tolly00 / **phase-4-project**

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Predicting building's heating and cooling loads with ML

Project overview

When we build a batiment, we have someting that very important. It is the load of the building. To be carefull about it, we are going to make a predictive model that estimates the heating load and the cooling load of a building based on its physical and structural features.

Business understanding

The energy of a building is as really important as others parts of a building construction. For that we are going to make an accurate load predictions can support energy-efficient building design, reduce energy costs, and help meet sustainability standards.

This project leverages **recommendations systems** to build a reliable predictive system that can build a reliable predictive system, Support architects and engineers in selecting optimal design configurations before construction, reduce energy consumption by recommending efficient design parameters, encourage sustainable development and support green building certification goals.

Data Understanding

Regarding like this system can be helpfull, it was necessery to get data to help it true. We used the Energy Efficiency Dataset commonly available on the UCI Machine Learning Repository. This dataset bases on several architectural and design-related parameters.

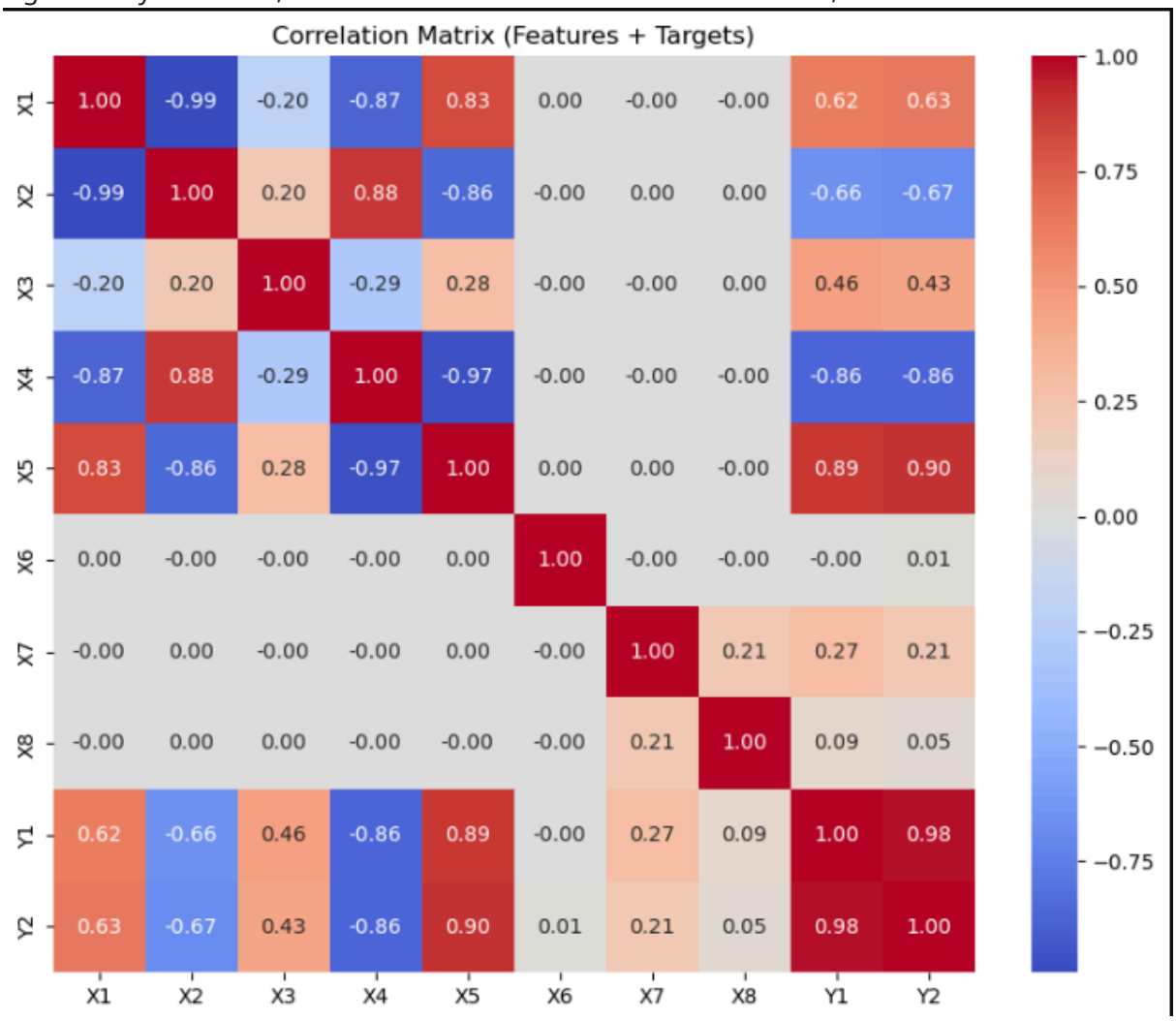
Data preparation

Before training any machine learning models, the dataset was carefully prepared to ensure data quality, consistency, and optimal model performance.
The following preprocessing steps were applied:

- Data Loading and Inspection
- Feature Selection
- Encoding Categorical Variables
- Data Splitting
- Separate targets were kept for heating load and cooling load

Data analisis

We made some EDA on the data to know about relevant features, to know about features that significantly correllate, to features that have almost not correlation, etc...



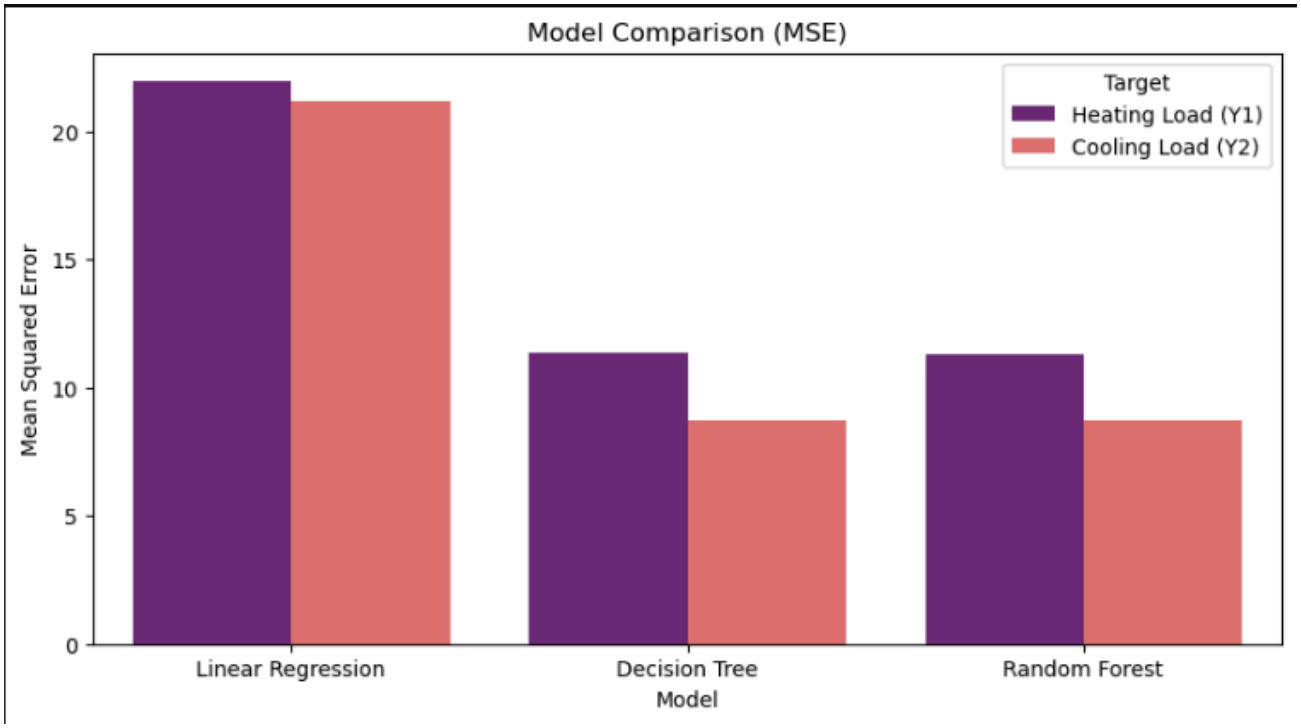
Modeling

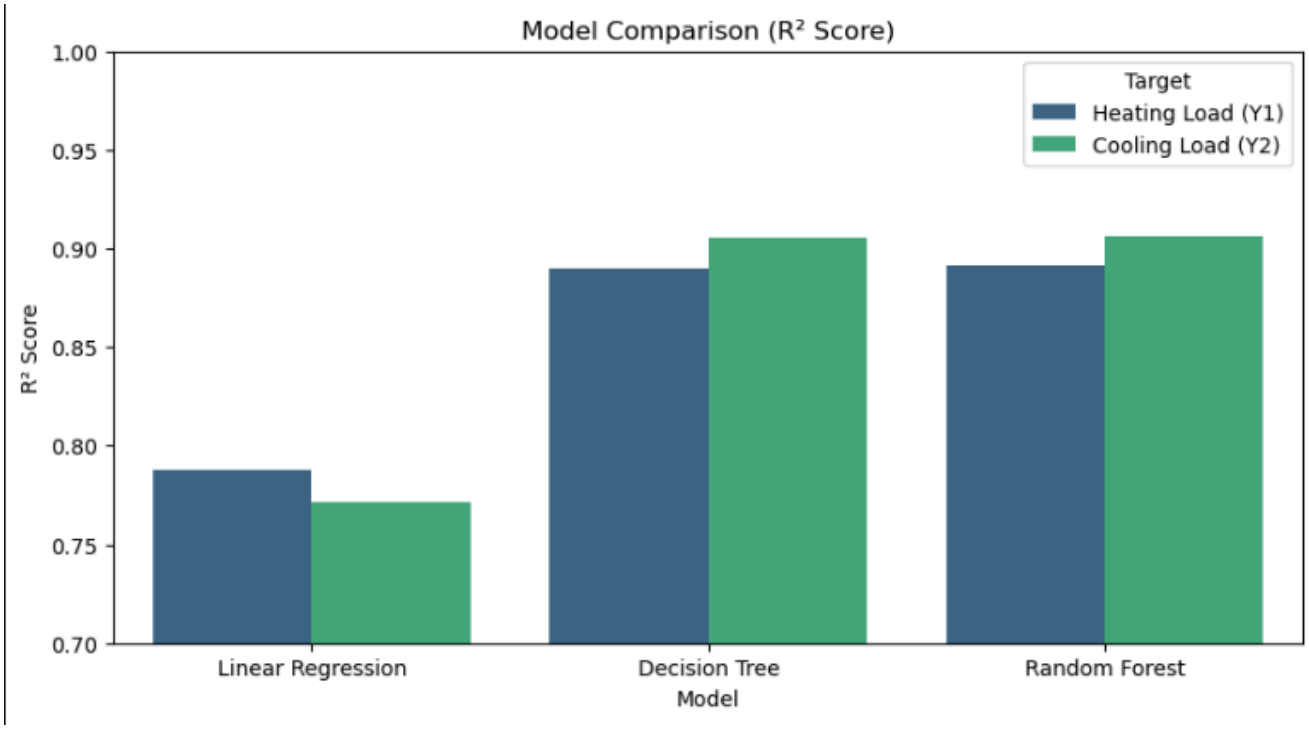
We used 3 models(linear regression, decision tree, random forest) to see which between them gemeralize well. For knowing that we must use metrics like r_square and mean square error(MSE)...

Here is the metrics for random forest. The model that generalize better. Heating Load (Y1): MSE = 11.37836604869241 R^2 = 0.8902871328418207

Cooling Load (Y2): MSE = 8.741029898401292 R^2 = 0.905673941598345

visualization





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