

Artificial Intelligence Report

By A. Abrar Hussain B. Maria Maqsood

October 21, 2022

Abstract

In this experiment we tried to explain the Darwin Evolutionary model or theory. Also, we have tried to implement this model in practical form i.e: for finding a picture from a group of people using Darwin Theory of Natural Selection.

1 Introduction

CHARLES DARWIN was a British naturalist, geologist and biologist who gave the theory of Evolution by Natural selection. His theory of evolution by Natural Selection gave way to modern evolutionary studies. He said that all humans and animals share common ancestors. Darwin proposed this idea of Natural selection five years after studying plants, animals and fossils. Finally all his studies led him to publish a book named as " On the Origin of Species".

2 Explanation of the Theory

Evolution by Natural Selection means change in species with the passage of time. Darwin model states that the species changes with the passage of time and this change occurs with the requirements or changes in the environment. Natural Selection increases the ability of the individuals to compete with the arising requirements, survive in that environment and this also helps in reproduction of the new individuals which are better fitted to the environment. He explains that the mostly characteristics in offspring are inherited from their parents or ancestors. This change also occurs when a particular specie find survival threats. For example; Darwin explained that in the past ages the beaks of some birds were long and thin but as time passes their beaks became short and thick. The reason that their beaks changed is that they were eating seeds, fruits or insects but with change in time their taste changes and long beaks helped them to pick out seeds while short beaks helped them to pick food from the ground. The traits(features) of a child resembles with the features of the Parents but the features adapted by the offspring are not the same as the whole population is. Darwin theory also explains that with the rapidly changes in the environment species are also changing , and the species that does not change with the environment they may not be able to adapt fast and they got extinct. For example; Dinosaurs. Darwin's theory explains that as the species changes over time, this gave birth to new species that are somehow different, but belong to the same ancestors. He took some species of pigeons and dogs, do

research on it by observing changes in the species and observed that this change occurs only if the specie of one area or pace moved to another area and place. Finally, concluded that the species now a days found are the result of the Natural Selection.

3 Evolution

Evolution is the key to life on Earth. Without Evolution there will be no life on the Earth. Evolution of a population takes place only when a new generation comes from a population in such a way that it is better fitted within the environment. With this change of population, many changes occur in the new generation. Mutation is the cause of evolution. Because in mutation the offspring produced are different from the parent generation.

4 Evolutionary Algorithm

Evolutionary Algorithm is basically originated from biology which explains the behaviour of living organisms. Evolutionary Algorithm explains all type of problems and in this there is no supposition. Types of Evolutionary Algorithm are:

Genetic Algorithm: In Genetic Algorithms, the fittest individuals are selected for the production of a new generation.

Evolution Strategies: Evolution Strategies include mutation and selection of the living organisms from the population.

Genetic Programming: This part includes the programming and solution of the the problem.

Fittest: In fittest, we choose the individuals or the new generation which is fitter to the environment and the changes within the environment. These fitters contribute in the production of the new generation or offspring.

Mutation and cross over: After chosing the fittest, the data or gene type is interchanged through which new generation arises.