

## Title: "The Enigmatic Iris Garden: Unveiling Nature's Secrets"



### Background

In the heart of a serene botanical garden lies a hidden treasure trove of irises, each flaunting its unique charm and color palette. These irises have fascinated botanists and enthusiasts alike for generations, but there's more to their allure than meets the eye. Deep within the garden's verdant embrace, lies a mystery waiting to be unraveled — a mystery that can be deciphered through the lens of machine learning.

### Mission Brief

As a budding data scientist, your mission is to embark on a journey through the Iris garden, armed with your data analysis skills and machine learning prowess. Your task is to explore the Iris dataset, a collection of meticulously curated iris flower measurements comprising sepal and petal dimensions, along with their corresponding species labels.

### Resources to deal with the problematic situation

#### Documents and links

Tool: [python-conda-install.pdf](#)

1. <https://scikit-learn.org/>
2. [https://scikit-learn.org/stable/auto\\_examples/datasets/plot\\_iris\\_dataset.html#sphx-glr-auto-examples-datasets-plot-iris-dataset-py](https://scikit-learn.org/stable/auto_examples/datasets/plot_iris_dataset.html#sphx-glr-auto-examples-datasets-plot-iris-dataset-py)
3. VanderPlas (2017) Python Data Science Handbook: Essential Tools for Working with Data.
4. McKinney (2017) Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython (2nd ed.).
5. Grus (2019) Data Science from Scratch: First Principles with Python (2nd ed.).
6. Géron (2019) Hands-on Machine Learning with Scikit-Learn, Keras, and Tensorflow: Concepts, Tools, and Techniques to Build Intelligent Systems (2nd ed.).
7. VanderPlas (2016) A Whirlwind Tour of Python, <https://jakevdp.github.io/WhirlwindTourOfPython/>
8. Slides of the course

### Project Objectives

1. **Data Exploration:** Begin your quest by delving into the depths of the Iris dataset (The link 2 above). Familiarize yourselves with the structure and contents of the dataset, discerning patterns and insights hidden within its numerical dimensions.
2. **Feature Engineering:** Uncover the latent beauty concealed within the measurements of sepal length, sepal width, petal length, and petal width. Craft innovative features that capture the essence of each iris, transforming raw measurements into informative signals for classification.
3. **Model Training:** Harness the power of machine learning algorithms to construct a classification model capable of distinguishing between the three distinct iris species - Setosa, Versicolor, and Virginica. Experiment with various classifiers, fine-tuning their parameters to achieve optimal performance.
4. **Evaluation and Validation:** Test the mettle of your classification model against the unseen data samples, gauging its accuracy, precision, and recall. Validate the robustness of your model through cross-validation techniques, ensuring its reliability in real-world scenarios.
5. **Insights and Interpretation:** Unveil the secrets concealed within the Iris garden, as your classification model unveils the intricate patterns underlying the diversity of iris species. Reflect on the significance of your findings, drawing parallels between nature's classification and the algorithms of machine learning.