**Predicting Restaurant Tips Using Predictive Analytics on Excel**

**Introduction:**

This project aims to predict restaurant tips based on customer and dining information using predictive analytics in Excel. The dataset contains features such as customer gender, smoking status, day of visit, time of visit, party size, total bill, and tip amount. The goal is to build a regression model to predict tips and evaluate its accuracy using RMSE.

**Steps Performed:**

1. **Data Cleaning:**

* Checked for missing values and removed rows with blanks.
* Removed duplicate rows to ensure data quality.

1. **Feature Identification:**

* Defined tip as the dependent variable.
* Selected sex, smoker, day, time, size, and total bill as independent variables.
* Created pivot tables and charts to ty understand the data

1. **Problem Type:**

* Identified the problem as a regression task since the target variable (tip) is continuous.

1. **Encoding Categorical Variables:**

* Converted categorical variables (sex, smoker, day, time) into numeric values using IF conditions.

1. **Correlation Analysis:**

* Calculated correlation coefficients between independent variables and tip.
* Found that total bill had the strongest correlation with tip.
* Based on Total Bill to Tip and Size to Tip having strong correlation coefficients, I chose the two for my predictive model.

1. **Model Building:**

* Built a simple linear regression model using total bill as the predictor.
* Generated the regression equation: Predicted Tip = m \* Total Bill + m \* Size +b.

1. **Prediction:**

* Used the regression equation to calculate predicted tip values.
* Added a new column for predicted tips in the dataset.

1. **Error Calculation:**

* Computed RMSE to measure the accuracy of the model.
* RMSE provides insight into the average error between actual and predicted tips.

**Results:**

* **RMSE Value:** Report the calculated RMSE (RMSE= 1,00918843).
* **Insights:**
* Higher total bills generally result in higher tips.
* Other factors like party size and day of visit may have weaker correlations with tips.

**Conclusion:**

The project successfully demonstrated how to use Excel for predictive analytics. A regression model was built to predict restaurant tips based on input features, and its performance was evaluated using RMSE. This approach can help restaurants better understand tipping behaviour and optimize service strategies.