

# INXOL TECHNOLOGIES



**AI Intern.**

**TEAM LEAD**

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**Submitted by**

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[faizrzaadec/AI-Intern\\_INXOL \(github.com\)](https://github.com/faizrzaadec/AI-Intern_INXOL)

# TASK 1: IMAGE CLASSIFICATION

## Situation: AI Gender Classification for Intelligence Gathering

### Problem Statement:

In a modern and technologically advanced world, an intelligence agency is tasked with monitoring public spaces and gathering information for various purposes, including security and threat assessment. As part of their efforts, the agency is collecting vast amounts of data, including facial images of individuals, from surveillance cameras, social media, and other sources.

One specific task they are working on is to develop an AI-powered gender classification model. This model will be used to automatically classify the gender of individuals in the collected facial images. The agency believes that this information could provide valuable insights into demographic patterns and potentially aid in identifying persons of interest more efficiently.

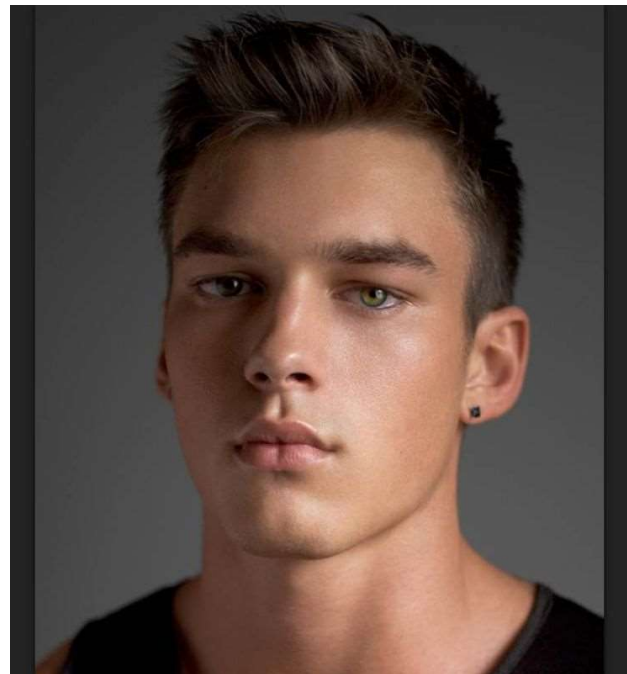
### Your Task:

You are supposed to create *Gender Classification* model using *Human Facial* images dataset. Develop gender classification models using provided approaches:

- **Dense Neural Network:** Develop and train a dense neural network. Evaluate accuracy and computational cost.

### Methodology

**Data Collection:** Data is collected from the Keggel! A collection of Male and Female Faces in a Large Quantity. Sample of the data is below...



**Data Preprocessing:** In data cleaning, first off, we read the images, after reading we did the following preprocessing steps:

- From the picture we detect the face, if there is any face in the image or not, e.g if we have the image of the person of full body, we don't want to process all the image, we'll just detect the face, so we can just process the face in which we're interested, it'll help us to reduce the computational cost.
- After detecting we extract the pixels of just the face, the rest of the image is not for our use,
- Convert the matrix into data frame after flatten and turning into list.
- We know the max value of a pixel is 255, so we divide all the data frame by 255, it's called normalization, it helps us to increase the accuracy of the model and reduce computational cost of ours.
- Randomize the data frame so the sequence of the labels will be randomized, it'll help us to reduce the effect of biasness in the model!

**Dataset Splitting:** First we split the data frame into features and target! (x, y). Then the x and y are further splitting into training and the testing. The training part will help us to train the model, testing set will be used to test the model.

**Model Selection:** This is our Task 1.1, we have to train the model using DNN, and so we will use Sequential. In this model we created two hidden layers, one contain 64 and other contain 32 neurons in it.

**Model Evaluation:** In model evaluation, we find the model accuracy on both training and testing sets, classification report (which include the Precision, F1 Score, Recall and more) and Confusion. This step provides insights into the model's real-world performance.

### Which Software is used?

Jupyter Notebook (Anaconda)

### System Specs?

Processor	Intel(R) Core(TM) i7-4600U CPU @ 2.10GHz	2.70 GHz
Installed RAM	12.0 GB	

**Source Code:** See the code at my [github](#)

**Evaluation:** The DNN is the dense neural network, which is also known as fully connected neural network because in DNN all the layers are densely connected to each layer. That make it better than others, and gives us the better accuracy.

**Conclusion:** We get 90+ accuracy and the computational cost is also low as compared to ML classifiers. That's why we don't use the ML widely!