SmartHome Savant: Optimizing Living Spaces with LLM Innovation

CSE 551: Smart Energy in the Information Age

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Proposed Tasks and Deliverables

01	Anomaly Detection in Household Energy Consumption with SHAP	• Developed models for anomaly detection and energy consumption prediction, integrating SHAP models to explain feature importance, and leveraging LLM suggestions for energy-saving practices based on top SHAP features.
02	FAQ Model Fine-Tuning	• Fine-tuned local LLM using FAQ data to answer user queries and access knowledge base documents. • Implemented Retrieval-Augmented Generation (RAG) for insights from manuals.
03	Optimal Device Placement	• Utilized Gemini Vision Pro for recommending ideal device placement in a room.

Project Demo

Future Work

- Running smaller LLMs on edge devices for edge QA and explainability
- Integrate Layout LM and GPT-4 V for recommending ideal device placement in a room.
- Attach the fine tuned model for the explainability and check the performance difference

Work Distribution

- Ankith - Anomaly Detection
- Abhilash - Fine-tuned local LLM in FAQ Model Fine-Tuning
- Aditya - Implemented RAG in FAQ Model Fine-Tuning
- Snigdha - Optimal Device Placement