

## IDENTIFICATION OF GENDER USING FACIAL IMAGES

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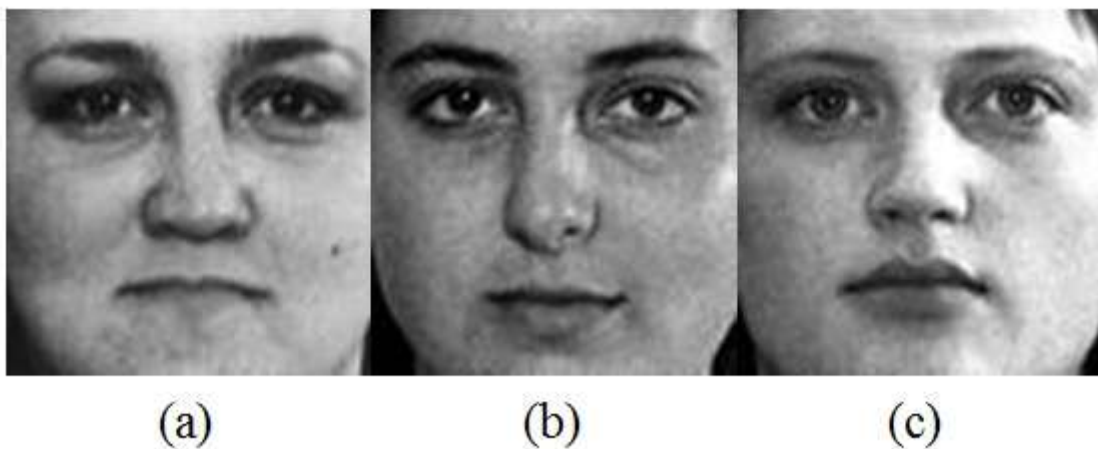
### ABSTRACT

Identification of gender using facial images have been interesting part as of now. People are very good at identifying gender from facial images. Recently, identification of gender from facial images has gained much profits in the computer vision and machine learning concepts. This is because of greatest importance in Computer Interaction, demographic research, and security and surveillance applications. It can also buildup in other important fields such as recognition of faces, age prediction, object prediction etc. The aim of this project is to determine the gender of a person by providing the facial image as input to the computer. This is a case of training datasets where first the algorithm is trained on some set of male faces and female faces, and then the results are used to arrange new data.

**KEYWORDS:** Gender Recognition, Support Vector Machine, Image Processing, Image Enhancement, Feature Extraction.

### I. INTRODUCTION

Over the past decades identification of gender based on images of faces have transcended from esoteric to popular areas of research in computer vision and one of the better and successful application of image analysis. Identification of gender using facial images has become an acute research area cross several disciplines such as pattern recognition, computer vision, cognitive science, image processing, neural networks etc. The goal of identification of gender is to detect whether there are any faces in the images or not and if the image is existing then it gives extent of each face. While this appears as the insignificant job for human beings, it is a very difficult duty for computers. Gender recognition is mainly derived from the mathematical features of a face is apparently the most instinctive appeal to face recognition. One of the initial automated recognition of face systems was represented in marker points (position of nose, eyes ears, lips, chin width) where used to augment feature vector. Newly different methods for a local feature extraction appeared. Gender classification is positioned as dual-class (binary) classification issue where the input facial image is to be fixed to one of them i.e., female or male categories.





**Fig-1:** Zoomed and positioned facial images (a), (b), (c) are female faces whereas (d), (e), (f) are male faces

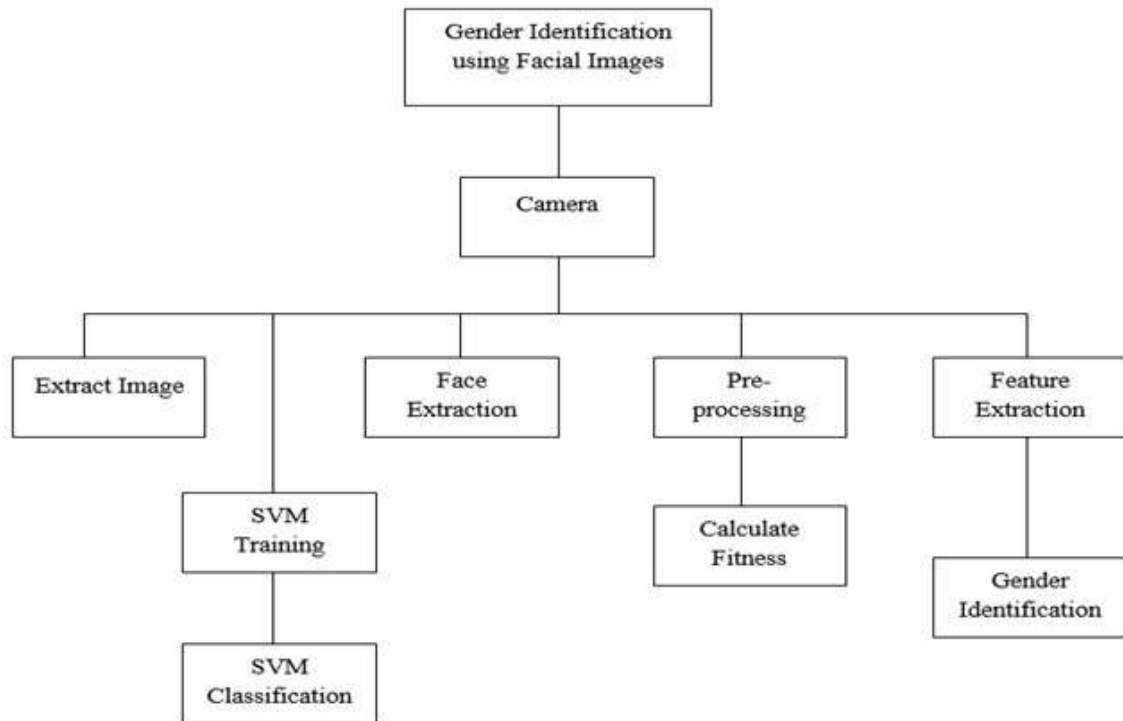
## II. LITERATURE SURVEY

Gender identification is a major job for human beings since most of social interactions extremely rely on the gender perception. Feature Extraction Techniques uses two methods to extract the features, Global Feature Extraction and Local feature extraction. Global feature extraction uses eigen face approach for reconstruction of face images by PCA and the two-dimensional discrete cosine transform (2D-DCT) approach. Local Feature Extraction uses LBP descriptor and computes by using the LBP operator. It was firstly used as an appearance descriptor giving very accurate results in many applications. Fusion of the Features is the process which Combines the global and local feature vectors to form the overall feature vector for the whole image. The Advantage is PCA are low noise sensitivity. Disadvantage is DCT is expensive to manufacture. Fuzzy rule formation is the method were identification can be done using beard, bindi, hair, ear ring, eyebrows. In this paper, trial and error method is used to locate skin color and non-skin color pixels. But many of the times, system fails to detect whether an image contains human face or not. Using Fuzzy rule formation, it is easy to detect facial features but sometimes result may be unpredictable. To recognize face in the image some facial features are used like skin tone, shape of face, mouth, width and height of lips etc. Face detection system based on a RCNN that detects tiny windows of an image to detect whether each window contains a face or not. The Advantage is this method produces good detection rates (77.9% and 90.3%) and disadvantage is only detecting up right faces looking at the camera. Gender identification using Support Vector Machine is largely used in recent days. This algorithm data is arranged in two groups. According to the properties of data, SVM data is grouped. The result gained by this algorithm is superior than other different algorithms. Support Vectors can largely classify the properties between two groups.

## III. METHODOLOGY

System Implementation is the phase where the conceptual design is converted into a functioning system. The system is implemented using Python. Python is an interpreted, high-level, general-purpose programming language. Created by Guido van Rossum and first released in 1991, Python's design philosophy emphasizes code readability with its notable use of significant whitespace. Python was conceived in the late 1980s as a successor to the ABC language. Python 2.0, released in 2000, introduced features like list comprehensions and a garbage collection system capable of collecting reference cycles. Python 3.0, released in 2008, was a major revision of the language that is not completely backward-compatible, and much Python 2 code does not run unmodified on Python 3. Python is a multi-paradigm programming language. Its language constructs and object-oriented approach aim to help programmers write clear, logical code for small and large-scale projects. Python is dynamically typed and garbage-collected. It supports multiple programming paradigms, including structured (particularly, procedural,) object-oriented, and functional programming. During this scheme additional details of the data structures and algorithmic design of each of the modules is highlighted. The logic of module is generally specified in a high-level design description language, which is individualistic of target language in which the software of the system will automatically be implemented.

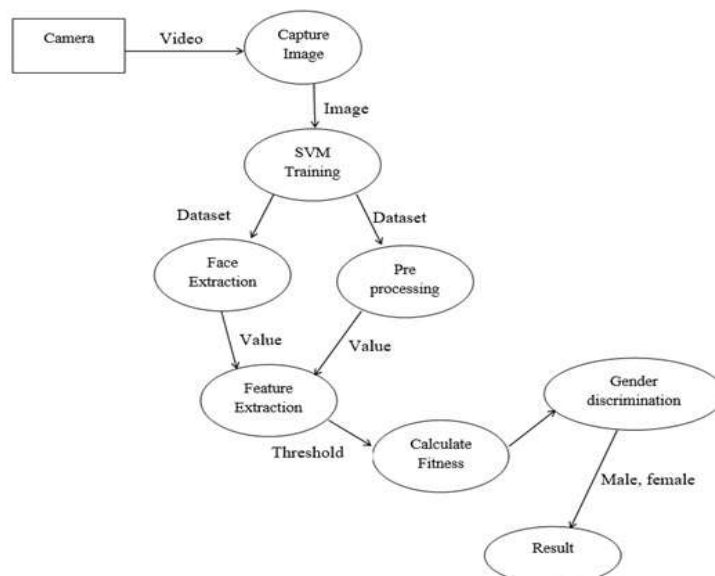
#### IV. MODELING AND ANALYSIS



**Fig-2:** High level design for Gender Identification

The above high-level design shows that the camera is used to extract the images, once the images are extracted, the SVM algorithm is used and the SVM classification is done. High-level design is also called as system design. The objective of system design is to identify the modules that are available in the system, the detailing of these modules and systems, and how the systems interact with one other to produce the required results. At the end of system design all the important data structures, file formats, output formats, as well as the modules in the system and their detailed facts are decided.

**Level 1DFD**



**Fig-3:** Level 1 Data flow diagram of Gender Identification

Level 2 DFD

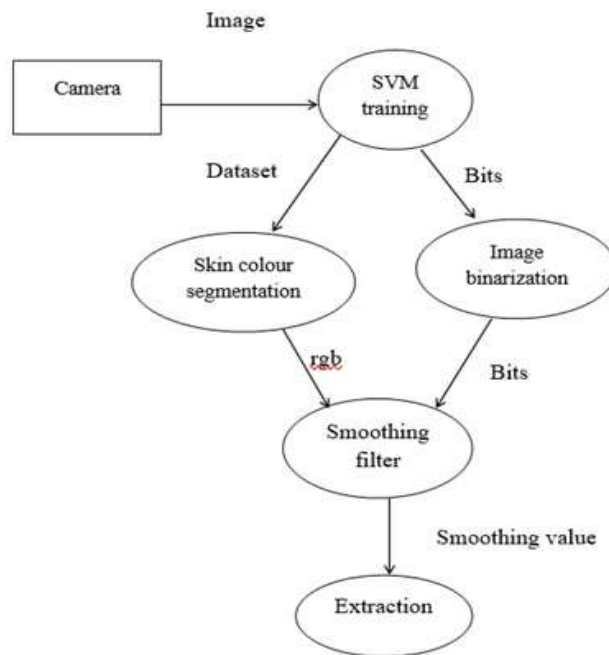


Fig-4: Level 2 Data flow of Gender Identification

A Data Flow Diagram (DFD) is a graph showing flow of data values from their sources in objects through operations that modify them to other objects. A DFD also known as “bubble chart” has the scheme of elucidating the requirements of the system and detecting important modifications that will set off methods in system design. So, it is the initial point of the system design phase that effectively deteriorate the requirements specifications down to the last level of module. The bubbles represent data Transformations and the lines represent data flows in the system. The level one DFD shows that the camera is placed and the video is recorded, the video will capture the image, through the SVM training based on the dataset face extraction and pre-processing is done, and based on the value feature extraction takes place. Due to this reason the threshold value fitness is calculated, the gender discrimination is done as male or female the results are displayed. The level 2 DFD shows that the camera which captures images the SVM training is used to know the skin color segmentation and through bits image binarization process takes place, smoothing filter is done through bits smoothing value is used for extraction.

## V. RESULTS AND DISCUSSION

From the above aspects it is observed that both the feature extraction and classification phases have been studied and implemented as part of this work. The best results are obtained by using an SVM classifier. The recognition rate of SVM are nearly similar with accuracy of 84% respectively. SVM is however, more pleasing conceptually and in execution, its force is its power to label non-linear classification tasks.

## VI. CONCLUSION

Identification of gender from face images is mainly the fundamental research areas in computer vision. Gender recognition is useful in major useful areas such as human computer inter-action, biometric, surveillance, demographic statistics etc. Human face accommodates major information for gender recognition. It is a difficult task for a machine to detect this information which classifies male faces from female faces. Experimentations are going on so that a machine can achieve human level accuracy. The project can be applied to overcome the frauds and also can be much used in voter identification. It can also be used for surveillance at banks and residential areas. In future this framework can be used in several vision based classification such as object and scene classification in reducing the burden of humans. Hence this project helps in identifying easily and also

currently it is inaccurate at identifying people of color especially black women. Thus, this can be improved in future.

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