


# Chapter 12

## Surveillance of Age and Gender With ML: A Knowledge Based Statistical Analysis for Next Gen Software Products

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### **ABSTRACT**

*Gender and age classification is a major role for many purposes in the world. Humans have god-gifted facilities to recognize any gender and their age, but they cannot notice all the people, so the author team has trained the machine to work at those which are not capable of recognizing by simply seeing the people. Nowadays, the age and gender classification have a major role in the market, surveillance, security, etc. This research work for age and gender detection is different from the other project for facial recognition. As in this research, fisherface algorithm has been used which is very easy and accurate, and which simply works on the basis of facial recognition. The authors have used an audience dataset which is today's most demanding dataset as it is a self-updated dataset, and easily available on the open source. It basically depends on the deep learning in which openCv is used for the implementation of the given algorithm and dataset. As it does not require any complex calculations to recognize the faces, it is very fast and easy to use as compared to the other projects.*

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## **INTRODUCTION**

In today's world age and gender detection has become a huge industrial requirement for security purposes, for digital marketing etc. Electronic Customer Relationship Management (ECRM) (Reponen et al., 2002) is growing the technology very fast and it enhances digital marketing based on gender and age detection management.

Working with approx 200,000 images, (Irick et al., 2007) implemented a gender classifier which is based on the appearance, using convolutional neural networks(CNN), which achieve 84% accuracy with a dataset of about 3,826 images. With the Radial Basis Function (RBF) by using Support Vector Machine (SVM) (Moghaddam et al., 2002) got 96.5% accuracy for the classification of gender on 1,770 images of FERET dataset (Phillips et al., 1998).

Gender and Age has become a great application for computer based security such as surveillance, or live surveillance, human-robot interactions, and passive demographic data collection etc. In this research project openCV which is a library will be used which will work by the help of the python code.

In presented research work, the author team are using the audience database and the fisher facial algorithm. Generally the faces can be recognized by two processes either by the feature based method or by the image based method. In feature extraction it will extract the angle and alignment of the nose eye etc, and then find its matching in the dataset. But in the image-based recognition it will recognize the texture and the illumination of the image and then find the matching according to it.

This is a very interesting research work which has a very high scope towards the world and everyone. It is one of the major projects which makes the world an easy step towards technology.

**Eigenface** The use of eigenface provides an advantage in improving the face recognition process since it generates facial patterns from face data sets that is able to significantly reduce the dimensions of the input image. The training image is then represented by a combined vector.

The Design System Face recognition system using fisherface method is designed to recognize the face image by matching the results of its feature extraction. The system is expected to determine whether the image to be tested is recognized correctly or not.

## **MOTIVATION**

The Authors' Team gets motivated to make this project from the problems in society. Researchers have seen many cases in which people often get confused to recognize the people's gender and people often get confused to predict the age of the people, due to which many problems occur. Today marketing is one of the major factors for the economy, so this project will bring a huge change in the market. One of the major factors in the market is the demand and the supply.

So, the team doing the study can supply the things in the market if we know the demands of the people according to the gender and the age, so this project will help us to improve the marketing.

The gender recognition is essential and critical for many applications in the commercial domains such as applications of human-computer interaction and computer-aided physiological or psychological analysis, since it contains a wide range of information regarding the characteristics difference between male and female.

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