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Utilization performance proposal

RMS - A.I Solution

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# Proposal: Utilization Performance Classification

# Introduction

In the dynamic hospitality industry, accurately predicting the performance of a company's hotel room reservations can greatly contribute to strategic decision-making and planning. To address this need, we propose the implementation of an AI-powered system that leverages historical data to classify the performance of a company, specifically focusing on the reservation details during the span of Ramadan to Dhu al-Hijja. By employing a series of preprocessing, statistical analysis, and machine learning techniques, this system aims to provide valuable insights and predictions for future reservation details within the same time frame.

# Required Data

* List of all reservations:
  + Reservation creation date
  + Reservation check-in date
  + Reservation check-out date
  + Reservation Price
  + #Rooms
  + Cancellation date (in case of cancellation)
* Domain expertise to create a matrix for evaluating the utilization performance for each of the 16 weeks (target weeks). The percentages shown in the table below are dummy values representing the lower bound for percentages to be classified as A,B,C,…

Example:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Label (Performance Category) | Week 1 | Week 2 | Week … | Week 16 |
| A | 70% | … | … | 80% |
| B | 50% | … | … | 60% |
| C | 30% | … | … | 40% |

# Objective

The main objective of this proposal is to develop a comprehensive pipeline that predicts the reservation details of a company for the upcoming year within the span of Ramadan to Dhu al-Hijja. This prediction will be based on historical data and will enable the company to proactively plan their operations and make informed decisions. The proposed pipeline consists of several key steps, including data preprocessing, separation by years and weeks, statistical summarization, and utilization percentage change classification.

# Pipeline Steps

1. Preprocessing of Historic Time Series Data:

The historic time series data related to reservation details received from a company will be preprocessed to calculate the ratio of reserved room nights to total room nights per day. These ratios represent the **utilization percentages** for each of the 16 weeks.

2. Data Separation by Years:

To facilitate accurate predictions, the historic data will be separated by years. This segregation ensures that the AI models can learn and classify performance based on patterns and trends specific to each year within the span of Ramadan to Dhu al-Hijja.

3. Separation of Data into 16-Week Intervals:

Within each year, the data will be further segmented into 16-week intervals – representing the time span from Ramadan to Dhu al-Hijja – which allows for focused analysis and prediction of reservation details within these specific weeks.

4. Statistical Summarization:

To capture the utilization percentage change for each of the 16-week intervals, statistical measures will be applied to summarize the data subsets. These measures, such as mean, median, standard deviation, or percentiles, will provide valuable insights into the performance of each week, enabling effective classification.

5. Machine Learning Classification Models:

The summarized statistical measures obtained from the previous step will be used as features for training machine learning classification models. For each tuple of summarized measures, a separate model will be developed to classify the performance of the data subset pertaining to one of the 16 weeks. Consequently, a total of 16 different models will be created, each specializing in predicting the performance of a specific week (e.g., A, B, C, …).

6. Production Phase:

During the production phase, when data from a specific company is received, the same statistical measures will be computed on the input data using the established measures from the historical data. These summarized measures will then be fed into the 16 trained models to obtain predictions for the upcoming 16 weeks. This real-time prediction capability will empower companies to make data-driven decisions and adapt their strategies accordingly.

# Conclusion

By implementing this AI-based system for classifying the performance of a company's hotel room reservations, organizations can gain valuable insights into future reservation details. The proposed pipeline, comprising data preprocessing, statistical summarization, and machine learning classification, offers a comprehensive approach to predicting performance and empowers companies to optimize their operations, and drive overall business success.

Thank you for considering our proposals. We look forward to the opportunity to discuss the details further and initiate the project.