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* AIE Machine Learning & Image Processing Course - Final Project

**Hotel Room Availability Prediction using Machine Learning**

Demand forecasting is a crucial part of hotel revenue management that aims to maximize revenue by matching demand to available capacity. Specifically, short-term demand forecasts of four weeks or less before the target stay day have a critical impact on hotel revenue management operations such as pricing decisions and inventory control.

For this project, the Linear Regression machine learning algorithm was chosen because of the need to model a target value based on independent predictors. This method is mostly used for forecasting and finding out cause and effect relationship between variables.

Many other technologies such as Python 3.6, Tkinter library for creating the graphical user interface and other necessary python libraries such as pandas, numpy, pickle, scikit-learn, ctypes, dateutil and matplotlib were used in this project as well.

The dataset is collected from ahotel in Sri Lanka which contains 48 total number of rooms. The dataset had data collected for about two years. The data fields of the dataset were ‘booking date’, ‘arrival date’, ‘departure date’, ‘room type’, ‘occupancy type of the room’, ‘meal plan’, ‘country’. Here, the two fields ‘arrival date’ and ‘departure date’ were used to draw graphs and the best fit lines of reserved and available room count of the hotel throughout a year. The room availability or reservation of a date of the year was predicted using machine learning.

This project could be further developed in various ways using this dataset only or adding even more training data. Getting more accuracy by using the Linear Regression machine learning algorithm for non-linear data should be one of the primary goals. Developing the project covering much broader area is possible by adding more features such as the effects of holidays, countries, seasonal climate changes of various countries on room reservations in Sri Lanka, meal plans and inventory control predictions, on which months to provide special offers for customers by hotels, effect on transport services for foreigners and monthly estimated outcome calculations etc.