# Advanced Energy Consumption Prediction using Deep Learning and Ensemble Models

Project Overview:

In Phase 3, we will commence the development of our energy consumption prediction system. We will load and preprocess the dataset and lay the foundation for implementing advanced prediction models using deep learning and ensemble methods.

Project Phases:

1. Data Download and Inspection:

Download the energy consumption dataset from the Kaggle link.

Thoroughly inspect the dataset to understand its structure, features, and data quality.

2. Data Preprocessing:

Handle Missing Data:

Identify and address missing values through imputation or removal, depending on the extent of missing data.

Feature Engineering:

Create relevant features that can improve the model's predictive power, especially time-related features for time series data.

3. Data Transformation:

Normalize or Scale Data:

If necessary, perform data scaling to ensure that all features are on a common scale, particularly for deep learning models.

4. Data Splitting:

Split the dataset into training, validation, and test sets to facilitate model development and evaluation.

5. Model Framework Setup:

Set up the programming environment with the required libraries and frameworks for deep learning and ensemble modeling (e.g., TensorFlow, Keras, scikit-learn).

Load the preprocessed data into your environment.

6. Data Visualization (Optional):

Visualize the dataset to gain insights into energy consumption patterns. Time series plots, histograms, and other visualizations can help in data exploration.

7. Documentation:

Maintain comprehensive documentation of the data preprocessing steps, feature engineering, and any data transformations. Detailed documentation is essential for tracking your work and sharing insights with the team.

8. Phase 3 Part 1 Submission:

Prepare your Phase 3 Part 1 submission, which should include a report or documentation outlining the steps taken in data loading and preprocessing. Ensure compliance with submission guidelines.

9. Model Development (Phase 3 - Part 2):

In the next phase, continue by developing deep learning and ensemble models for energy consumption prediction based on the preprocessed data.

Implement and optimize your models, perform hyperparameter tuning, and evaluate their performance.

10. Model Deployment Plan (Phase 4):

In the subsequent phase, develop a plan for deploying the selected model in a real-time or batch prediction system. Ensure the deployment process is well-documented and ready for integration into the existing energy management system.

11. Regular Updates and Collaboration:

Maintain ongoing communication within the team, sharing insights and progress regularly.

Be prepared to adapt and make necessary adjustments as the project evolves.

This Phase 3 project plan sets the stage for developing advanced energy consumption prediction models. Ensure that your work aligns with the project's objectives and goals, and make the most of the available data and resources.