



DIY Projects

# Implement ML Algorithms from Scratch

Difficulty - **Beginner**

Expected time to finish **7-9 Days**

## Introduction

In this project, our aim is to learn and implement ML algorithms from scratch. We will understand the mechanics of ML algorithms and how to transform mathematical functions into functional code. We will cover the following ML algorithms:-


- K-Nearest Neighbours (KNN) - Classification & Regression
- Naive Bayes - Classification
- Decision Trees - Classification and Regression

## Tech Stack




- Python
- PyTorch
- Matplotlib ( for visualization)

## Resources



- If you are not already comfortable with Python :
  - Learn the Basics of Python with a focus on Data Science
    -  Python for Data Science - Course for Beginners (Learn Python, P...
  - Use the following timestamps:
    - [1:37:25](#) How to Launch a Jupyter Notebook
    - [1:46:28](#) How to Code in the iPython Shell
    - [1:53:33](#) Variables and Operators in Python
    - [2:27:45](#) Booleans and Comparisons in Python
    - [2:55:37](#) Other Useful Python Functions
    - [3:20:04](#) Control Flow in Python
    - [5:11:52](#) Functions in Python
    - [6:41:47](#) Modules in Python
- Learn Basic OOP in Python

<https://www.youtube.com/playlist?list=PL-osiE80TeTsghluOqKhwlXsIBIdSeYtc> (videos 1-4 will be sufficient for our purpose )


- **Learn NumPy and Matplotlib**







- Overview of essential NumPy operations
  -  Complete Python NumPy Tutorial (Creating Arrays, Indexing, M...
- Reading material on NumPy-
  - <https://cs231n.github.io/python-numpy-tutorial/>
- Go through Kaggle Notebook, identifying the syntax for various types of data representations
  - <https://www.kaggle.com/code/prashant111/matplotlib-tutorial-for-beginners/notebook>

- **Learn and Implement KNN Algorithm-**

- Basic Idea of KNN -
  -  StatQuest: K-nearest neighbors, Clearly Explained
- Implementation -
  -  KNN Classification & Regression in Python (See the tutorial until 13:24, then try implementing on your own first)
- Blog Post -
  - <https://towardsdatascience.com/how-to-build-knn-from-scratch-in-python-5e22b8920bd2>

- **Learn and Implement Naive-Bayes.**

- Basic Idea of Naive-Bayes
  -  Naive Bayes, Clearly Explained!!!

- Reading Material -  
<https://cs229.stanford.edu/summer2020/cs229-notes5.pdf> ( pages 8 - 14)
- Implementation
  -  Naive Bayes Classifier in Python (from scratch!)
  - Blog Post -  
<https://towardsdatascience.com/implementing-naive-bayes-algorithm-from-scratch-python-c6880cfc9c41>
- **Learn and Implement Decision Tree.**
  - Basic Idea in Decision Tree -
    -  Decision and Classification Trees, Clearly Explained!!!
  - Ideas Before Starting to Implement
    - Classification
      -  Decision Tree Classification Clearly Explained!
    - Regression
      -  Decision Tree Regression Clearly Explained!
  - Implementation
    - Classification
      -  Decision Tree Classification in Python (from scratch!)
    - Regression
      -  Decision Tree Regression in Python (from scratch!)

## Submission

Form Link - <https://forms.gle/sHmvzS1gT4LBxXa28>