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Neural Network-Based Face Detection Using Genetic Algorithm

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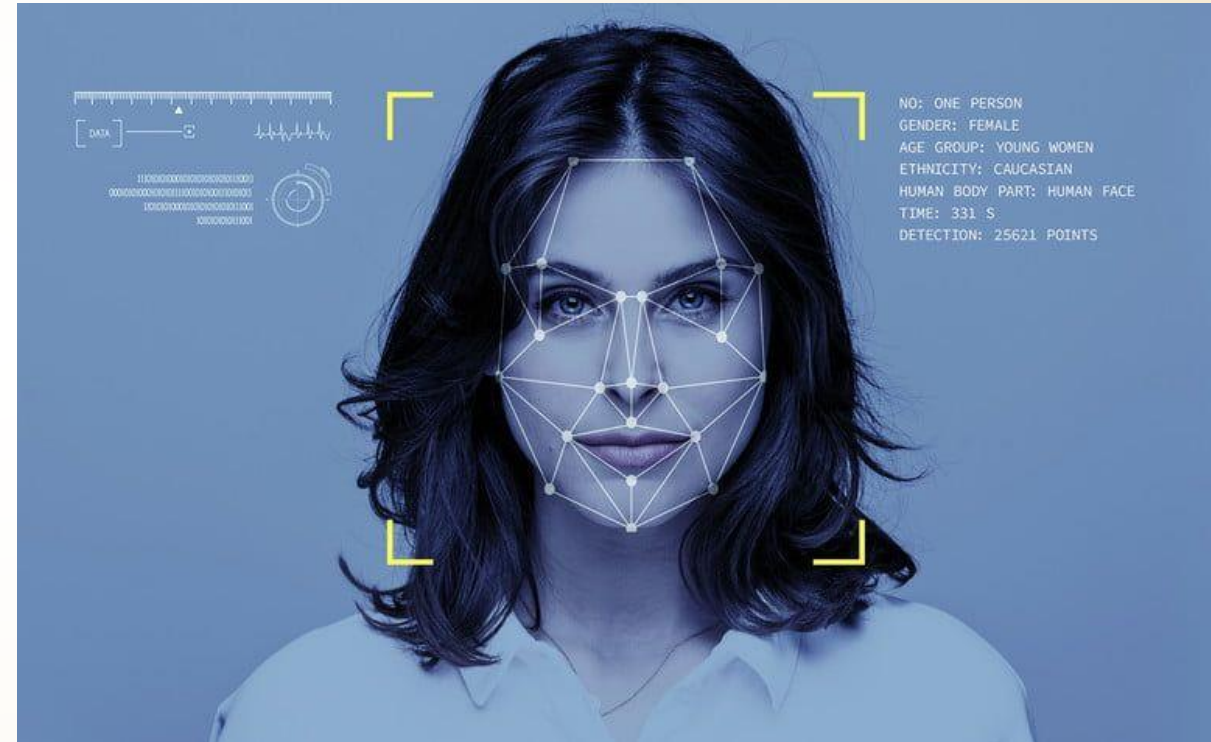
INTRODUCTION



INTRODUCTION

Face Detection =

- A wide range of applications, including biometric identification, indexing of image and video databases, and human-computer interfaces.

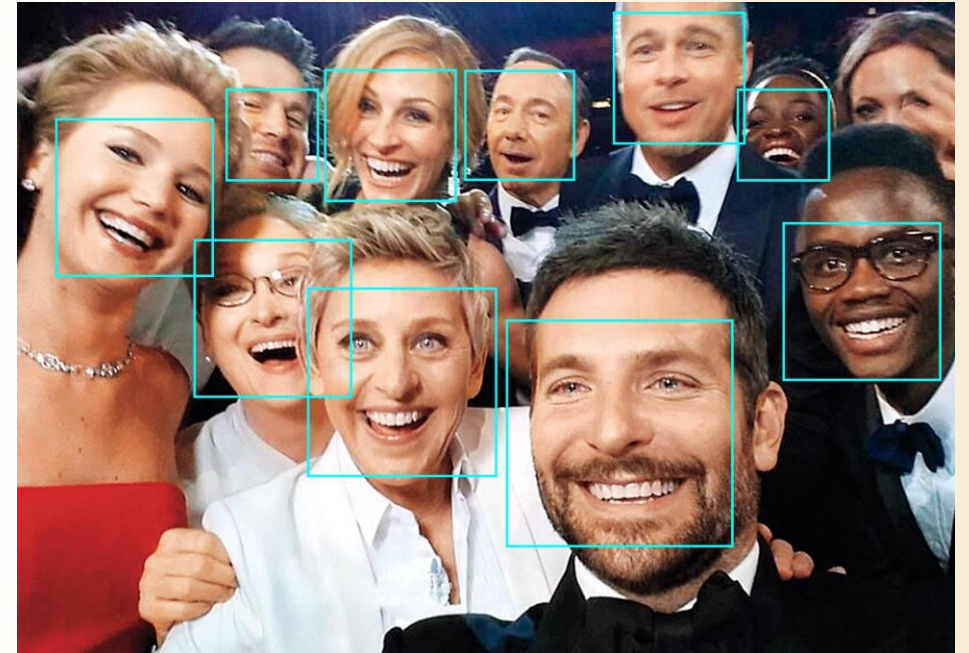


INTRODUCTION

- ❑ The performance of a learning-based method highly depends on the quality of training.

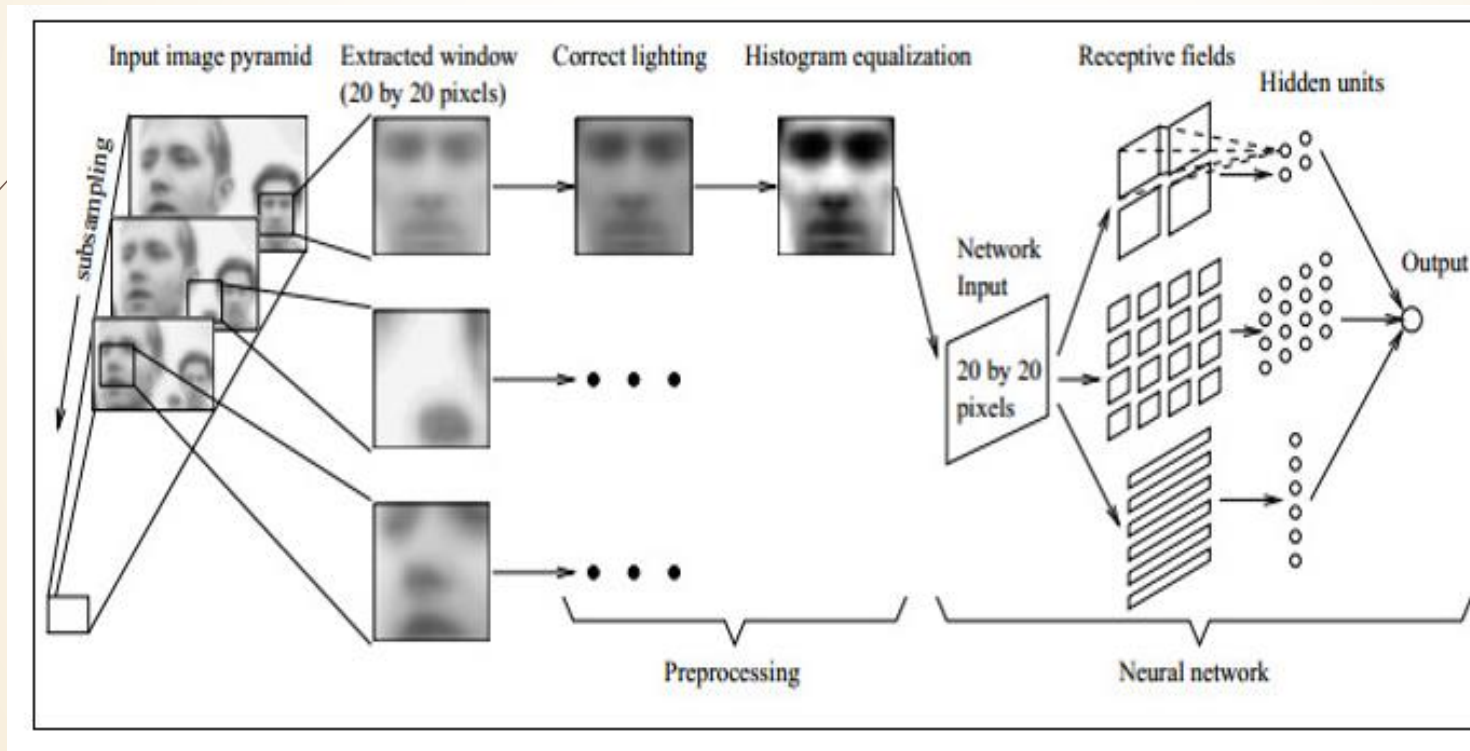
What are we going to discuss:

The outcomes of
Applying genetic algorithm for
optimizing the neural network
weights



ANN MODELS FOR FACE DETECTION

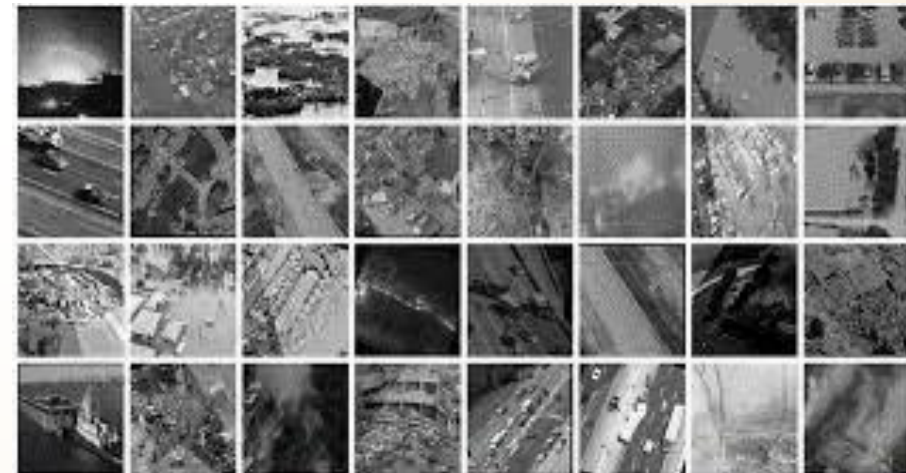
□ Neural Network Architecture



ANN MODELS FOR FACE DETECTION

□ Training Stage

Training data set consists of two classes: face and non-face images scaled to a specific size and orientation within 20*20 pixel window.



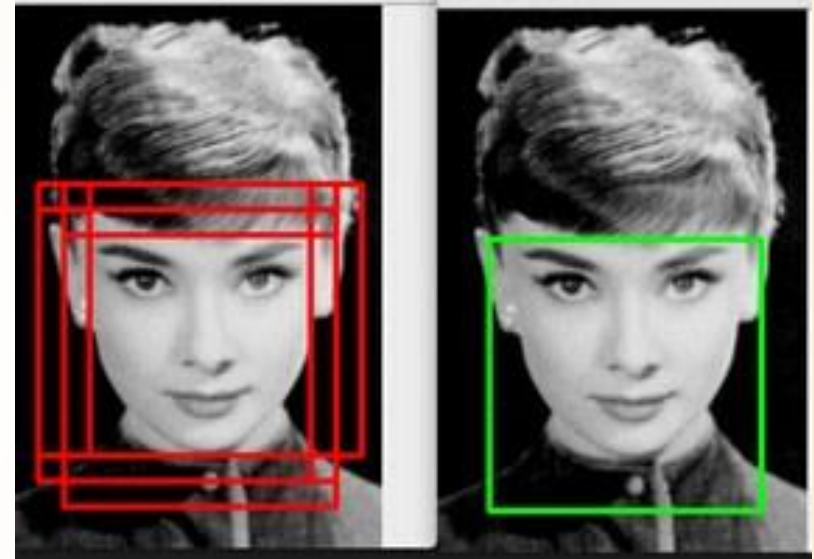
Example of a Face and a non-face images

ANN MODELS FOR FACE DETECTION

❑ Arbitration among detections

(clean up heuristics)

- Locations with higher number of detections within a small neighborhood are preserved.
- Locations with number of detections less than threshold are eliminated.

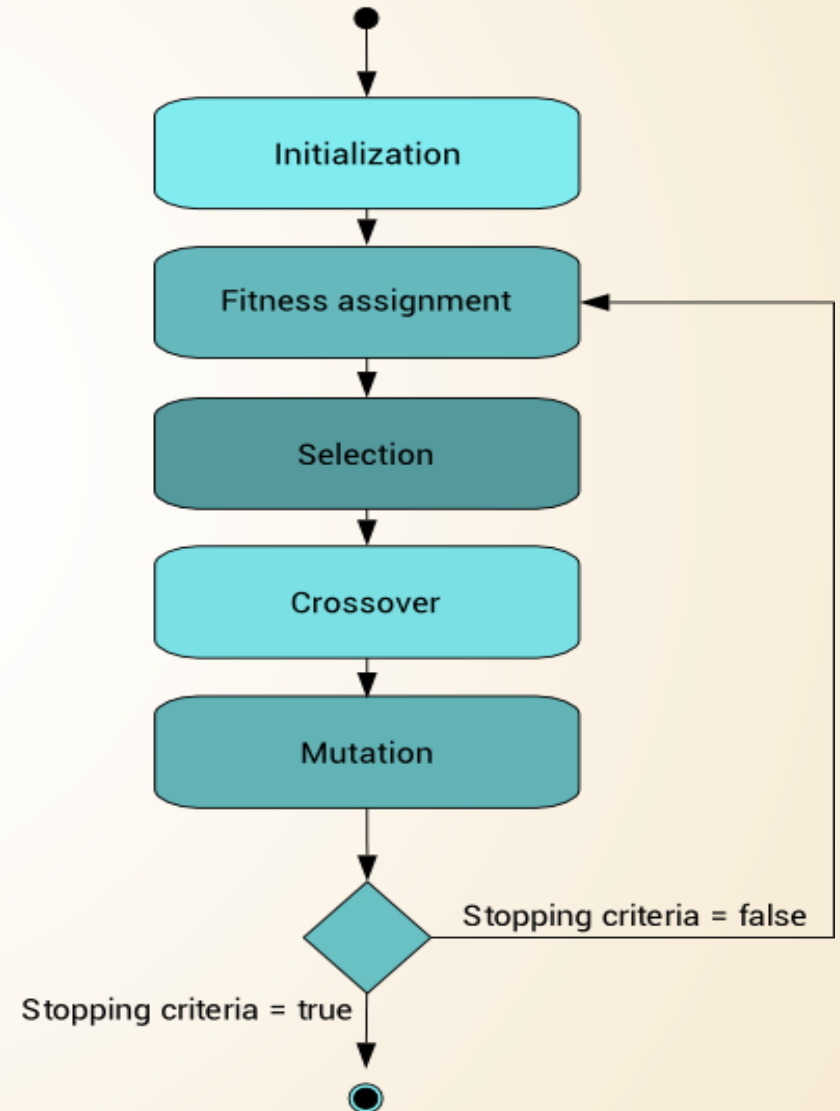


GENETIC ALGORITHM IMPLEMENTATION

- ❑ *optimizing the neural network weights.*
- ❑ From the literature review, when a GA is applied in searching for the optimal weights, the probability of being trapped in local minima is removed.

GENETIC ALGORITHM IMPLEMENTATION

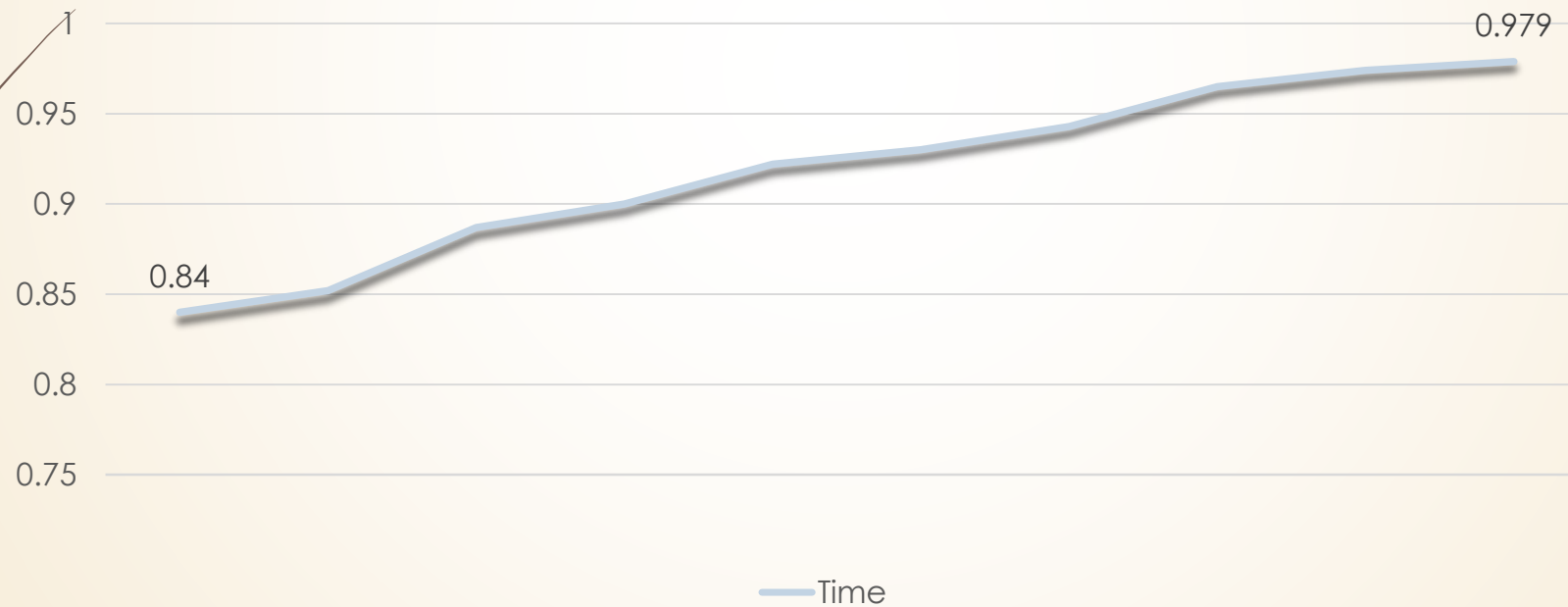
- ❑ The initial population is represented by the initial weights of the neural network.
- ❑ Each individual in the population is then assigned with the fitness value
- ❑ For every two parents **selected**, we apply the **crossover** and **mutation** operators.



EXPEREMENTS RESULTS

The best achieved accuracy result of the detection system is nearly 98%.

Performance evaluation of the GA-based neural network over time



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Thanks For giving your time

And Stay Safe :)