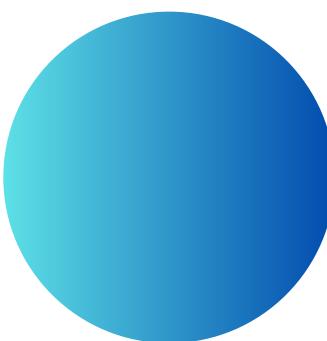
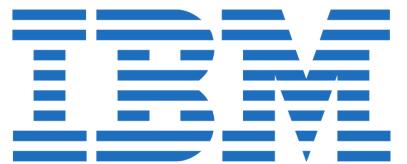


Hackathon

Sustainability Track - Team 23

Léo DEMELLE - Maria KATIBI - Hector MELL MARIOLLE - Hugo
ROBIN - Ghadi SALAMEH - Jules SAYAD-BARTH



Introduction

Hackathon organized by IBM for the **BI Pipeline** course.

From November 5 to November 6, 2025.

Objective: Develop artificial solutions using IBM's **watsonx** platform.

Four tracks:

- Track Finance
- Track Automation
- **Track Sustainability**
- Track UAV

watsonx

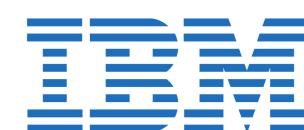
Track Sustainability

Estimation and Simulation of the CO₂ Impact of LLM Queries - by **Capgemini Engineering**

Objective: Create a user interface and an AI model capable of estimating the carbon footprint of a request sent to an LLM.

Open-source LLM models: LLaMA-3, Gemma, CodeLLaMA.

Hardware types: laptop, workstation, server.

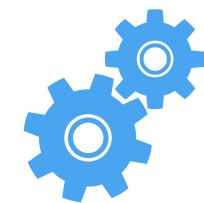


Objectives



Analyze

Analyze the energy consumption of an open-source model. Understand all the variables and their impact on the target (total LLM energy consumption).



Build

Build a predictive model estimating the energy consumed per token or per request.

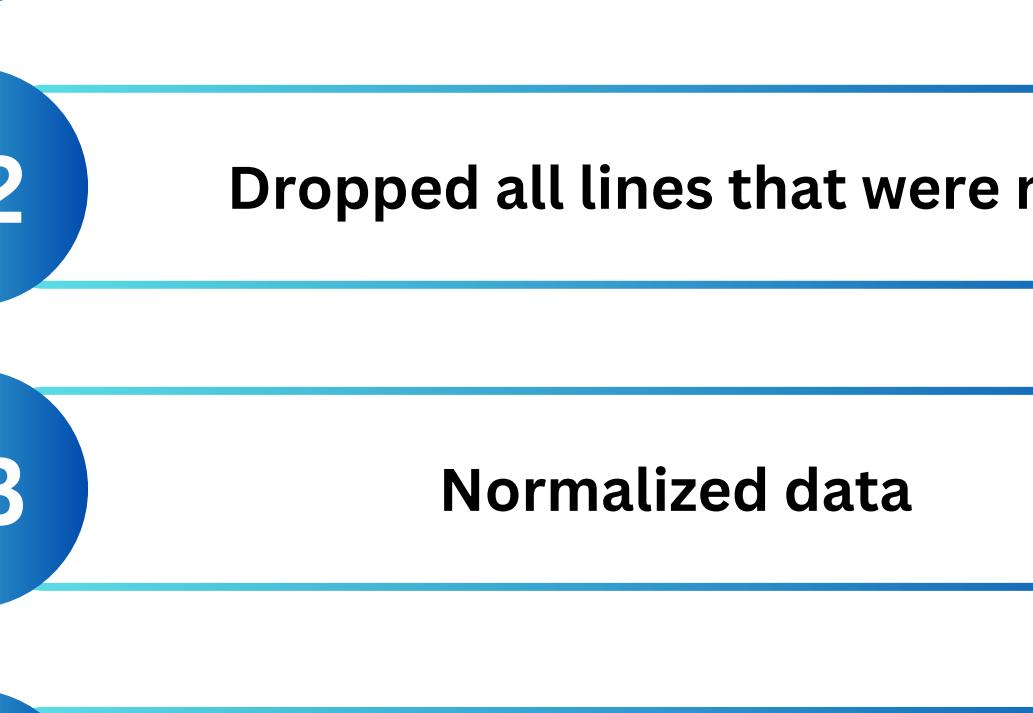


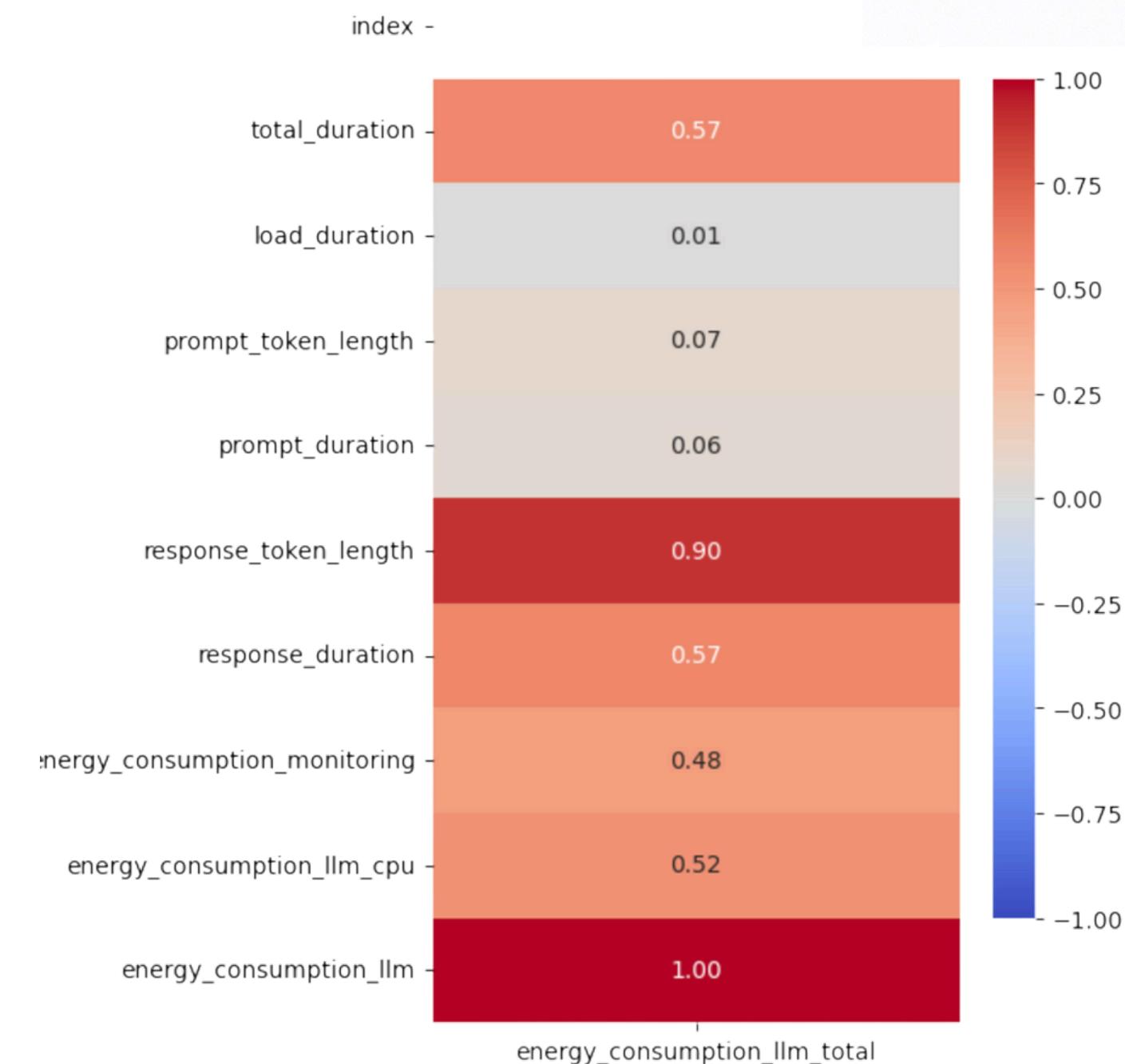
Develop

Develop an interactive interface (Webapp/ Dashboard/ Chrome extension) to visualize and simulate the environmental impact of a request.

Data Pre-processing

Our Steps

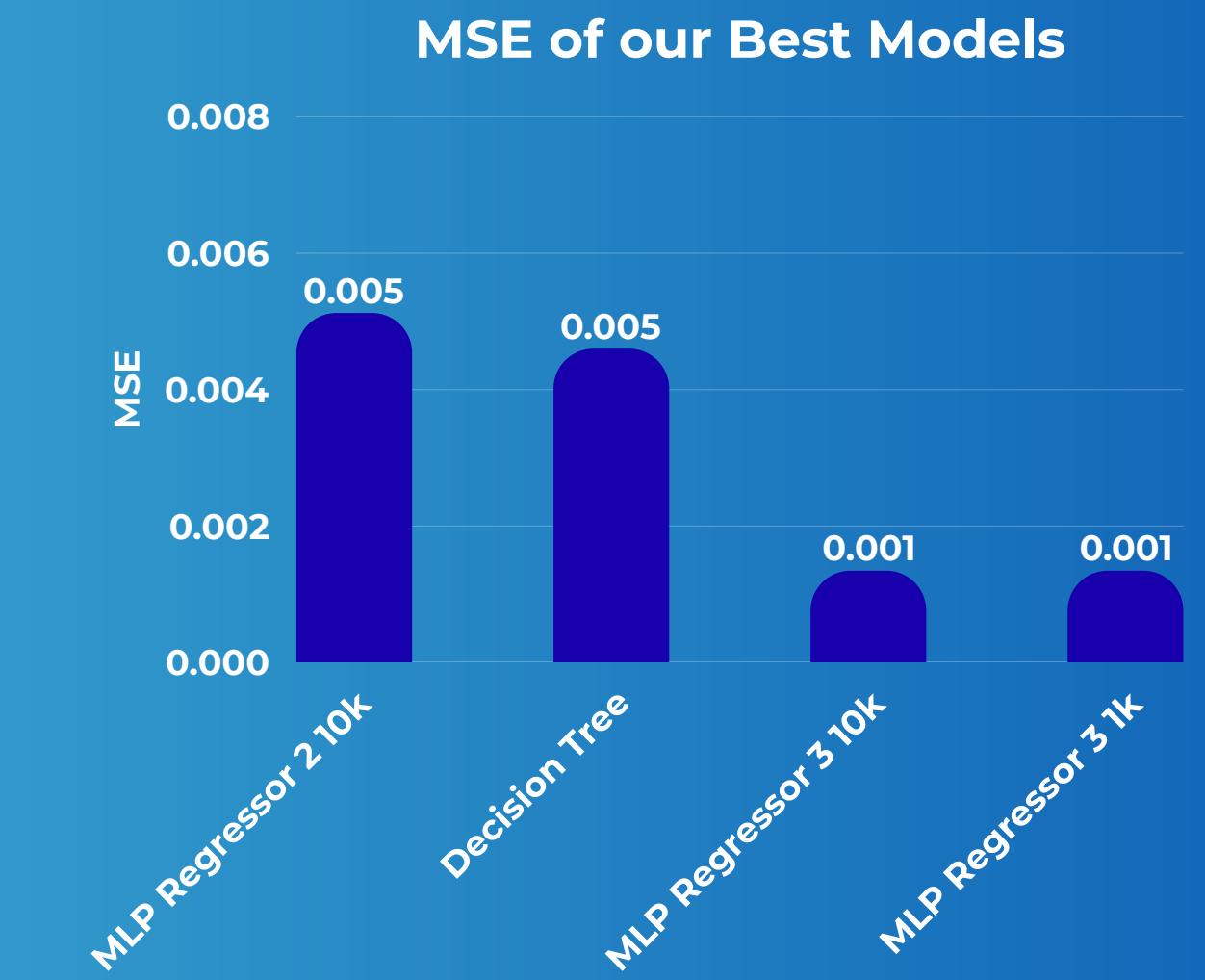
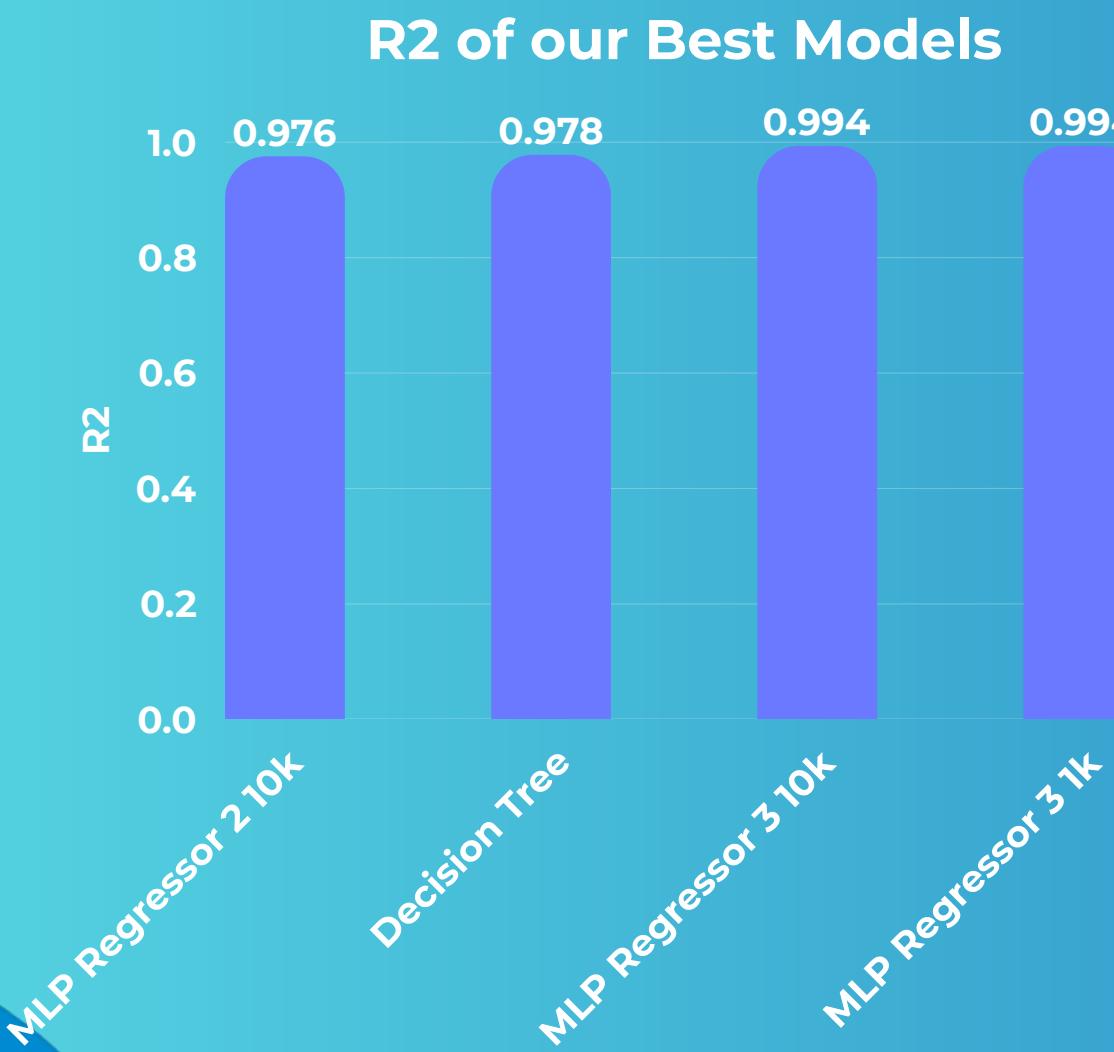
- 
 - 01 Chose columns based on correlation
 - 02 Dropped all lines that were null
 - 03 Normalized data
 - 04 Created train and test data



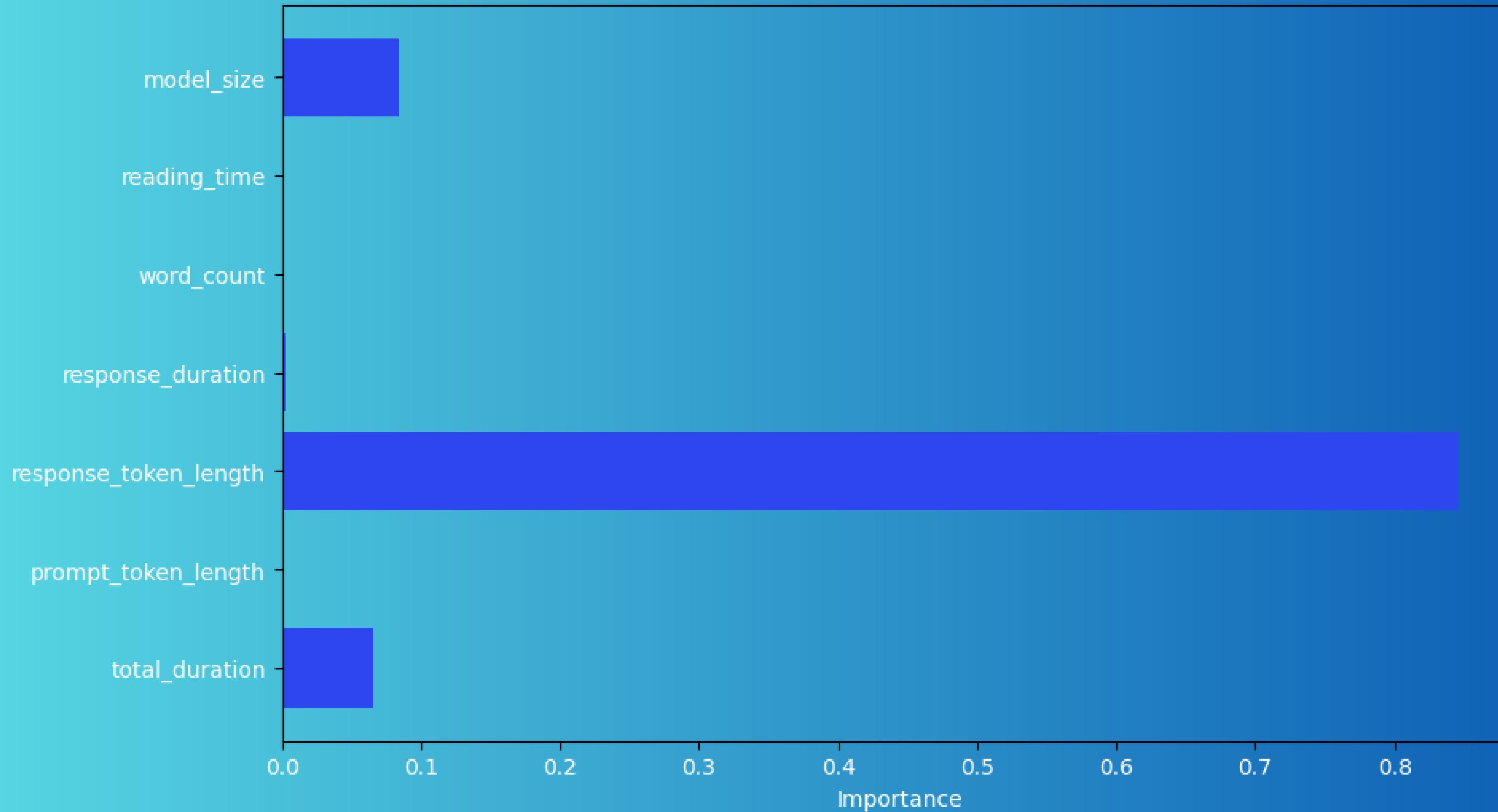
Model Analysis

We tested numerous models on our dataset, the **best results** were with:

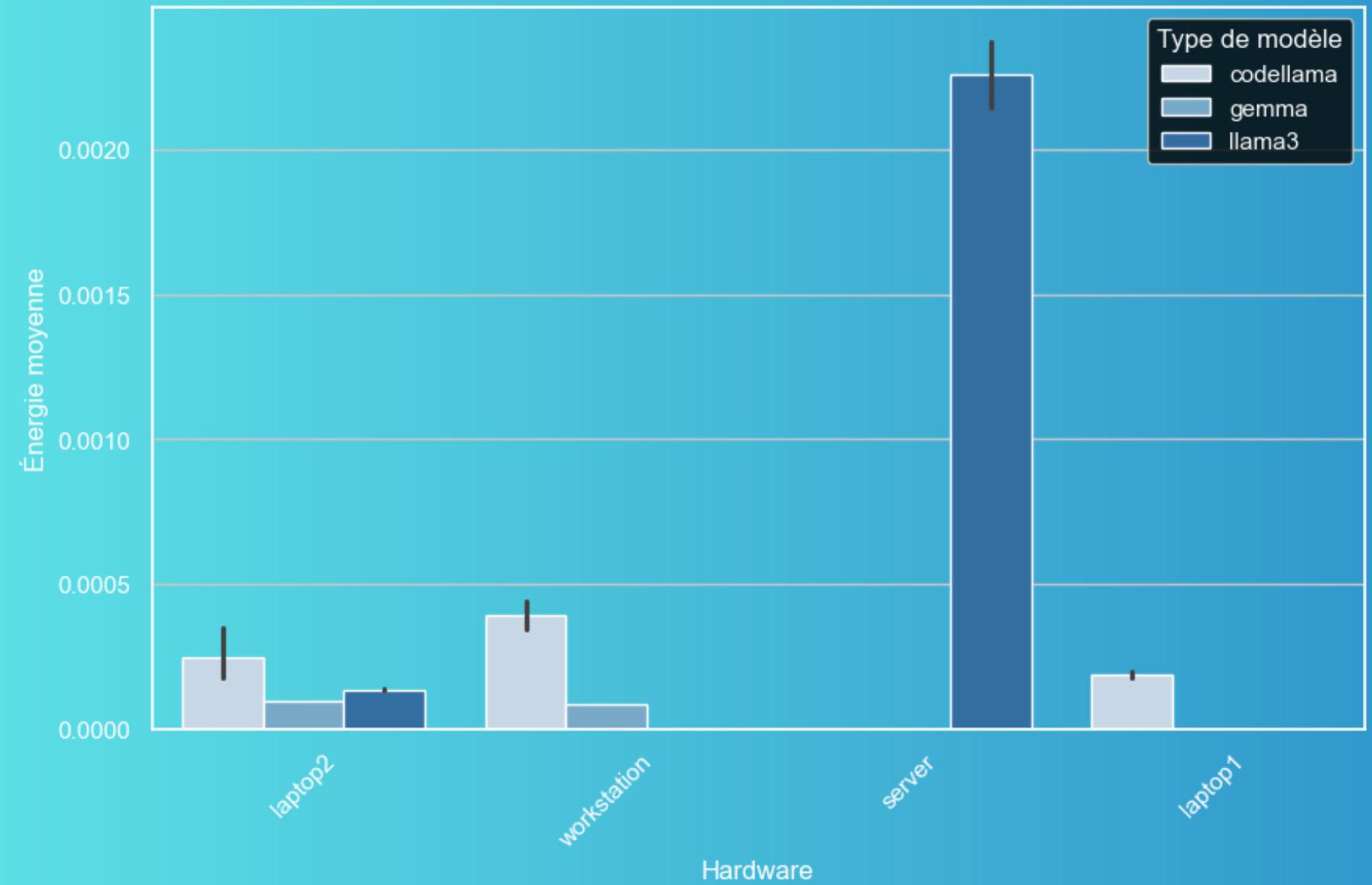
- MLP Regressor (**2** hidden layers, **10000** iterations)
- Decision Tree Regression
- MLP Regressor (**3** hidden layers, **10000** iterations)
- MLP Regressor (**3** hidden layers, **1000** iterations)



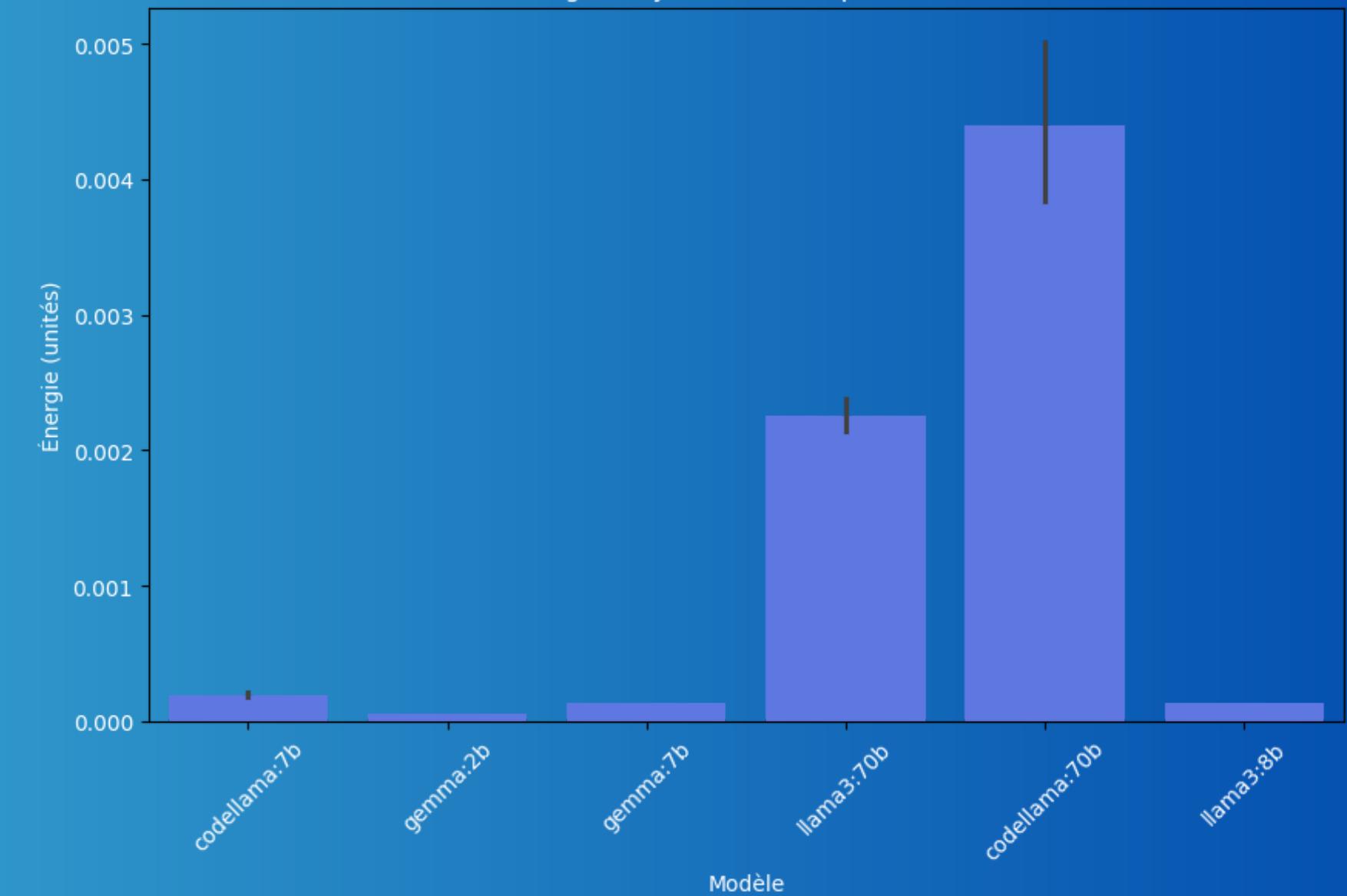
Feature Importance for DecisionTreeRegression



Énergie moyenne selon le hardware et le type de modèle



Énergie moyenne utilisée par modèle



DEMO



Thank you

