Evaluation Report for Workplace Occupancy Forecasting Project

1. Project Objective
The goal of this project is to predict workplace occupancy using sensor da

---

2. Dataset Description
- **Source**: Processed occupancy dataset (`processed_data.csv`)
- **Features Used**:
  - `hour`: Hour of the day (0–23)
  - `day_of_week`: Day of the week (0 for Monday, 6 for Sunday)
  - `Temperature`: Room temperature (in Celsius)
  - `Humidity`: Room humidity (percentage)
  - `Occupancy`: Binary indicator (1 for occupied, 0 for unoccupied)

---

3. Methodology
1. **Data Preprocessing**:
   - Converted timestamps to hourly intervals.
   - Created new time-based features (`hour`, `day_of_week`).
   - Checked for and filled missing values using forward fill (`ffill`).

2. **Model Building**:
   - Used a **Linear Regression** model to predict occupancy.
   - Split data into training (80%) and testing (20%) sets.
   - Evaluated model performance using appropriate metrics.

---

4. Model Evaluation
- **Mean Absolute Error (MAE)**: `0.2393`
- **R² Score**: `0.4699`

The model shows a reasonable ability to predict occupancy. Some improvemen

---

5. Visualizations
1. **Model Predictions vs. Actual**
   ![Model Evaluation](../visualizations/model_evaluation.png)

2. **Occupancy Over Time**
   ![Occupancy Over Time](../visualizations/occupancy_over_time.png)

3. **Average Occupancy by Hour and Day of Week**
   ![Heatmap](../visualizations/average_occupancy_heatmap.png)

4. **Combined Dashboard**
   ![Model Dashboard](../visualizations/model_dashboard.png)

---

6. Conclusion
The current model provides a foundation for understanding workplace occupa

---