SOLAR POWER DATA VISUALIZATION AND ANALYSIS MACHINE LEARNING WEB APPLICATION

STUDENT'S NAME

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INTRODUCTION

- **Solar power data** visualization and analysis machine learning web is a smart grid system that is being studied for collecting and predicting facility data in real-time.
- Smart grid has attracted attention as the next-generation power solver because it can serve for power demand, environmental pollution, and resource depletion.
- Therefore, in this study, we propose a management system that collects the data of a photovoltaic system and predicts the amount of power generation.
- Thus, we designed an environment that can collect solar data, adjacent environment data, and facility information in real time.

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DESIGN

The web application was designed using the following technologies:

- ✓ Stream-lit (Python library) for creating the user interface,
- ✓ MySQL database for storing solar power data
- ✓ HTML for adding functionalities in a web application
- ✓ CSS for styling,
- ✓ Sk-learn (Python library) for machine learning.

WORKING PRINCIPLE

- Solar Power Data are fetched from MySQL database with MySQL connector into the web application which manages data by providing the analysis and visualization. Also, with a machine learning model provides the predictive analysis to the output due to the change in the input parameters like Temperature, Humidity, Current, Voltage.
- After the data analysis and visualization of data, it provides real-time updates for dynamic data visualization and immediate feedback on changes in the solar power system
- Also, the user inputs different parameters, then the trained model predicts solar sizing based on the user inputs
- With an interactive dashboard a user is able to interact with filters and customization options.

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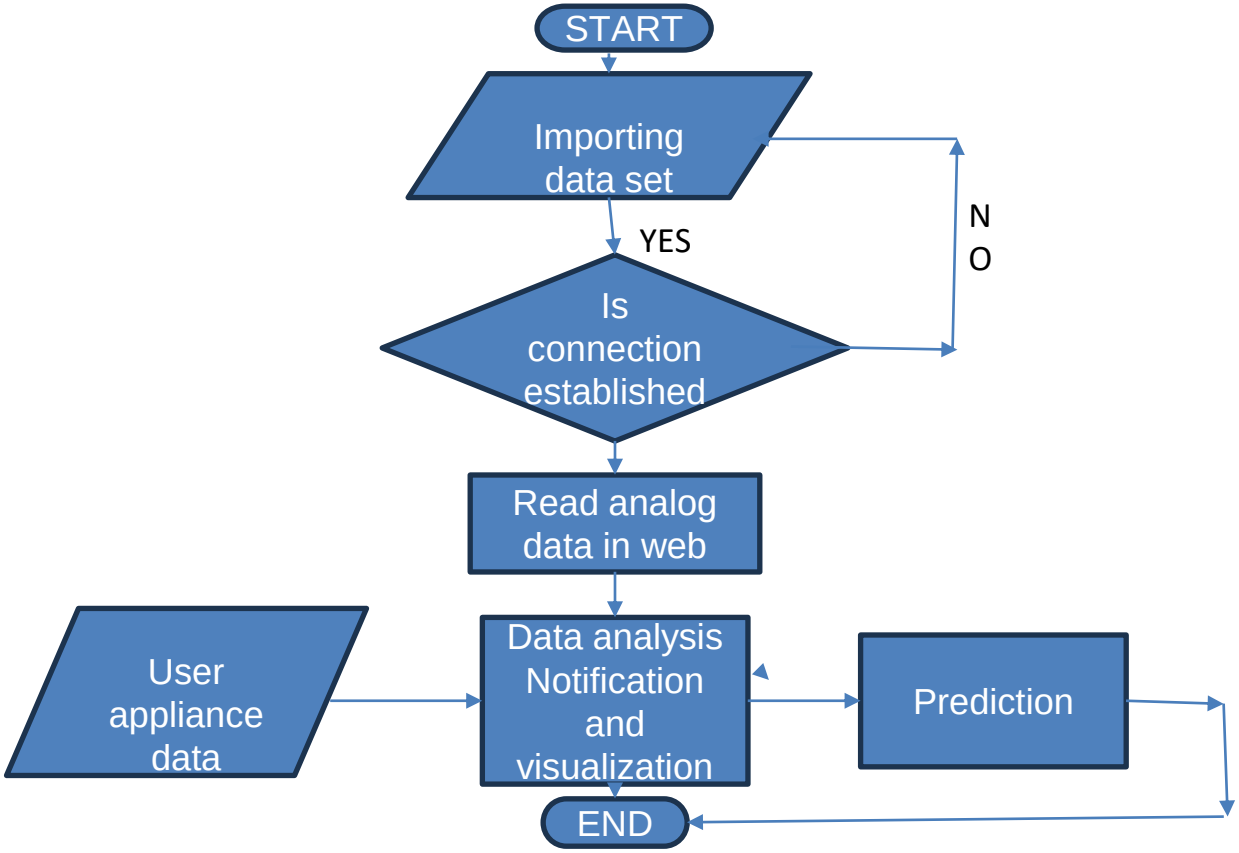
FLOWCHART



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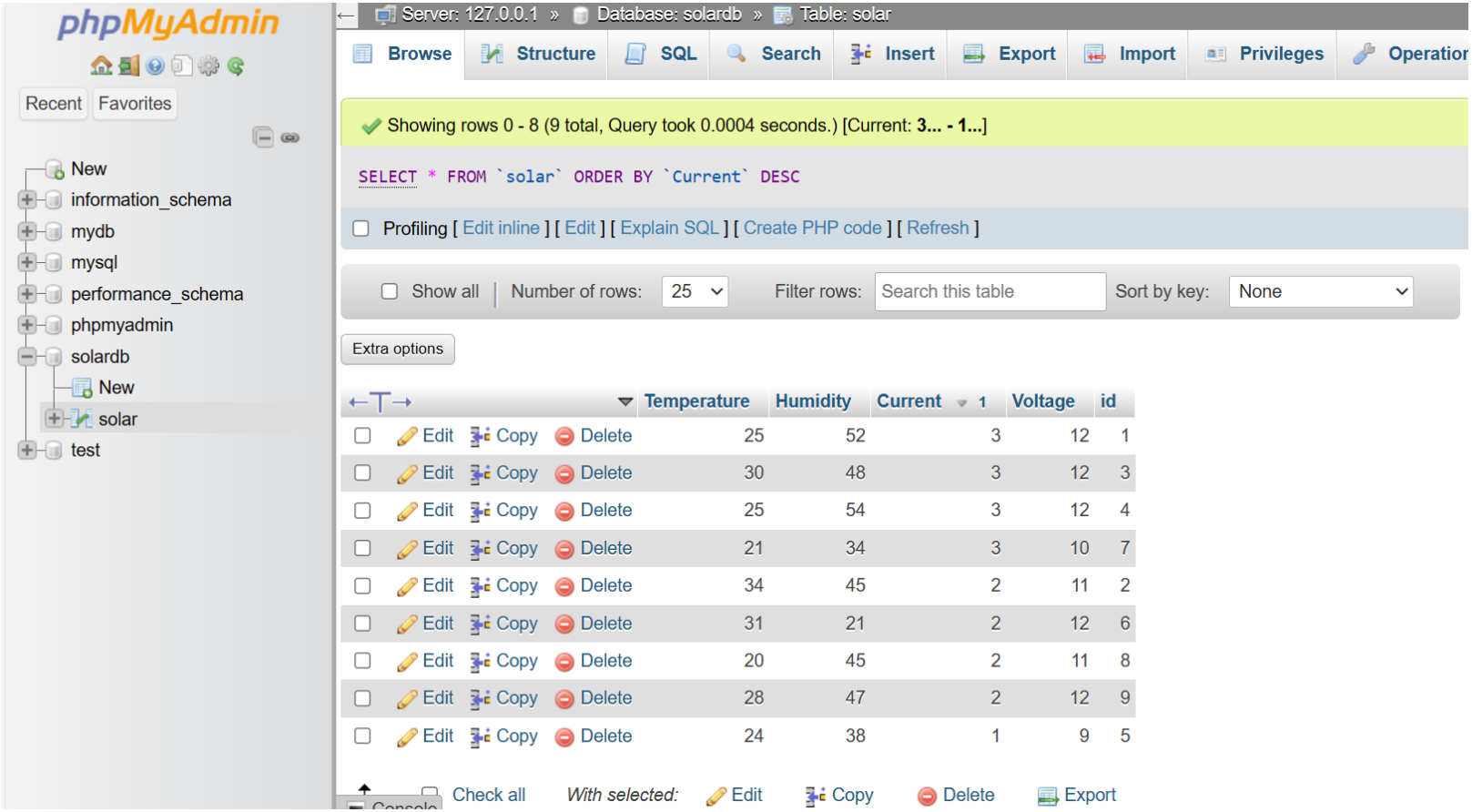
MySQL database for storing Solar Power Data and sending them into a web application



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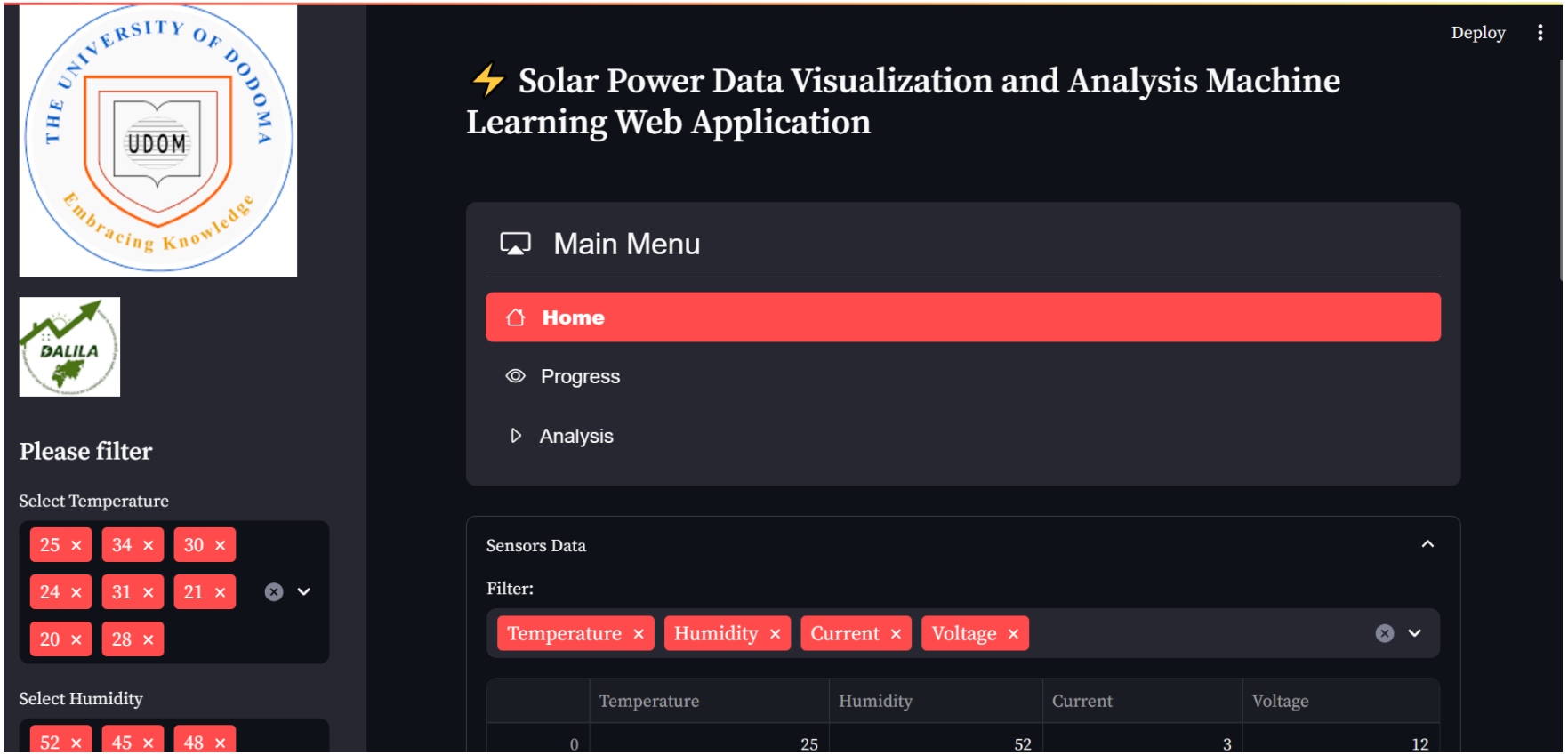
VISUALIZATION OF THE OUTPUT:
WEP APP home page(dashboard)



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Solar Power Module Data from the Database:

Sensors Data

Filter:

Temperature × Humidity × Current × Voltage ×

	Temperature	Humidity	Current	Voltage
0	25	52	3	12
1	34	45	2	11
3	25	54	3	12
4	24	38	1	9
5	31	21	2	12
6	21	34	3	10
7	20	45	2	11
8	28	47	2	12

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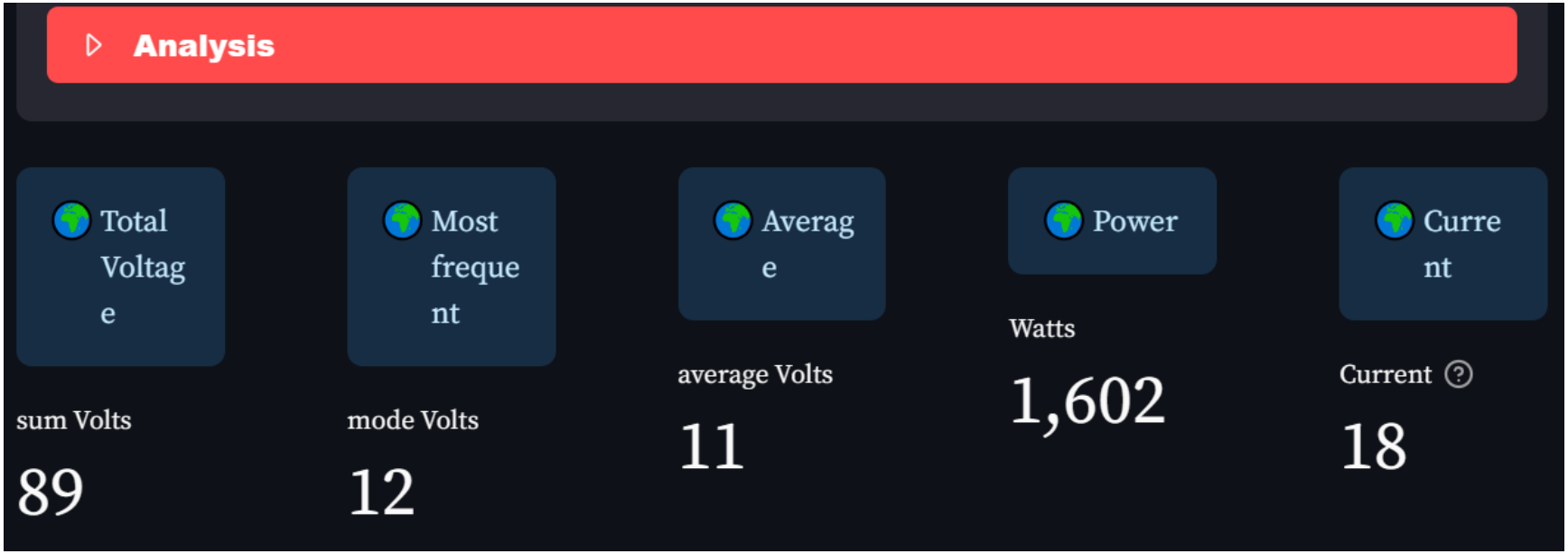
The analysis bar gives the analyzed (including central tendencies) automatically for our outputs:



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Graphs:

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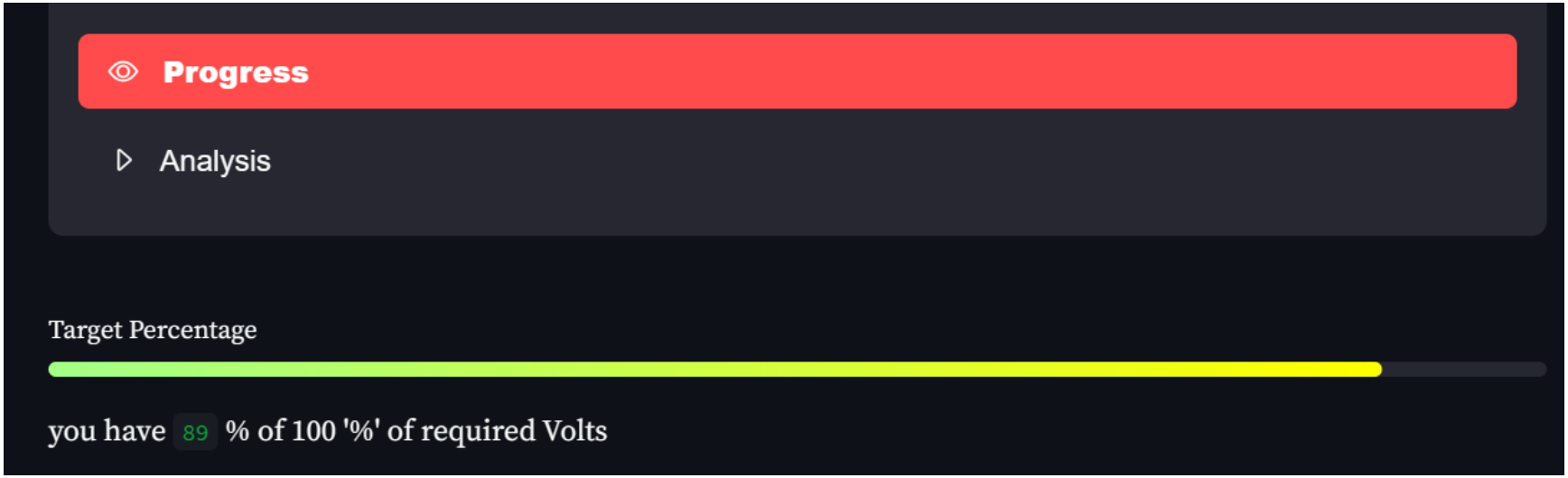
The progress bar shows the progress of our solar power model if it satisfies the required outputs:



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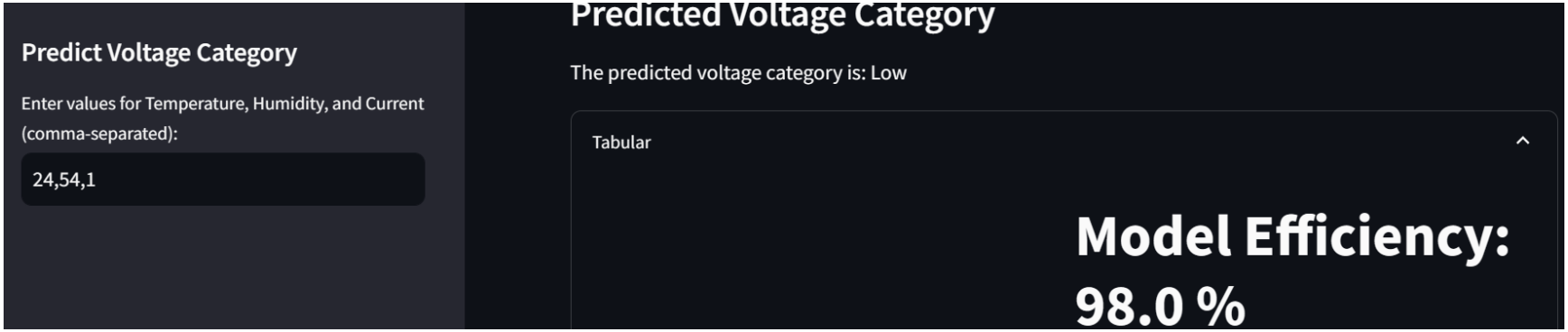
Embedded Machine Learning Model which predicts optimal configurations for solar sizing and installations.



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