iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 9 **Issue:** VII **Month of publication:** July 2021

DOI: https://doi.org/10.22214/ijraset.2021.36806

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue VII July 2021- Available at www.ijraset.com

Face Sketch Recognition Using Computer Vision

K S Meghana[1], Neha Pawar KR [2], Nidhi S Jain [3], Yemimah Angel MD [4], Dr. Roopa G M [5]
[1, 2, 3, 4]*Final year student, Dept of CSE, BIET College, Davangere*
[5]*Associate Professor, Dept of CSE, BIET College, Davangere.*

Abstract: ***Now-a-days need for technologies for identification, detection and recognition of suspects has increased. One of the most common biometric techniques is face recognition, since face is the convenient way used by the people to identify each-other. Understanding how humans recognize face sketches drawn by artists is of significant value to both criminal investigators and forensic researchers in Computer Vision. However, studies say that hand-drawn face sketches are still very limited in terms of artists and number of sketches because after any incident a forensic artist prepares a victim's sketches on behalf of the description provided by an eyewitness. Sometimes suspect uses special mask to hide some common features of faces like nose, eyes, lips, face-color etc. but the outliner features of face biometrics one could never hide. Here we concentrate on some specific facial geometric feature which could be used to calculate some ratio of similarities from the template photograph database against the forensic sketches. The project describes the design of a system for face sketch recognition by a computer vision approach like Discrete Cosine Transform (DCT), Local Binary Pattern Histogram (LBPH) algorithm and a supervised machine learning model called Support Vector Machine (SVM) for face recognition. Tkinter is the standard GUI library for Python. Python when combined with Tkinter provides a fast and easy way to create GUI applications. Tkinter provides a powerful object-oriented interface to the Tk GUI toolkit.***

Keywords: Face Sketch Recognition, Photo-Sketch Identification, LBP, SVM, DCT.

I. INTRODUCTION

Face recognition is commonly used in applications such as human-machine interfaces, automatic access control systems and forensic investigations etc. which involves comparing a face image with a database of stored faces in order to identify the face in the image. Forensic sketches play an important role in criminal identification process. These sketches are drawn by forensic artists on the basis of the description provided by an eyewitness or victim. These sketches are publicized to get some clues to reveal the identity of the criminals. A faster way to identify the criminals is to match the forensic sketch with some mug-shot database. In the process of drawing a sketch, the description provided by the eyewitness often includes some unique facial details comprising the deviations from an average face. This project involves the design and development of a face sketch identification system.

II. LITRATURE SURVEY

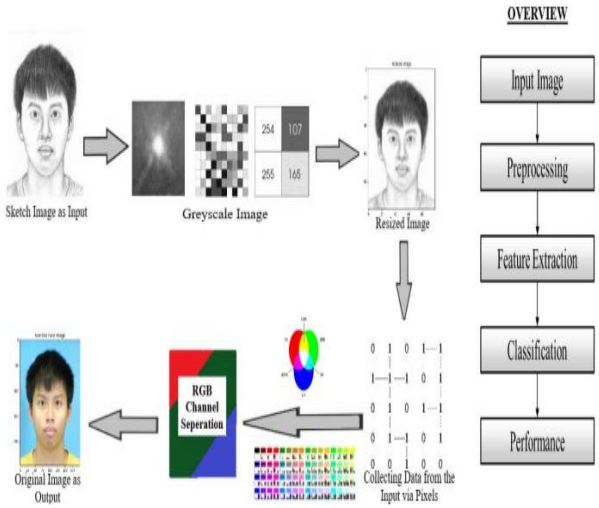
A. Chao-Yeh Chen and Kristen Grauman, 2012, "Efficient Activity Detection with Max-Sub graph Search" proposed an efficient approach that exploits top-down activity knowledge to quickly identify the portion of video that maximizes a classifier's score. Given a novel video, a 3D graph is constructed in which nodes describe local video sub regions, and their connectivity is determined by proximity in space and time. Each node is associated with a learned weight indicating the degree to which its appearance and motion support the action class of interest. At this point, the detection problem is equivalent to solving a maximum-weight connected sub-graph problem, meaning to identify the subset of connected nodes whose total weight is maximal; for our setting, this in turn is reducible to a prize-collecting Steiner tree problem, for which practical branch-and-cut optimization strategies are available.

B. William Brendel and Sinisa Todorovic, 2011,"Learning Spatiotemporal Graphs of Human Activities" proposed a model, which seeks to learn what activity parts and their spatiotemporal relations should be captured to represent complex human activities, and how relevant they are for enabling efficient inference in realistic videos. This advances prior work that typically ignores the "what" question. The goal of learning this is twofold. First the structure of the activity model and the pdf's associated with nodes and edges of the model are studied. This model is then used for parsing new videos in terms of localizing relevant activity parts, present at multiple scales.

C. Quoc V. Le Marc'Aurelio Ranzato Rajat Monga, 2012 "Building High-level Features Using Large Scale Unsupervised Learning" proposed a system in which the high-level class specific neurons are simulated using unlabelled data. This was achieved by combining ideas from recently developed algorithms to learn invariance from unlabelled data. The implementation scales to a cluster with thousands of machines thanks to model parallelism and asynchronous SGD. The work shows that it is possible to train neurons to be selective for high-level concepts using entirely unlabelled data. From the experiments, the results obtained are the neurons that function as detectors for faces, human bodies, and cat faces by training on random frames of YouTube videos.

D. Vlad I. Morariu and Larry S. Davis, 2011, "Multi-agent event recognition in structured scenarios" presented a method for static and dynamic visual saliency computation and investigate the impending of their fusion for generating videos summaries. The model uses a biological inspired model of saliency which considers different important features such as colour contrast, motion intensity and motion orientation between consecutive frames. The proposed video summarization leads to a more informative and enjoyable summaries for the users.

III. MODEL DESIGN



The model follows a simple design structure. Initially a sketch image of a person is given as input to the model. In the second step, the given sketch image undergoes Gray-scaling. The Gray image is then resized to focus on the features of the face in order to recognize the given input sketch and generate the expected output accurately. The data is collected from the resized image in the form of Pixel values. Lastly, the sketch image undergoes RGB Channel Separation in which red, green, and blue light are added together in various ways to reproduce a broad array of colors. Thus, final output is generated that is, the original image of the person is matched with the given sketch image. A series of salient features are extracted by applying feature extraction module. These facial features are used to analyze face landmarks which represent human identity information. In the next process, the classifier is trained for recognizing the face. In the last module, the system recognizes face image and fetch information about the person from the database.

The six stages are:

1) Data gathering of face images of subjects.
2) Pre-processing of face images i.e., copping, grayscale conversion.
3) Feature extraction of the sketch image using Pattern Based Algorithm.
4) Discrete Cosine Transform (2D - DCT) image compression of face image classes.
5) Training the sketch images from the mugshot dataset using SVM, a supervised Machine Learning Algorithm.
6) Testing and validation of the program and technique.

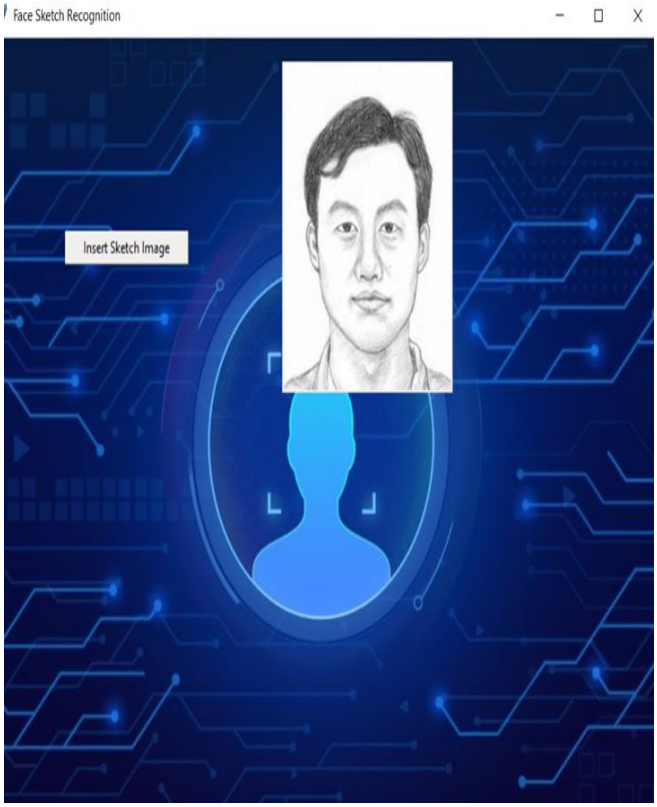
IV. DATASET DESCRIPTION

The dataset for the project has been collected from Kaggle - https://www.kaggle.com/. The dataset consists of two categories namely; sketch images and original images. Each image in the dataset is unique and of different features. Python script is used to collect and process the final dataset. The sketch images are used for training the model. And the original image of the person is generated as output.

Fig: Dataset

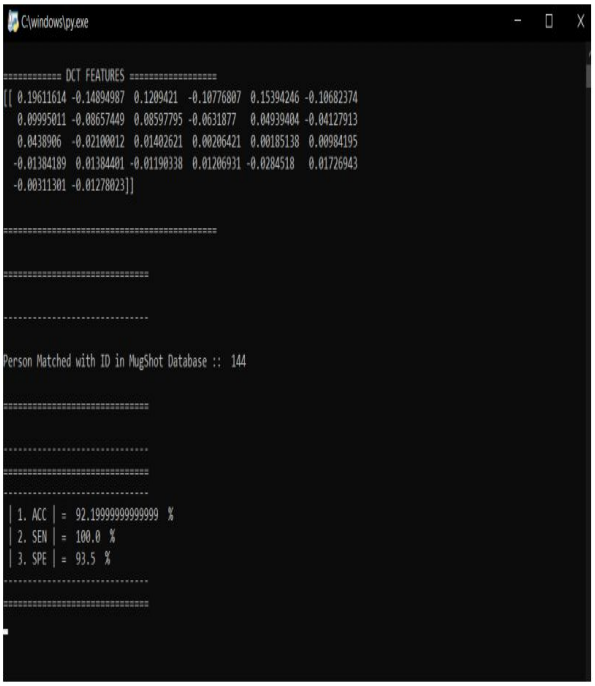
A dataset of criminal's face is created which will help the forensic department for future recognition. We have created a Machine Learning model using OpenCV and LBPH algorithm to train the dataset of criminal's face.

V. RESULTS



- *Description:* The above snapshot shows the sketch of a person given as input image to the trained model inserted via tkinter GUI.

- *Description:* The above snapshot shows the original image match to the corresponding input sketch image.



- *Description:* The above snapshot represents the output obtained for the sketch image given as input to the trained model.

VI. CONCLUSION

In the current scenario, the Face Sketch Recognition System has poor image quality which limits face recognition's effectiveness. From the literature review we have explored the major drawbacks and issues related to face sketch recognition system in the traditional approach. Thus, to overcome the drawbacks in the existing system, we have proposed an efficient technique of Face Sketch Recognition using Computer Vision by identifying the current technology support to predict the precise results related to Face Sketch Recognition.

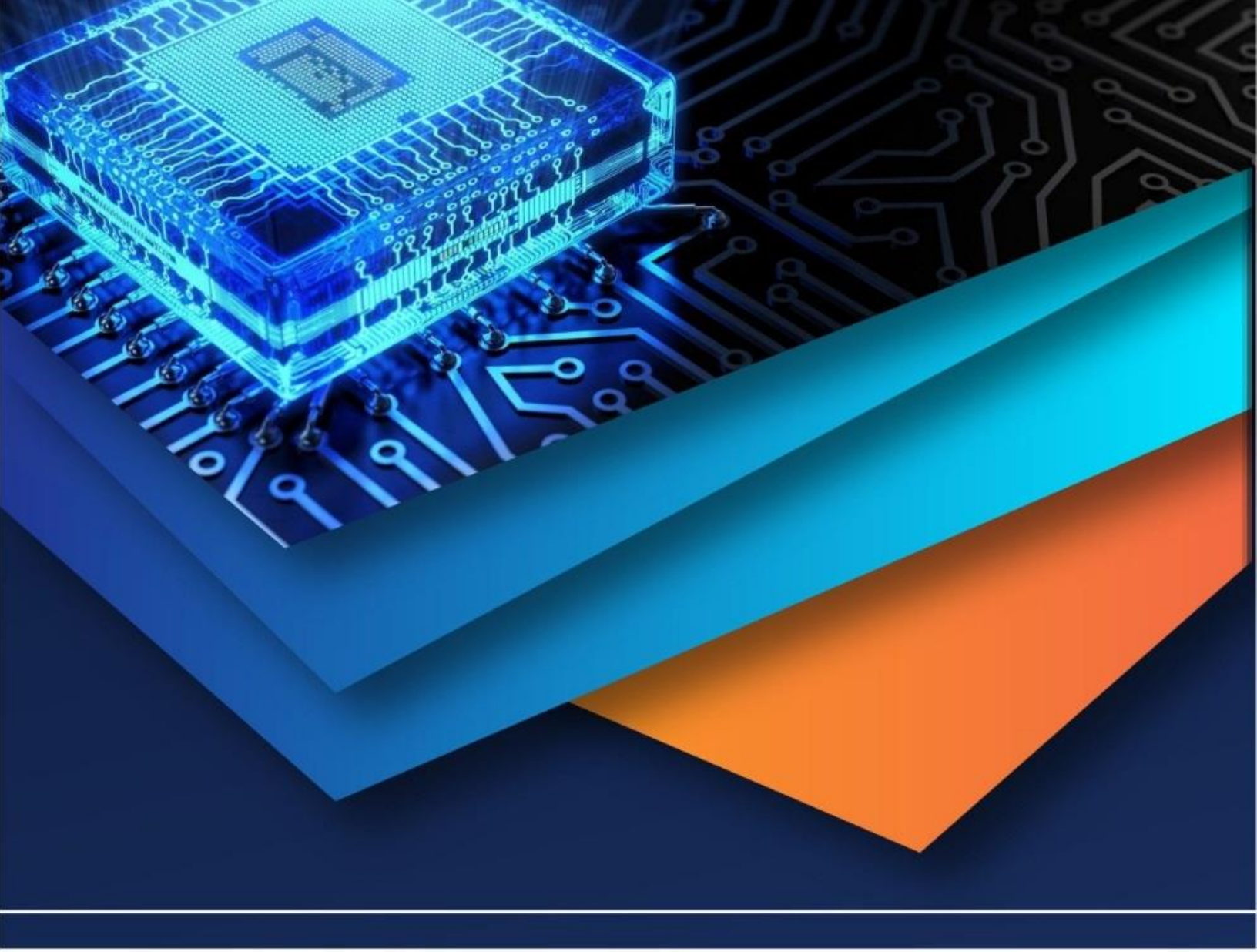
VII. FUTURE WORK

Upon extensive study and research, recommendations for improvement and enhancement of the face sketch recognition system program are concluded as follows:

A. Improving accuracy by using some variations or modifications for the existing model.
B. Using larger dataset of different sketch images.
C. Developing an unsupervised method for joint segmentation and modelling.
D. Replacing the DCT with the Discrete Wavelet Transform (DWT) as it is a superior and improved algorithm for image compression which requires less processing time than the DCT with better compression capability.

BIBLIOGRAPHY

[1] Zheng Xiang, Hengliang Tan, Wienling Ye., "The excellent properties of dense gird", Based HOG features on face recognition compare to Gaborr and LBP, 2018.
[2] VarunGarg, KritikaGarg, "Face Recognition Using Haar Cascade Classifier", Journal of Emerging Technologies and Innovative Research (JETI), December 2016.
[3] ArchanaUphade and J.V. Shinde, "Matching Composite Sketches to Facial Photos Using Component-Based Approach", International Journal of Computer Applications, Vol. 129, No.15, pp. 17-21, 2015.
[4] Deepinder Singh and Dr. Rajat Gupta, "Matching Facial Composite Sketches to Police Mug-Shot Images Based on Geometric Features", IOSR Journal of Computer Engineering, Vol. 16, Issue 3, pp. 29-35, 2014.
[5] Md. Abdur Rahim, Md. Najmul Hossain, T. Wahid, Md. Shafiul Azam, "Face recognition using Local Binary Patterns (LBP)", Global Journal of Computer Science and Technology Graphics & Vision, Global Journals Inc. (USA), Volume 13 Issue 4 Version 1.0, 2013.
[6] W. Zhang, X. Wang and X. Tang, "Coupled Information Theoretic Encoding for Face Photo-Sketch Recognition", Proceedings of IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2011.
[7] B. Klare, Z. Li and A. Jain, "Matching forensic sketches to mug shot photos", IEEE Trans. Pattern Analysis & Machine Intelligence, vol. 33, no. 3, pp. 639–646, 2011.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY