image into numpy array
        imageNp = np.array(pilImage, 'uint8')
        # getting the Id from the image
        ID = int(os.path.split(imagePath)[-1].split(".")[1])
        # extract the face from the training image sample
        faces.append(imageNp)
        Ids.append(ID)
    return faces, Ids
```

```
##############################################################################
################

def TrackImages():
    check_haarcascadefile()
    assure_path_exists("Attendance/")
    assure_path_exists("StudentDetails/")
    for k in tv.get_children():
        tv.delete(k)
    msg = ''
    i = 0
    j = 0
    recognizer = cv2.face.LBPHFaceRecognizer_create()  # cv2.createLBPHFaceRecognizer()
    exists3 = os.path.isfile("TrainingImageLabel\Trainner.yml")
    if exists3:
        recognizer.read("TrainingImageLabel\Trainner.yml")
    else:
        mess._show(title='Data Missing', message='Please click on Save Profile to reset data!!')
        return
    harcascadePath = "haarcascade_frontalface_default.xml"
    faceCascade = cv2.CascadeClassifier(harcascadePath);

    cam = cv2.VideoCapture(0)
    font = cv2.FONT_HERSHEY_SIMPLEX
    col_names = ['Id', '', 'Name', '', 'Date', '', 'Time']
    exists1 = os.path.isfile("StudentDetails\StudentDetails.csv")
```

```
    if exists1:
        df = pd.read_csv("StudentDetails\StudentDetails.csv")
    else:
        mess._show(title='Details Missing', message='Students details are missing, please
check!')
        cam.release()
        cv2.destroyAllWindows()
        window.destroy()
    while True:
        ret, im = cam.read()
        gray = cv2.cvtColor(im, cv2.COLOR_BGR2GRAY)
        faces = faceCascade.detectMultiScale(gray, 1.2, 5)
        for (x, y, w, h) in faces:
            cv2.rectangle(im, (x, y), (x + w, y + h), (225, 0, 0), 2)
            serial, conf = recognizer.predict(gray[y:y + h, x:x + w])
            if (conf < 50):
                ts = time.time()
                date = datetime.datetime.fromtimestamp(ts).strftime('%d-%m-%Y')
                timeStamp = datetime.datetime.fromtimestamp(ts).strftime('%H:%M:%S')
                aa = df.loc[df['SERIAL NO.'] == serial]['NAME'].values
                ID = df.loc[df['SERIAL NO.'] == serial]['ID'].values
                ID = str(ID)
                ID = ID[1:-1]
                bb = str(aa)
                bb = bb[2:-2]
                attendance = [str(ID), '', bb, '', str(date), '', str(timeStamp)]
```

```
        else:
            Id = 'Unknown'
            bb = str(Id)
        cv2.putText(im, str(bb), (x, y + h), font, 1, (255, 255, 255), 2)
    cv2.imshow('Taking Attendance', im)
    if (cv2.waitKey(1) == ord('q')):
        break
ts = time.time()
date = datetime.datetime.fromtimestamp(ts).strftime('%d-%m-%Y')
exists = os.path.isfile("Attendance\Attendance_" + date + ".csv")
if exists:
    with open("Attendance\Attendance_" + date + ".csv", 'a+') as csvFile1:
        writer = csv.writer(csvFile1)
        writer.writerow(attendance)
    csvFile1.close()
else:
    with open("Attendance\Attendance_" + date + ".csv", 'a+') as csvFile1:
        writer = csv.writer(csvFile1)
        writer.writerow(col_names)
        writer.writerow(attendance)
    csvFile1.close()
with open("Attendance\Attendance_" + date + ".csv", 'r') as csvFile1:
    reader1 = csv.reader(csvFile1)
    for lines in reader1:
        i = i + 1
        if (i > 1):
            if (i % 2 != 0):
```

```
            iidd = str(lines[0]) + '   '
            tv.insert('', 0, text=iidd, values=(str(lines[2]), str(lines[4]), str(lines[6])))
    csvFile1.close()
    cam.release()
    cv2.destroyAllWindows()

######################################### USED STUFFS
#############################################

global key
key = ''

ts = time.time()
date = datetime.datetime.fromtimestamp(ts).strftime('%d-%m-%Y')
day,month,year=date.split("-")

mont={'01':'January',
      '02':'February',
      '03':'March',
      '04':'April',
      '05':'May',
      '06':'June',
      '07':'July',
      '08':'August',
      '09':'September',
      '10':'October',
      '11':'November',
```

```
    '12':'December'
    }

########################################## GUI FRONT-END
##########################################

window = tk.Tk()
window.geometry("1280x720")
window.resizable(True,False)
window.title("Attendance System")
window.configure(background='#262523')

frame1 = tk.Frame(window, bg="#00aeff")
frame1.place(relx=0.11, rely=0.17, relwidth=0.39, relheight=0.80)

frame2 = tk.Frame(window, bg="#00aeff")
frame2.place(relx=0.51, rely=0.17, relwidth=0.38, relheight=0.80)

message3 = tk.Label(window, text="Face Recognition Based Attendance System"
,fg="white",bg="#262523" ,width=55 ,height=1,font=('times', 29, ' bold '))
message3.place(x=10, y=10)

frame3 = tk.Frame(window, bg="#c4c6ce")
frame3.place(relx=0.52, rely=0.09, relwidth=0.09, relheight=0.07)

frame4 = tk.Frame(window, bg="#c4c6ce")
frame4.place(relx=0.36, rely=0.09, relwidth=0.16, relheight=0.07)
```

```
datef = tk.Label(frame4, text = day+"-"+mont[month]+"-"+year+"  |  ",
fg="orange",bg="#262523" ,width=55 ,height=1,font=('times', 22, ' bold '))

datef.pack(fill='both',expand=1)


clock = tk.Label(frame3,fg="orange",bg="#262523" ,width=55 ,height=1,font=('times', 22, '
bold '))

clock.pack(fill='both',expand=1)

tick()


head2 = tk.Label(frame2, text="                    For New Registrations                    ",
fg="black",bg="#3ece48" ,font=('times', 17, ' bold ') )

head2.grid(row=0,column=0)


head1 = tk.Label(frame1, text="                    For Already Registered                    ",
fg="black",bg="#3ece48" ,font=('times', 17, ' bold ') )

head1.place(x=0,y=0)


lbl = tk.Label(frame2, text="Enter ID",width=20  ,height=1  ,fg="black"  ,bg="#00aeff"
,font=('times', 17, ' bold ') )

lbl.place(x=80, y=55)


txt = tk.Entry(frame2,width=32 ,fg="black",font=('times', 15, ' bold '))

txt.place(x=30, y=88)


lbl2 = tk.Label(frame2, text="Enter Name",width=20  ,fg="black"  ,bg="#00aeff"
,font=('times', 17, ' bold '))

lbl2.place(x=80, y=140)


txt2 = tk.Entry(frame2,width=32 ,fg="black",font=('times', 15, ' bold ')  )
```

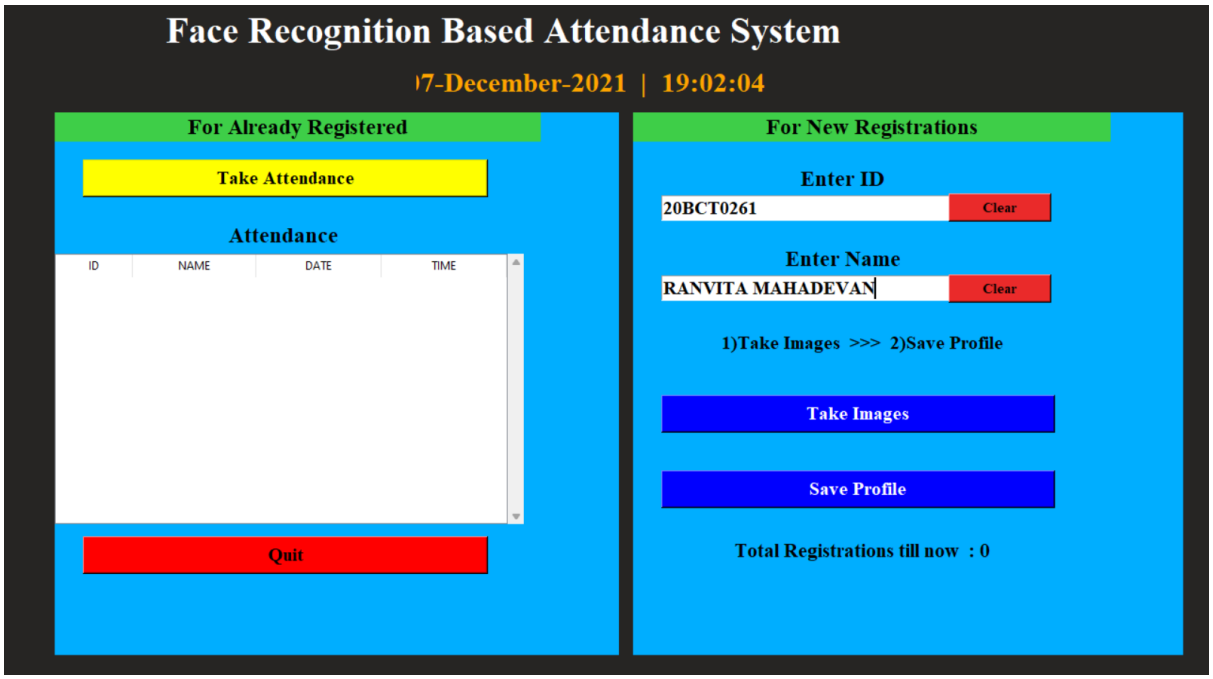
```
txt2.place(x=30, y=173)


message1 = tk.Label(frame2, text="1)Take Images  >>>  2)Save Profile" ,bg="#00aeff"
,fg="black"  ,width=39 ,height=1, activebackground = "yellow" ,font=('times', 15, ' bold '))

message1.place(x=7, y=230)


message = tk.Label(frame2, text="" ,bg="#00aeff" ,fg="black"  ,width=39,height=1,
activebackground = "yellow" ,font=('times', 16, ' bold '))

message.place(x=7, y=450)


lbl3 = tk.Label(frame1, text="Attendance",width=20  ,fg="black"  ,bg="#00aeff"  ,height=1
,font=('times', 17, ' bold '))

lbl3.place(x=100, y=115)


res=0

exists = os.path.isfile("StudentDetails\StudentDetails.csv")

if exists:

    with open("StudentDetails\StudentDetails.csv", 'r') as csvFile1:

        reader1 = csv.reader(csvFile1)

        for l in reader1:

            res = res + 1

    res = (res // 2) - 1

    csvFile1.close()

else:

    res = 0

message.configure(text='Total Registrations till now  : '+str(res))


###################### MENUBAR ##################################
```

```
menubar = tk.Menu(window,relief='ridge')
filemenu = tk.Menu(menubar,tearoff=0)
filemenu.add_command(label='Change Password', command = change_pass)
filemenu.add_command(label='Contact Us', command = contact)
filemenu.add_command(label='Exit',command = window.destroy)
menubar.add_cascade(label='Help',font=('times', 29, ' bold '),menu=filemenu)

################## TREEVIEW ATTENDANCE TABLE ####################

tv= ttk.Treeview(frame1,height =13,columns = ('name','date','time'))
tv.column('#0',width=82)
tv.column('name',width=130)
tv.column('date',width=133)
tv.column('time',width=133)
tv.grid(row=2,column=0,padx=(0,0),pady=(150,0),columnspan=4)
tv.heading('#0',text ='ID')
tv.heading('name',text ='NAME')
tv.heading('date',text ='DATE')
tv.heading('time',text ='TIME')

###################### SCROLLBAR ################################

scroll=ttk.Scrollbar(frame1,orient='vertical',command=tv.yview)
scroll.grid(row=2,column=4,padx=(0,100),pady=(150,0),sticky='ns')
tv.configure(yscrollcommand=scroll.set)
```

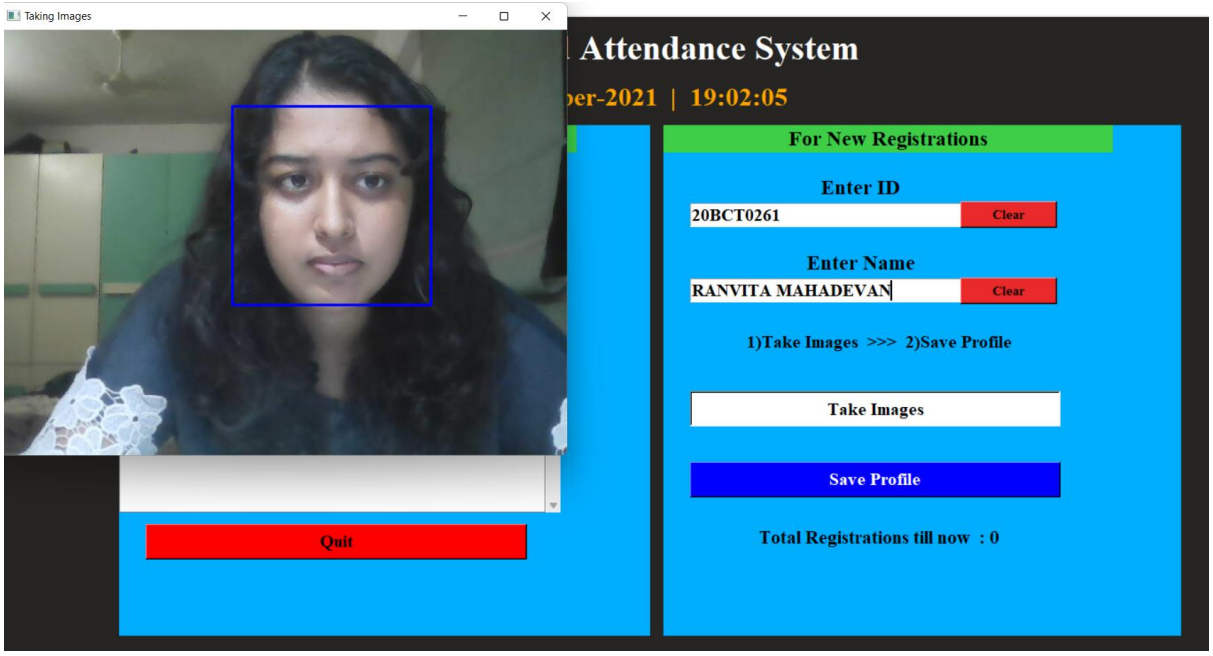
```
###################### BUTTONS ##################################


clearButton = tk.Button(frame2, text="Clear", command=clear  ,fg="black"  ,bg="#ea2a2a"
,width=11 ,activebackground = "white" ,font=('times', 11, ' bold '))

clearButton.place(x=335, y=86)

clearButton2 = tk.Button(frame2, text="Clear", command=clear2  ,fg="black"
,bg="#ea2a2a"  ,width=11 , activebackground = "white" ,font=('times', 11, ' bold '))

clearButton2.place(x=335, y=172)

takeImg = tk.Button(frame2, text="Take Images", command=TakeImages  ,fg="white"
,bg="blue"  ,width=34  ,height=1, activebackground = "white" ,font=('times', 15, ' bold '))

takeImg.place(x=30, y=300)

trainImg = tk.Button(frame2, text="Save Profile", command=psw ,fg="white"  ,bg="blue"
,width=34  ,height=1, activebackground = "white" ,font=('times', 15, ' bold '))

trainImg.place(x=30, y=380)

trackImg = tk.Button(frame1, text="Take Attendance", command=TrackImages  ,fg="black"
,bg="yellow"  ,width=35  ,height=1, activebackground = "white" ,font=('times', 15, ' bold '))

trackImg.place(x=30,y=50)

quitWindow = tk.Button(frame1, text="Quit", command=window.destroy  ,fg="black"
,bg="red"  ,width=35 ,height=1, activebackground = "white" ,font=('times', 15, ' bold '))

quitWindow.place(x=30, y=450)


###################### END #######################################


window.configure(menu=menubar)

window.mainloop()

##############################################################################
#########################
```

WORKING:

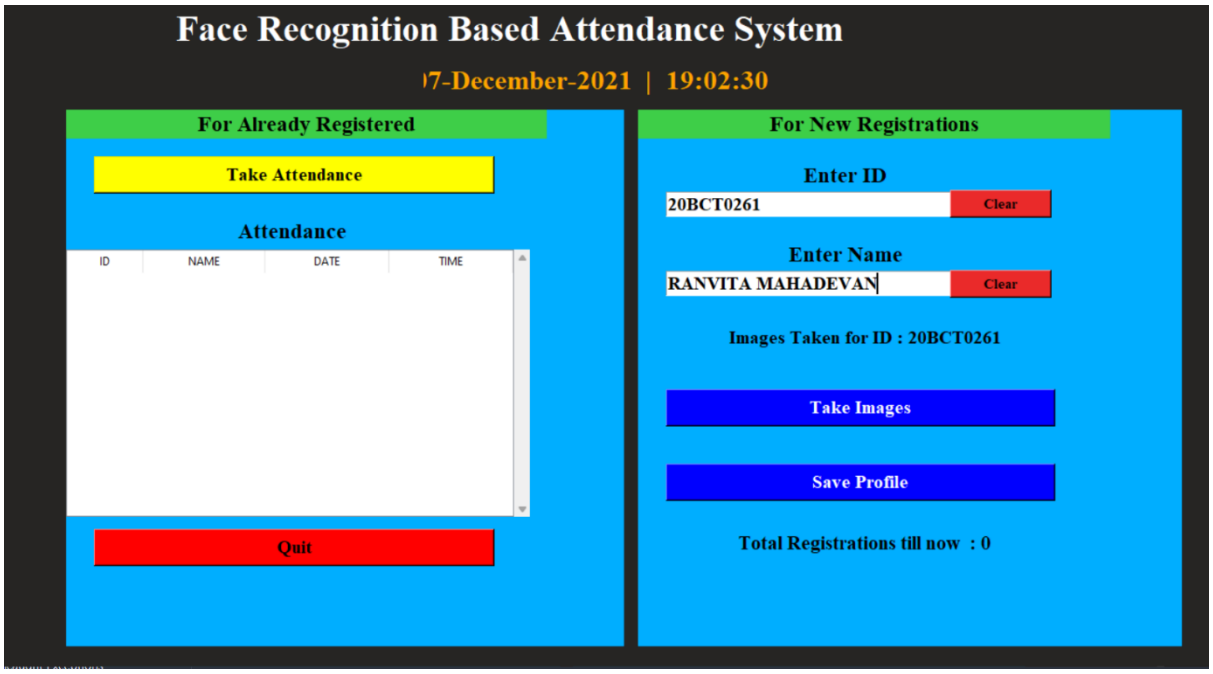
ENTERING DETAILS FOR NEW REGISTRATION



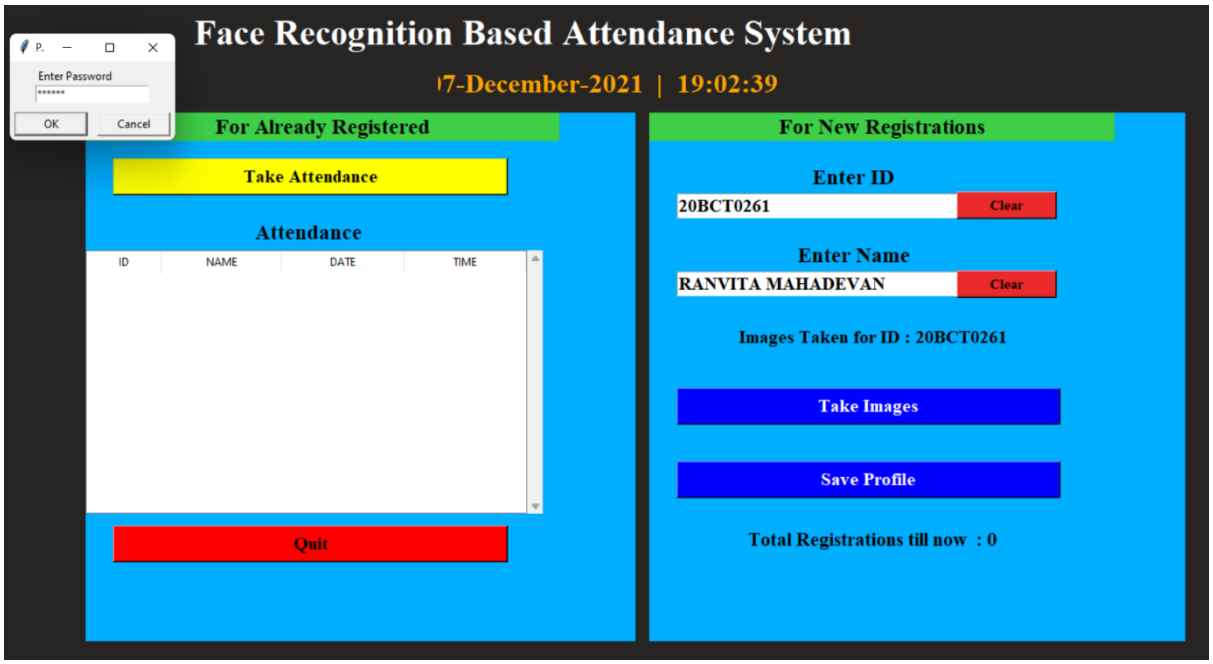
TAKING IMAGES FOR NEW REGISTRATION



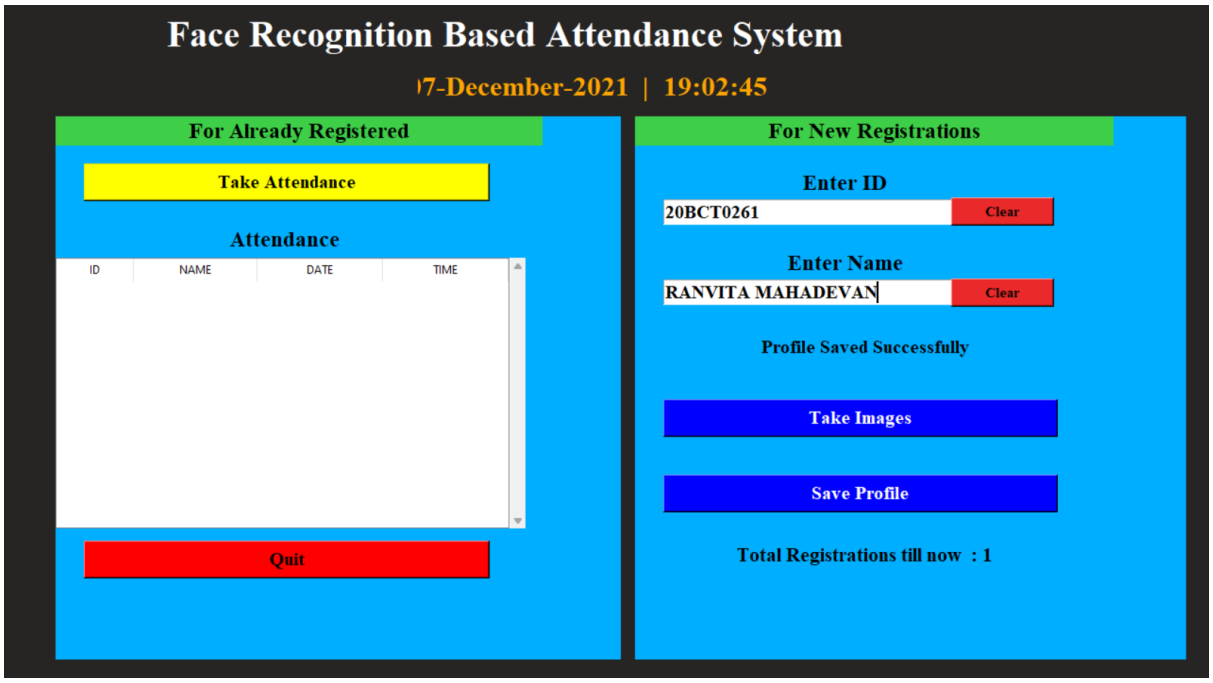
IMAGES TAKEN



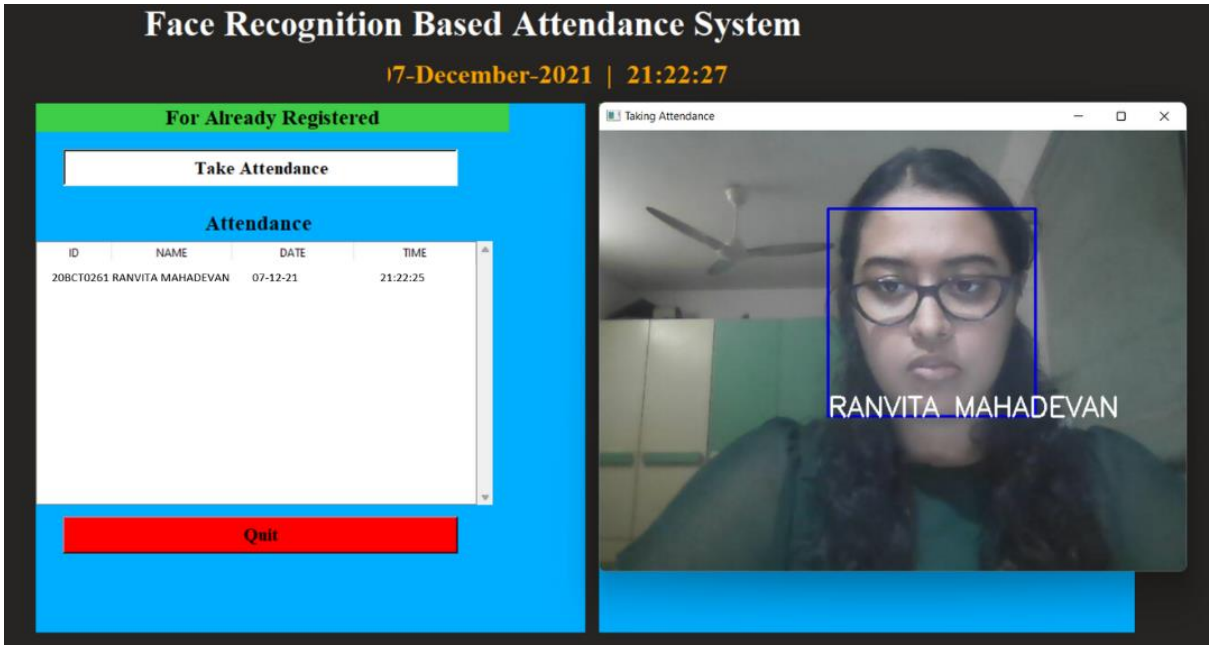
ENTERING PASSWROD TO COMPLETE REGISTARTION



REGISTARTION COMPLETE



TAKING ATTENDANCE



STUDENT DETAILS

	A	B	C	D	E	F	G
1	SERIAL NO.		ID		NAME		
2							
3	1		20BCT0261		RANVITA MAHADEVAN		
4							
5							
6							

StudentDetails

ATTENDANCE

	A	B	C	D	E	F	G
1	Id		Name		Date		Time
2							
3	20BCT0261		RANVITA MAHADEVA		07-12-21		21:22:25
4							
5							
6							
7							

Attendance_07-12-2021