**ALGORITHM:**

**MACHINE LEARNING**:

Machine learning is a discipline that deals with programming the systems so as to make them automatically learn and improve with experience. Here, learning implies recognizing and understanding the input data and taking informed decisions based on the supplied data. It is very difficult to consider all the decisions based on all possible inputs. To solve this problem, algorithms are developed that build knowledge from a specific data and past experience by applying the principles of statistical science, probability, logic, mathematical optimization, reinforcement learning, and control theory.

Machine learning is associated with the study of the algorithms that enhance the efficiency of the machines/computers automatically through the training and testing of the machine/computers with certainly different variables. The machine learning is among the most favourable and fastest growing areas of computer technology. The computers work efficiently with different algorithms and functions. The machine learning is the training the computer with certainly different algorithms to experience the machine in automatic smart data processing. The machine learning enhances the efficiency and accuracy of the data processing and is used in a wide range of fields. The machine learning is developed with effectual algorithms that utilize a certain set of tools and functions to solve the complex and huge data.

The input to a learning algorithm is training data, representing experience, and the output is any expertise, which usually takes the form of another algorithm that can perform a task. The input data to a machine learning system can be numerical, textual, audio, visual, or multimedia. The corresponding output data of the system can be a floating-point number, for instance, the velocity of a rocket, an integer representing a category or a class, for example, a pigeon or a sunflower from image recognition. In this chapter, we will learn about the training data our programs will access and how learning process is automated and how the success and performance of such machine learning algorithms is evaluated.

Applications of Machine Learning Algorithms the developed machine learning algorithms are used in various applications such as:

* Vision processing
* Forecasting things like stock market trends, weather
* Pattern recognition
* Games
* Data mining
* Expert systems
* Robotics

**Steps Involved in Machine Learning**:

A machine learning project involves the following steps:

* Defining a Problem
* Preparing Data
* Evaluating Algorithms
* Improving Results
* Presenting Results

The best way to get started using Python for machine learning is to work through a project end-to-end and cover the key steps like loading data, summarizing data, evaluating algorithms and making some predictions. This gives you a replicable method that can be used dataset after dataset. You can also add further data and improve the results.

**Data Analysis:**

During the last decades, there has been an incredible growth in our capabilities of generating and storing data. In general, there is a competitive edge in being able to properly use the abundance of data that is being collected in industry and society today. Efficient analysis of collected data can provide significant increases in productivity through better business and production process understanding and highly useful applications for e. g. decision support, surveillance and diagnosis.

The purpose of data analysis is to extract answers and useful patterns such as regularities and rules in data. These patterns can then be exploited in making predictions, diagnoses, classifications etc.

Typical examples of working industrial and commercial applications are

* Virtual sensors, i. e. an indirect measurement of values computed from values that are easier to access.
* Predictive maintenance and weak point analysis through e. g. maintenance and warranty databases.
* Incremental step-wise diagnosis of equipment such as car engines or process plants.
* Intelligent alarm filtering and prioritization of information to operators of complex systems. Fraud and fault detection in e. g. data communication systems and ebusiness.
* Sales and demand prediction, e. g. in power grids or retail.
* Speed-up through model approximation in control systems, e. g. replacing a slower simulator with a faster learning system approximation.
* Clustering and classification of customers, e.g for targeted pricing and advertising, and identification of churners, i. e. customers likely to change provider.