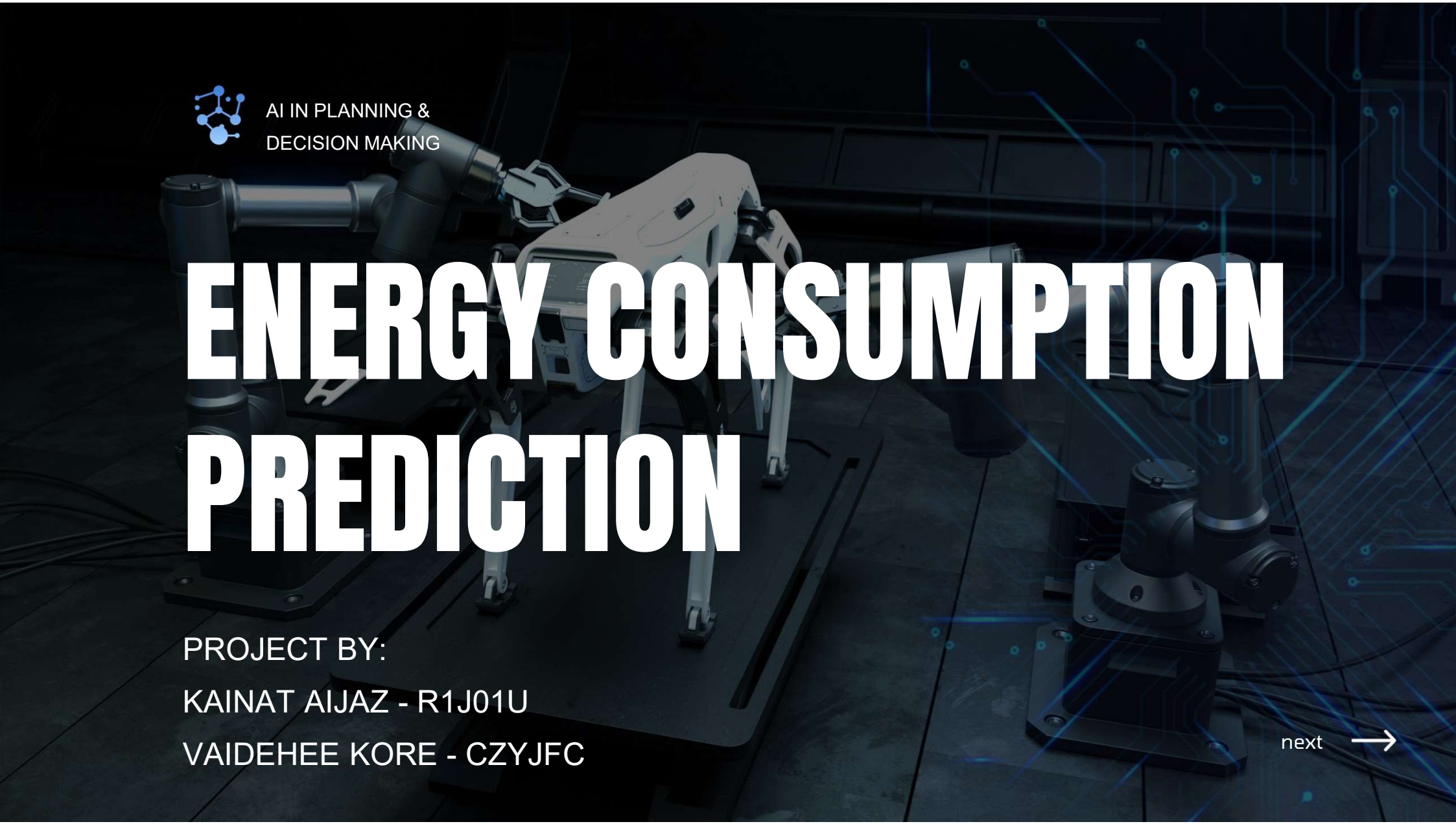

AI IN PLANNING &
DECISION MAKING

ENERGY CONSUMPTION PREDICTION

PROJECT BY:
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VAIDEHEE KORE - CZYJFC

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PROBLEM STATEMENT

The primary problem is understanding and predicting energy consumption patterns to optimize energy usage, reduce wastage, and better plan energy production.

Colab Book link

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PROPOSED AI SOLUTION

To develop an AI-based model that accurately predicts energy consumption based on historical data and specific input parameters (e.g., time of day). Enable informed decision-making for energy providers and consumers to optimize usage and reduce wastage.

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DATA COLLECTION & ANALYSIS

Dataset Details:

-Household power consumption dataset from Kaggle (CSV)

-Include many features for accurate prediction such as:

Date, Time, Global Active Power, Voltage, Sub-metering values.

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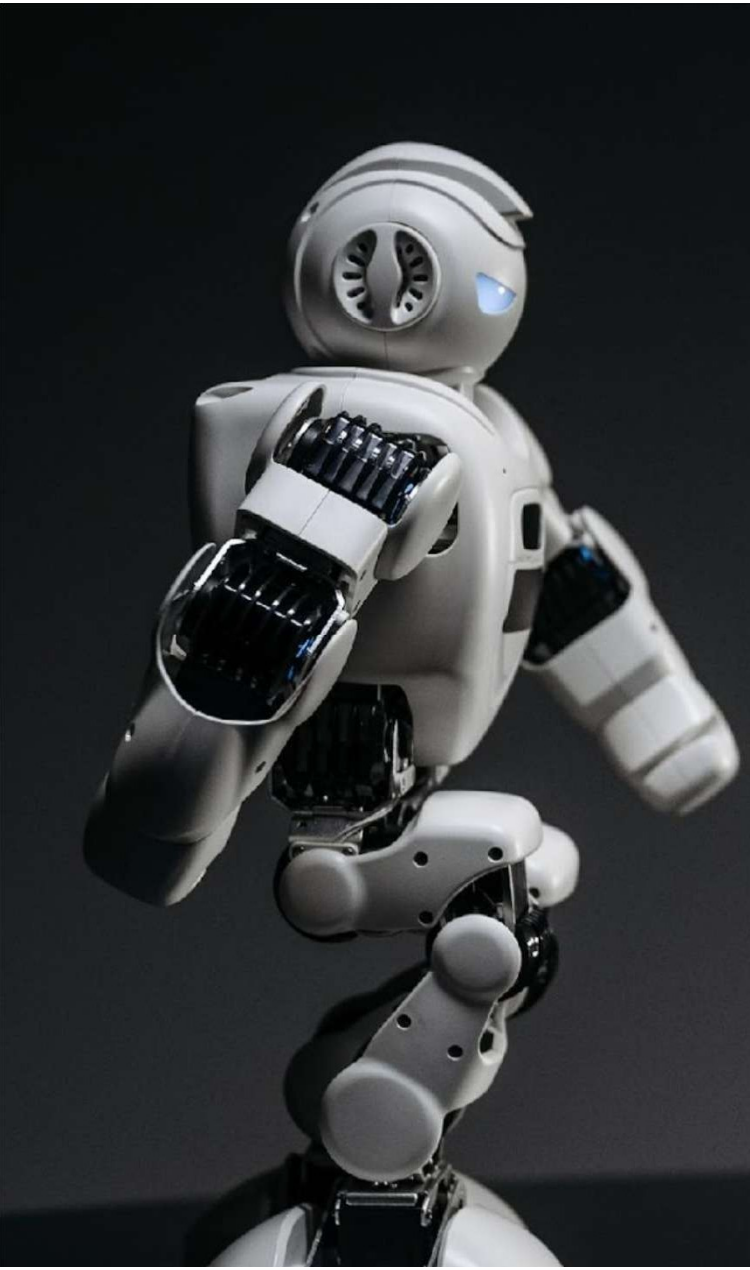

DATA PREPROCESSING

- Data Cleaning: Filled out all the missing values in any column.
- Feature Engineering: Combined Date and Time column to create a new DateTime column, extracted time based features such as time and day of the week.
- Normalized energy consumption columns for better model performance

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DATA PREPROCESSING

- Divided dataset into training (80%) and testing (20%)
- Set X (input variable) to be Time of the day and Y (target variable) to Global Active Power.

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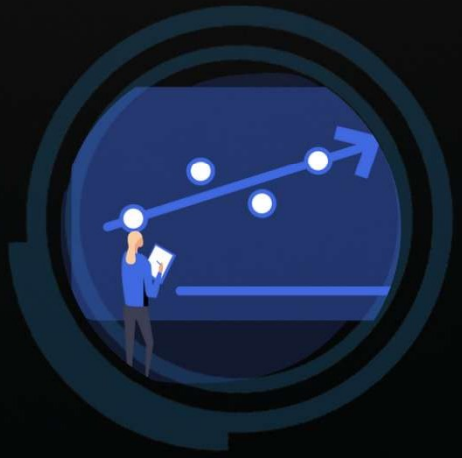
MODEL SELECTION



Simple but less accurate for non-linear trends.

LINEAR REGRESSION

Better accuracy by capturing complex patterns.

NEURAL NETWORKS

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MODEL TRAINING

- Trained both the models using date time and energy features.
- Calculated MSE and R-squared error from both the models to evaluate performance.
- Visualized and compared the performance using residual plots and heatmap.

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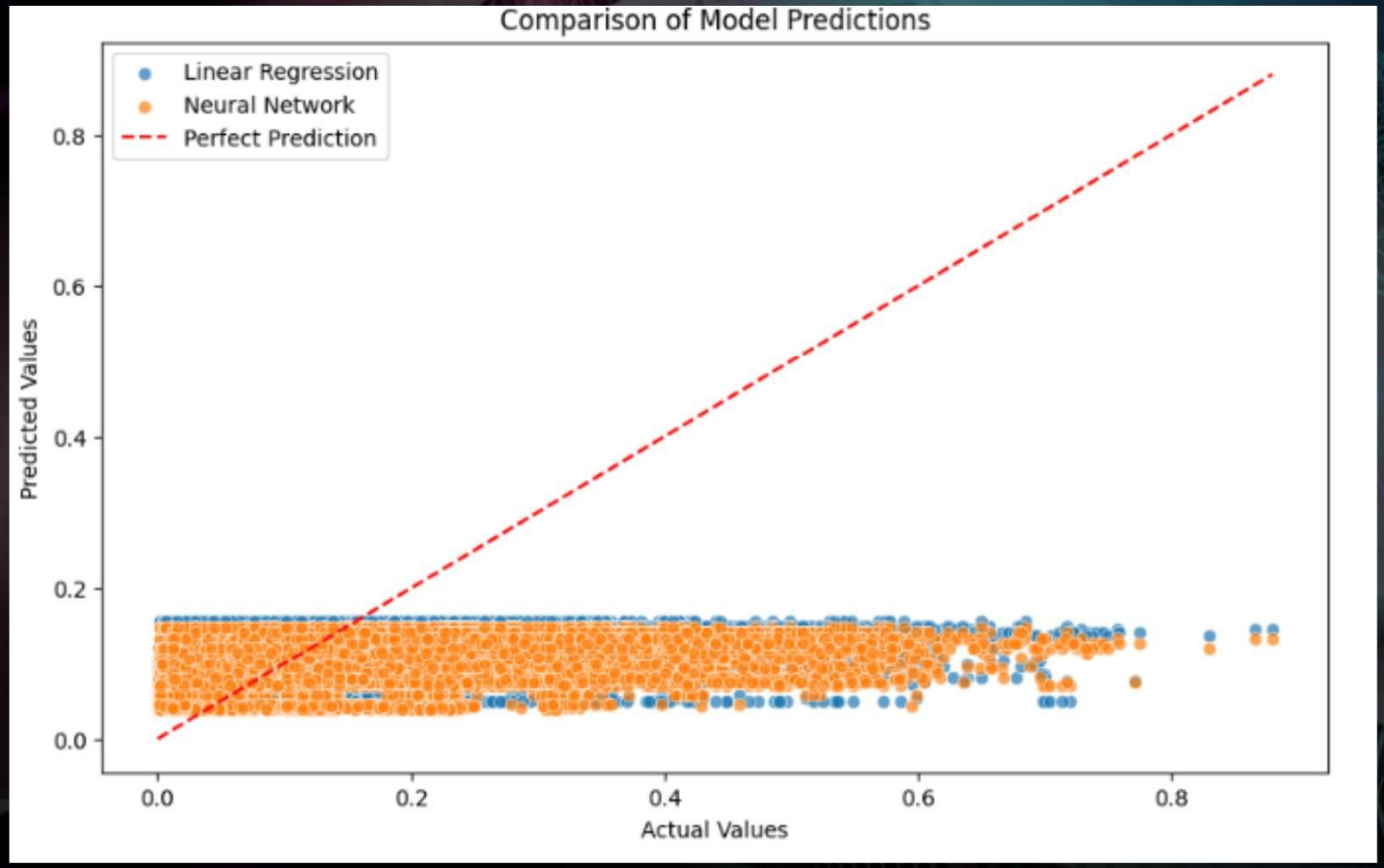
MODEL PERFORMANCE



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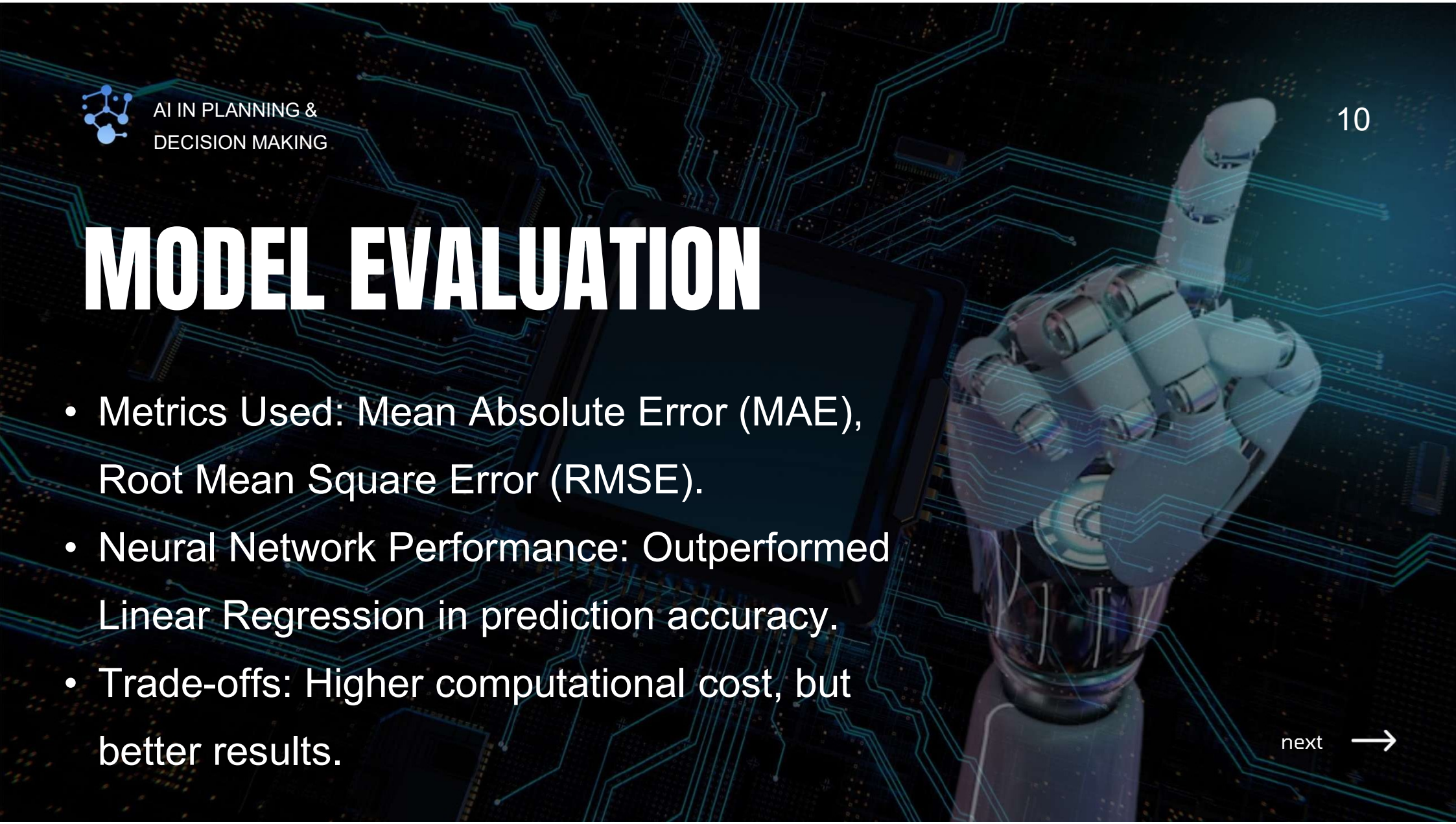
MODEL EVALUATION

- Metrics Used: Mean Absolute Error (MAE), Root Mean Square Error (RMSE).
- Neural Network Performance: Outperformed Linear Regression in prediction accuracy.
- Trade-offs: Higher computational cost, but better results.



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CHOSEN SOLUTION

- Final Decision: Implemented a Neural Network model.
- Reason: Best balance of accuracy and practical applicability.

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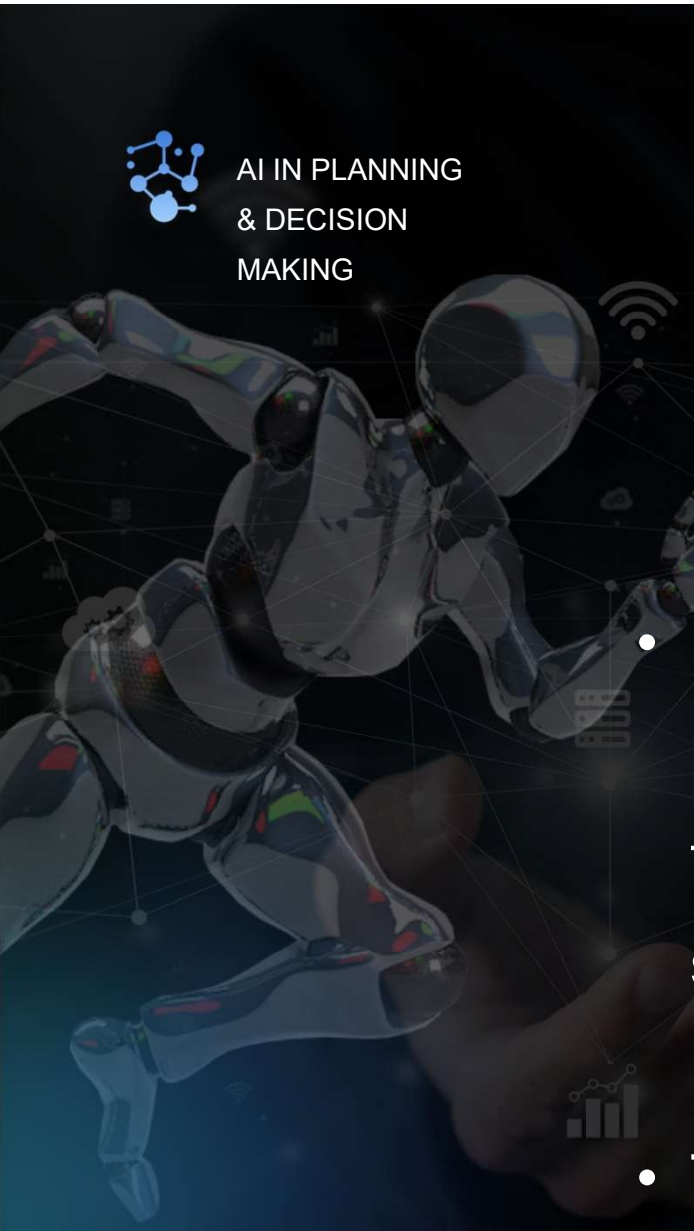

DECISION IMPLEMENTATION

- Implemented the solution using trained neural network model by taking input time of the day from the user and predict energy consumption at that specific time.

- Tools used: Python, Google Colab, Gemini

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THANK YOU!

ANY QUESTION?

APPLICATIONS AND IMPACT

- Use Case: Energy providers can optimize distribution.
- Benefits: Reduce energy waste, save costs, improve sustainability.

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