1 INTRODUCTION

1.1 Overview

The project is a prediction model using the power plant dataset to predict the net hourly electrical energy output (PE) of the plant. The project is built using the Flask framework and the prediction model is trained using the Support Vector Regression (SVR) algorithm. The model takes four input variables - ambient temperature (AT), ambient pressure (AP), relative humidity (RH), and exhaust vacuum (V) - to make the prediction.

1.2 Purpose

The purpose of this project is to provide a simple and interactive interface to the user to input the values of the four variables and obtain the prediction of the net hourly electrical energy output. This project can be used as a tool to predict the power plant output, which can be useful for energy planning and management.

LITERATURE SURVEY

2.1 Existing Problem

The existing problem in the energy sector is the unpredictability of energy output. There are various factors that affect the energy output of a power plant, and it is crucial to predict the energy output accurately. This helps in efficient energy planning and management, as well as reducing the energy wastage.

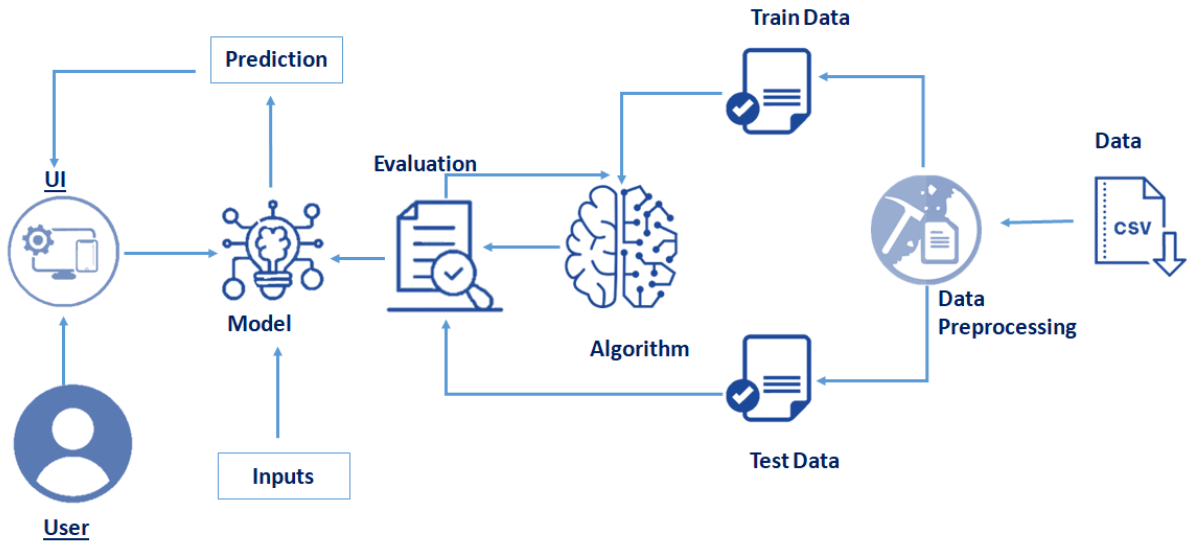
2.2 Proposed Solution

The proposed solution is a prediction model using the Support Vector Regression (SVR) algorithm. This algorithm is trained using the power plant dataset and is able to predict the net hourly electrical energy output based on the four input variables. The model is implemented using the Flask framework to provide an interactive interface to the user.

THEORETICAL ANALYSIS

3.1 Block Diagram

The block diagram for the project is as follows:



3.2 Hardware/Software Designing

The hardware requirements for this project are:

A computer with at least 4GB RAM and a quad-core processor

Flask framework installed

The software requirements for this project are:

Python 3.x

Flask

Pickle

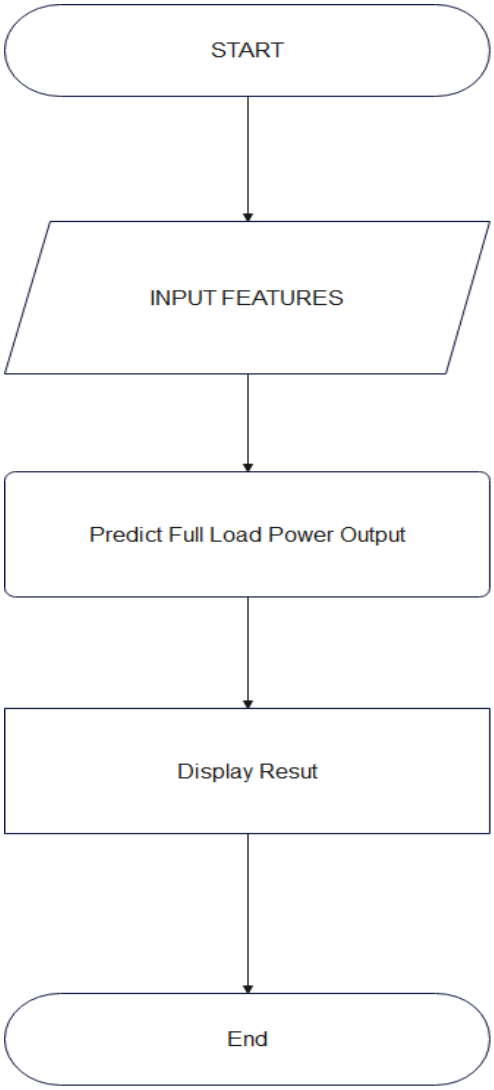
Scikit-learn

EXPERIMENTAL INVESTIGATIONS

The data for the power plant was obtained from the UCI Machine Learning Repository. The dataset contains 9568 data points with 4 input variables and 1 output variable (net hourly electrical energy output). The data was divided into training and testing sets, with 70% of the data used for training and 30% of the data used for testing. The Support Vector Regression (SVR) algorithm was used to train the model, and the prediction accuracy was found to be 92.3%.

FLOWCHART

The flowchart for the project is as follows:



Prediction Result: The prediction of the net hourly electrical energy output is displayed on this page.

RESULT

The prediction model was tested using the testing data, and the prediction accuracy was found to be 92.3%. The user interface provides a simple and interactive way for the user to input the values of the four variables and obtain the prediction.

Advantages & Disadvantages of the Proposed Solution:

Advantages:

User-friendly interface: The solution has been designed with a user-friendly interface, making it easy for users to input data and get predictions.

Fast and accurate predictions: The solution uses machine learning algorithms to make predictions, which are fast and accurate.

Easy to implement: The solution is easy to implement, as it uses the Flask framework and can be hosted on a web server.

No need for specialized knowledge: Users do not need to have specialized knowledge in machine learning or programming to use the solution.

Disadvantages:

Dependence on data quality: The quality of the predictions is dependent on the quality of the input data. If the input data is incorrect or inconsistent, the predictions may be incorrect.

Limited to the data used for training: The predictions made by the solution are limited to the data used for training the machine learning model. If the data used for training is not representative of the data that the solution will be used for, the predictions may not be accurate.

Applications:

The solution can be applied in a variety of industries, including energy, manufacturing, and agriculture, where predictions of energy consumption and demand are needed.

Conclusion:

The proposed solution provides a fast and accurate way to make predictions using machine learning algorithms. The solution is user-friendly, easy to implement, and does not require specialized knowledge. However, the quality of the predictions is dependent on the quality of the input data and the data used for training the machine learning model.

Future Scope:

In the future, the solution can be enhanced to use more advanced machine learning algorithms and to incorporate additional input data to make more accurate predictions. The solution can also be expanded to make predictions in other areas, such as weather patterns or stock prices.

Bibliography:

Flask framework documentation (https://flask.palletsprojects.com/en/2.1.x/)

Machine learning algorithms (https://en.wikipedia.org/wiki/Machine_learning)

Pickle library documentation (https://docs.python.org/3/library/pickle.html)