**Model Performance Analysis Report**

**1. Model Performance Overview**

The model for 2D floor plan prediction was trained to determine room layouts based on given plot dimensions. It predicts room type, position, and size using a dataset of 1,979 entries. The model was evaluated on its ability to place rooms accurately within the given plot constraints.

**2. Challenges Faced**

**Room Overlapping Issues:** Some predicted rooms have overlapping coordinates, leading to unrealistic floor plans.

**Size Constraints:** Certain rooms exceed the plot dimensions, indicating the need for constraint-based learning.

**Class Imbalance:** Some room types (e.g., Storage or Office) appear less frequently in the dataset, which may impact prediction accuracy.

**Generalization Issues:** The model may struggle with unseen plot configurations, leading to inconsistent room placements.

**3. Potential Improvements**

**Constraint-based Optimization:** Introduce logic to prevent room overlap and ensure proper placement within the plot.

**Data Augmentation:** Generate synthetic data to balance room type distribution.

**Hyperparameter Tuning:** Optimize the model’s parameters to improve prediction accuracy.

**Post-processing Rules:** Apply post-processing filters to refine room placements and adjust unrealistic predictions.

**4. Conclusion**

While the model provides reasonable room layout predictions, further refinements in data preprocessing, constraint handling, and hyperparameter tuning can enhance its accuracy and reliability for practical applications.