**MINI PROJECT REPORT**

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**(CSE V Semester Mini-Project)**

**2022-2023**

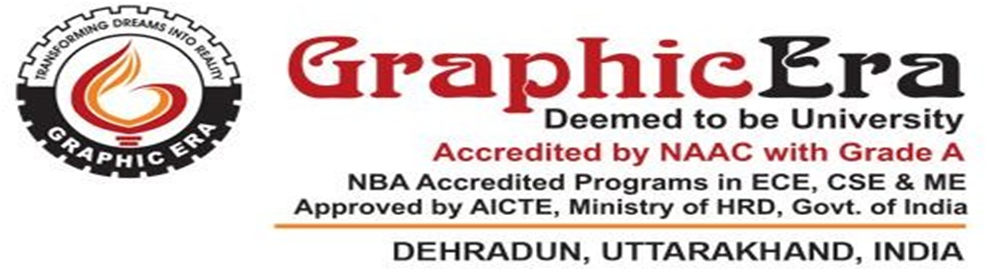


**Guided by:-**  **Mr. Ashwini Kumar**

**Submitted By:**

**Ankit Kumar Singh**

**2017635**

**AI&DS** 

**CERTIFICATE**

This is to certify that this report represents the original work done by **Ankit Kumar Singh** during this project as a partial fulfillment of the requirement for the “**Face Recognition Attendance System Using Deep Learning Approach** ” of Bachelors Of Technology ,5th semester of the Graphic Era Deemed To Be University Dehradun Uttarakhand 248001.

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**Ankit Kumar Singh**

**2017635**

B.Tech 5thSem

Department of computer science

Graphic Era Deemed to be

University Dehradun Uttarakhand

248001

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Hereby I am submitting the project report on “ **Face Recognition Attendance System Using Deep Learning Approach** ”as per the scheme of Graphic Era Deemed University, Dehradun.

I would like to express our sincere gratitude to **Dr. Devesh Pratap Singh**, Head of Dept. of Computer Science, for providing a congenial environment to work in and carry out our project.

I consider it my cardinal duty to express the deepest sense of gratitude to **Mr. Ashwini Kumar**, Department of Computer Science and Engineering for the invaluable guidance extended at every stage and in every possible way.

Finally, I am very much thankful to all the faculty members of the Department of Computer Science and Technology, friends, seniors and our parents for their constant encouragement, support and help throughout the period of project conduction.

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**PROBLEM STATEMENT: -**

Face Recognition Attendance System Using Deep Learning Approach.

**INTRODUCTION:-**

It is basically designed to mark the attendance of students or employees by scanning their faces. A facial recognition attendance system incorporates facial recognition technology to recognize and verify an employee's facial features and to record attendance automatically.

**IMPLEMENTATION DETAILS:-**

The libraries and tools that have been used to implement the model are:

1. Visual Studio Code: It is a streamlined code editor with various forms of support for debugging, task running and version controlling.
2. Opencv: OpenCV is a Python open-source library that is used for computer vision in Artificial intelligence, Machine Learning, face recognition, image processing etc. It supports a variety of languages such as Java, C++, Python, etc.
3. OS : It is a library that provides helpful tools for interfacing the underlying operating system that is being used to run the python code respectively. It helps with creating directories, managing paths, accessing various files and changing the environment variables.
4. Numpy: It is a short form for NumericalPython which is a python library. It is utilized for working with arrays or matrices. It consists of multidimensional- array object and collection of routines and subroutines for processing those arrayS.
5. Face Recognition: It is a python library built using dlib and provides accuracy over 99 percent. It is solely used for operations related to face.

**SOFTWARE REQUIRED:-**

| **Number** | **Description** | **Type** |
| --- | --- | --- |
| 1 | Operating System | Windows XP / Windows |
| 2 | Language | Python |
| 3 | IDE | Pycharm |
| 4 | Browser | Google Chrome |

**Advantages of Face Recognition Attendance System :-**

* **TIME SAVING**

Beginning with the most effective and important benefit i.e. saving time. As successful people say ‘saving time = saving money, it's true since saving time at a workplace can boost productivity

* **HIGH SECURITY**

Not only are these systems quick, but they are also highly advanced when it comes to security. The face recognition camera attendance system comes with numerous features such as Imposter violation, location tagging, and facial suspicion.

* **EASY TIME TRACKING**

Entering attendance manually is not always accurate. People don’t remember the exact minute they arrived or left so having precise numbers is a challenge.

* **EASY TO MANAGE**

Managing a person’s daily activities, entry time, exit time is tough. Managing the same thing for hundreds of people is even more difficult.

**METHODOLOGY:-**

This project illustrates the Recognition System. In this project, we use a pre-trained face recognition model to identify a person and mark its attendance along with date and time and save it in a csv file.

The pre-trained face\_recognition model works in following steps:

1. Detecting faces: In the pipeline, the first thing it does is to detect all the faces in the image and locate them. It is using the Histogram of Oriented Gradients (HOG) method, invented in 2005. It converts our image to grayscale and looks through every single pixel in our image one at a time. For each pixel the model analyzes the pixels that directly surround it. The goal is to compare the darkness of current pixels and the ones that directly surround it. It then simply draws an arrow determining the increase of darkness from pixel to another. We repeat the process till every pixel is replaced by an arrow. The arrows are called gradients and can show the flow of light from dark across the entire image. We use tis method because if we directly analyze the pixels then the same person might have different pixel values.
2. Posing and projecting faces: Once the faces have been isolated, we come to face a big problem that is the angle of a face. For a computer the faces at two different angles would be faces of two different people even though it belongs to the same person. To overcome this, we provide landmarks to facial features and face\_detection library methods proposed by Vahid Kazemi and Josephine Sullivan in 2014. In this we use 68 specific landmarks that exist on every face and compare it with our testing image. It manipulates our image by turning the face till we get roughly similar location of mouth and eyes as that of testing image.
3. Face Encodings: The model extracts a few basic measurements from each face and then compares them. The one with the closest difference is selected as the identity. These few basic measurements include spacing between eyes, length of nose, shape of eyebrows and lips, etc. This process utilizes convolutional neural networks. There are 128 face encodings which are embedded using machine learning. Steps involved in face recognition and automatic attendance marker : Calculating all the encoding in dataset: We first find all the encodings of all the images in the dataset and save it in the form of a list. In addition to this we extract the name as well and store it in another list. All this work is done by operations such as face\_location, find\_faces, find\_encodings, find distance provided by the face\_recognition python library.

**RESULT:-**

Marking Attendance: Once the person is identified, we add the name to the csv file along with date and time. Limitations of model: The accuracy of the model is high but depends solely on the quality of the images such as clarity, orientation, light exposure, size, etc. In the worst case scenario the model fails to identify the person correctly. One more drawback of this model is that it cannot work on large datasets. I tried using it on a LWF dataset containing 19000 identities, but it was taking more than 45 minutes to find all encodings and save it in a list.

**CONCLUSION:**

This project has successfully implemented AI to identify a person. The completion of the project went quite well, I learned many new things while I was building it, and I got to know various platforms which help us to learn all this stuff. I was able to learn the practical use of Python as a powerful language and its Open CV library. The practical helped me to learn the debugging of Python code and use of Google Colab. Overall working on this project was great fun as I came up with a great piece of knowledge and understanding of the topic.

**REFERENCES:**

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