SOFT COMPUTING & OPTIMIZATION ALGORITHMS MINIPROJECT

FOR LAB PROGRAMMING - IV

A Project Report on

Genetic Algorithm on IRIS dataset

Submitted by:

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Title: Apply the Genetic Algorithm for optimization on a dataset obtained from UCI ML repository. (IRIS Dataset).

Prerequisite:

-Basic of Python, Data Mining Algorithm, Iris Dataset, Genetic algorithm.

Software Requirements:

-Jupyter Notebook

Hardware Requirement:

-PIV, 2GB RAM, 500 GB HDD, Lenovo A13-4089Model.

Learning Objectives:

-Learn How to Apply Genetic Algorithm for given Iris Dataset. The main objective of this assignment is to implement Iris Flower Dataset or any other dataset into a data frame using python.

Outcomes:

-After completion of this assignment students are able Implement code for the Iris Dataset with plotting diagram.

Theory Concepts:

1. Python is an interpreted high level programming language for general purpose programming created by Guido Van Rassom and First released in 1991.
2. Python for a design philophy that emphasizes code readability, notably using significant white space .
3. Python features a dynamic type of automatic memory management support multiple programming paradigm, including object – oriented, imperative, functional and procedural and has a large ,comprehensive standard library.
4. Python library is a collection of function and methods that allows you to perform lots of actions without writing your own code.

Eg: If you are working with data, numpy, scipy, pandas, etc .are the libraries you must know.

- **Import pandas as pd**

  Pandas is an open source ,BSD-licensed library providing high performance, easy to use data structure and data analysis tools for the python programming language.

  - Pip install pandas

- Pip install matplotlib

- **Import matplotlib as plt**

  - Matplotlib is a plotting library for the python programming language and its numerical mathematics extension numpy.
  - If provides an object oriented API for embedding plot into applications using general purpose GUI tools like Tkinter , Wxpython.

- **Iris Dataset**

  - This dataset includes three species with so samples each as well as some properties about each flower .
  - The available columns in this dataset are : id , sepal length cm, sepal width cm, petal length cm , petal width cm and species .
  - The Dataset is self available below in csv file . This dataset is also available in scikit-learn package of which the link description also attached in title.
  - The main task in this dataset is to create an iris (name of a flower) Classifier based on given properties that are the sepal and petal size.
  - If you don't know the difference between sepal and petal, here is an image that shows which part of the flower is sepal and which part is petal.

- df.isnull().any()
  - It is used to check whether we have null values in our dataset or not .

- df.types()
  - To know the type of each column values

- df.describe()
  - check the quick summary of data.

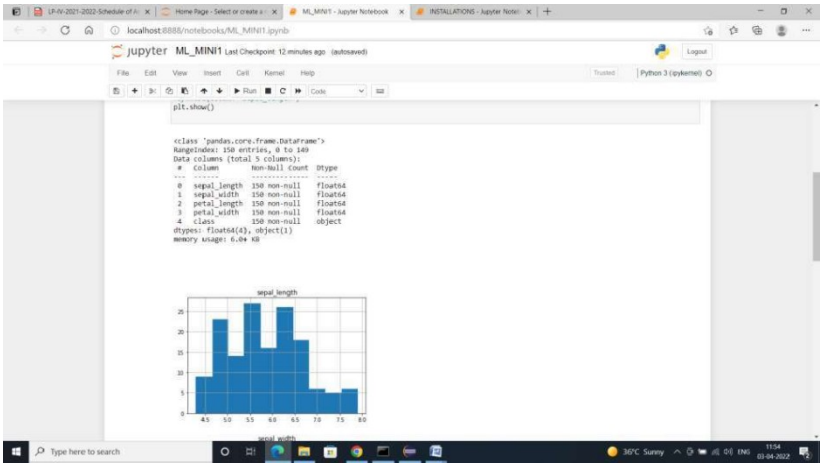
- Df.['petalwidth'].plot.hist()
  Plt.show()

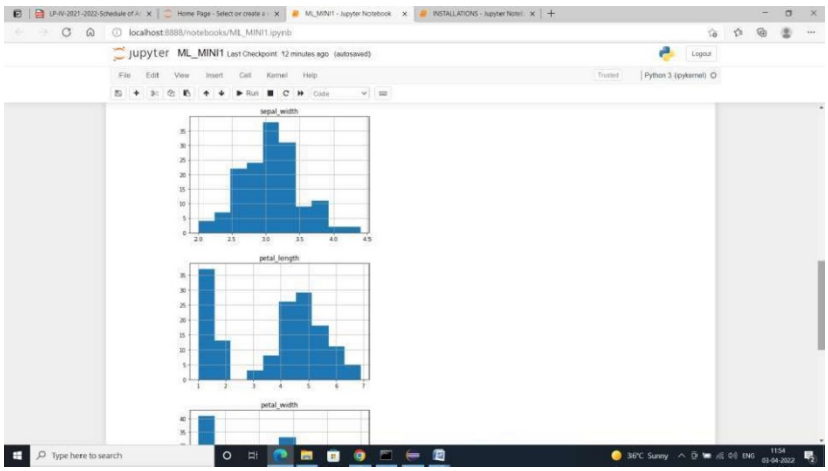
  - It is used to represent flowers datasets of values between 0.1 and 0.5 in the graph form.

- **Splitting the Dataset**
  - Since there is only dataset available, we need to divide the dataset into training and test dataset.
  - To do this, we can use train_test_split method from the scikit learn.

- **BoxPlot**
  - A 'Boxplot' or 'box-&-whiskerplot' is a graphical summary of the distribute.
  - The box in the middle indicates 'hinges' and 'median'.
  - The lines('whisker')show the largest or smallest observation that falls within a distance of 1.5 times the box size from the nearest hinge.
  - A boxplot can often give a good idea of the data distribution and is often more useful to compare distributions side by side as it is more compact than histogram.
  - We can use the boxplot function to calculate quick summaries for all the variables in our dataset by default.
  - The real power of boxplots is really to do comparisons of variables by sub-grouping.

Results:





Conclusion:

Hence, we have studied and practically implemented Iris flower dataset into a Data frame And we learn Genetic Algorithm for optimizing Iris Dataset .