**AI Documentation**

**1.Original Objective**

* **Goal**: Predict optimal temperature for energy-efficient operation of air conditioners.
* **Why**: To reduce energy wastage and enhance sustainability.

**2. Learning Progression**

* **Linear Regression**:
  + **Why Chosen**: Simple model to understand the relationship between features and temperature.
  + **Outcome**: Established foundational understanding of data trends.
* **Random Forest**:
  + **Why Chosen**: To capture non-linear relationships and interactions between variables.
  + **Outcome**: Improved accuracy compared to linear regression.
* **Neural Networks**: (Current progress)
  + **Why Chosen**: Make use of deep learning to extract more complex feature relationships
  + **Outcome**: Enabled more generalized predictions.
* **LSTM**: (Current progress)
  + **Why Chosen**: To account for sequential data and temporal dependencies in temperature trends.
  + **Outcome**: Best results for time-series prediction.

**3. Datasets**

* **Source**: Data collected from Sensors, energy meters and weather APIs
* **Features**: Indoor Average temperature, outdoor temperature, people count, Average humidity, average co2, weather temperature and humidity, date and time
* **Preprocessing**: Include steps like normalization, handling missing values, and feature selection.

**4. Model Development**

* **Linear Regression**:
  + Implementation details, loss function, and results.
* **Random Forest**:
  + Parameters tuned (e.g., number of trees, depth).
  + Results comparison with linear regression.
* **Neural Networks**:
  + Architecture design (number of layers, activation functions).
  + Training process and challenges.
* **LSTM**:
  + Sequence input structure, training length, and loss function.
  + Visualization of predicted vs. actual results.

**5. Evaluation**

* **Metrics Used**:
* **Model Comparison**:
* **Best Model**:

**6. Challenges and Insights**

**7. Implementation**