CBRE

SMU Hackathon Challenge

Prepared for:

SMU

CBRE

Our mission is to realize the potential of our clients, professionals and partners by building the real estate solutions of the future.

From instilling confidence in today's decisions to re-imagining tomorrow's spaces, we thrive in complex and ever-changing environments.

- 500+ Offices
- 100+ Countries
- ~115k Employees
- 95+ of Fortune 100 Clients

With deep market knowledge, **superior data** and **proprietary technology**, our multi-dimensional perspective helps our clients use real estate to transform their business and find greater success.

Hackathon Challenge:

AI-Powered Asset Condition Proactive Monitoring in Commercial Buildings

Overview

The goal of this challenge is to develop an application that can effectively track the condition of various assets in a commercial building. These assets can include HVAC systems, elevators, electrical panels, and more. The application should not only log current statuses but also use machine learning algorithms to predict future maintenance needs or potential failures.

Objectives of the Challenge

- **Data Collection:** A fictional asset dataset will be provided to you but you are encouraged to enrich this dataset for enhanced insights. Other datasets may include, but are not limited to, operational logs, error logs, maintenance history, user-reported work orders
- **Data Visualization:** Our clients are accustomed to market leading visualizations of their data. Create a user interface where a building manager can easily view the current status of all assets and make proactive decisions based on the data
- **Anomaly Detection:** Implement machine learning algorithms/generative AI to identify any anomalies in asset behavior that could indicate an impending failure or need for maintenance
- **Predictive Analysis:** Use AI or ML algorithms to predict when each asset will likely need servicing or might fail, based on the provided historical data. Consider other variables that may influence your models.
- **Notifications:** Build a notification system to alert the building manager about assets that require immediate attention or scheduled maintenance, consider the best mechanism for delivering these notifications, i.e. e-mail, SMS...

Your work will be evaluated on the following:

- **Functionality:** Does the application fulfill the core requirements of the challenge?
- **Usability:** Is the application user-friendly and intuitive to use, considering real estate professionals are not always tech savvy?
- **Innovation:** How creatively does the application use AI/ML for solving the problem? Does the application incorporate features and functions that go further than the basic requirements?
- **Scalability:** Can this application be easily scaled to monitor more assets or different types of assets across multiple buildings, cities, states or even countries?
- **Presentation:** Quality of the demo, explanation of the technology used and commercial understanding of the requirements (commercial buildings differ greatly from residential homes).

When working with your ML/AI implementations here are some tips on what you may want to consider:

- **Analyze Operational Time:** A higher operational time might indicate wear and tear, making the asset more likely to fail or require servicing soon.
- **Work Orders and Repairs:** A higher frequency of work orders or repairs could indicate that the asset is problematic and might fail soon.
- **Time Since Last Service:** Assets that haven't been serviced for a long time may be more prone to failure.
- **Anomaly Detection:** Machine learning models can be trained to detect anomalies in operational data, such as sudden spikes or drops in sensor readings, which could indicate potential issues.
- **Seasonal Patterns:** Some assets might have seasonal usage patterns. For example, HVAC systems are used more during summer and winter. Accounting for these patterns could improve the prediction accuracy.
- **Manufacturer Quality:** If data on other assets from the same manufacturer is available, it could be used to assess the likely reliability of new assets.

Thank you

and Good Luck!