

Digital Twin Architectural Model Applied with MLops Techniques

The paper and its findings

- This paper provides a deep insight into the digital twin ontology and combines it with the MLops pipeline to predict the energy consumption of the experimental environment.
- It focuses on implementing the digital twin technology to improve the accuracy and efficiency of predictions at the appliance level to have a better understanding.
- The paper focuses on offline experiments and addresses the MLOps challenges in an online environment

Strengths

- Training the forecast models at different time intervals and using MSE and NMSE metrics, it was found that the higher time frequencies produced better results with normalized metrics than lower frequencies that were better with non-normalized metrics.
- The ML Ops pipeline is simpler and can be used as a standard to perform similar functions.

Weakness

- Security is a crucial aspect and this paper lacks the focus on security especially when dealing with personal and sensitive data
- The paper's exploratory data analysis was conducted manually. The manual reliance can be time-consuming and error-prone. Automation of the data analysis would be more efficient and consistent.

Open issues

- There is not enough content covered on testing with real users and it is decided to explore further on smart home ontology supporting engaging conversations and making personalised suggestions.
- Exploring the Human IoT concept by further allowing the users to complement digital twin information with detailed metadata about the users and related costs. Automating this process of collecting information through natural language inputs is suggested as a promising direction.

The paper's relation to the objectives of our project

There are not many concepts that intersect with our project or an ideology that can be implemented upon as the focus is on the digital twin aspect of IoT applications.

- We can implement a similar ML pipeline including online and offline for our project to analyze data and handle the process.
- We can also implement similar models that were used for training and prediction for our project as they provide promising results.