AOP with AI Project

SIT AAI ITP Group 1

Predictive Analytics

Property Price Forecasting	Javier
Market Trend Analysis	Rianna
Rental Yield Prediction	Brian
Demand Forecasting	Jun Kai

Proposed AI Model

AI Model - XGBoost (Extreme Gradient Boosting)

- **Property Price Forecasting**: High accuracy for tabular data
- **Market Trend Analysis**: Can capture trends using engineered features
- **Rental Yield Prediction**: Strong at regression tasks
- **Demand Forecasting**: Can model demand trends with lag features

Framework

1. **XGBoost Library (Standalone API)** → Core framework for training and optimising XGBoost models
2. **Scikit-learn** → Essential for preprocessing data, feature engineering and evaluation metrics
3. **Pandas & Numpy** → Required for data handling, transformation and analysis

AWS Services

Architecture Portion	Service Name	Description
Data Ingestion and Storage	**Amazon S3**	Stores raw datasets (housing prices, rental yields, transaction data)
	AWS RDS (MySQL/PostgreSQL)	Stores processed structured data for querying
Model Training and Deployment	**AWS CodeCommit & CodePipeline**	Manages model training scripts, infrastructure-as-code and automated deployment
	Amazon SageMaker	Trains and deploys XGBoost model efficiently
API and Real-Time Predictions	**AWS Lambda (Auto Scaling enabled)**	Handles real-time inference by calling SageMaker when new data arrives
	AWS API Gateway	Exposes an API for AI model predictions (for place2lease)
Monitoring and Security	**Amazon Cloudwatch**	Monitors logs, failures and system performance
	AWS IAM	Manages access control and security policies

Property Price Forecasting (Questions)

1. How specific? (Street, Floor range, etc)
2. Expected forecasting time frame?

Market Trend Analysis (Questions)

1. What are the primary objectives of the market trend analysis?
2. What are the key factors to be analysed in the market? (e.g. location, flat type, price, floor area)
3. Apart from the dataset which was given previously, are there any other datasets we should refer to?
4. What kind of data visualisation would you want?

Rental Yield Prediction (Questions)

1. How is it calculated?
    a. (Annual Rental Income / Property Value) × 100%?
2. Will it be tied to the other parts, i.e. Property Price Forecasting?
3. What types of rental yield to consider?
    a. Gross Rental Yield, as mentioned above
    b. Net Rental Yield [((Annual Rental Income - Annual Expenses) / Property Value) × 100%]

Demand Forecasting (Questions)

1. Expected demand forecasting time range?
2. What prediction should i focus on? (e.g number of resale transaction,price trends, location demand?)
3. Additional feature: sentimental analysis (if