Cash Flow Proposal

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Table of Contents

[Proposal: Cash Flow Prediction for Hotel Reservation Company 1](#_Toc139989780)

[Introduction 1](#_Toc139989781)

[Required Data 1](#_Toc139989782)

[Implementation Steps Overview 1](#_Toc139989783)

# Proposal: Cash Flow Prediction for Hotel Reservation Company

## Introduction

We are addressing the critical issue of cash flow management in the hotel reservation industry. In our scope, we will focus on two main aspects of the company: reservation sales and collections. The former represents the sale amount, while the latter represents the actual money collected. Our objective is to preprocess the historic time series data, transforming it into a ratio of collection over sales per day, and utilize this data to predict the cash flow ratio for a specific duration in the future.

# Required Data

* Reservation Sales: money that still needs to be collected from the company due to the hotel reservations they made.
* Reservation Collections: money that had been successfully collected from the company.
* Cash flow ratio (.
* The date timeline (i.e., 01/01/1428, 02/01/1428 in Hijri).

## Implementation Steps Overview

Preprocessing: The historic time series data for reservation sales and reservation collections will be processed to calculate the ratio of sales to collections for each day.

Forecasting Model: A forecasting model will be built using the preprocessed historic data to predict the cash flow ratio for future durations. Three separate models will be created, one for each of the chosen companies (3 for example); These models will act as reference models.

Production Phase: When new data is received from a company, the system will identify the company and perform the following steps based on the company name:

1. For the companies whose data were used to train the reference models, we will directly use these models for prediction.
2. For Other Companies: If the incoming data is from a company not included in the reference models, the system will check its database for historic data related to that company. Based on the size of the historic data:
   1. If the historic data is insufficient (e.g., less than 3 months), the system will terminate and wait until at least 3 months' worth of data is available in the database.
   2. If the historic data is extensive (e.g., more than or equal to 3 years), a new model will be automatically created using the available historic data. This new model will be stored as a reference model alongside the existing three models. Subsequent data from this new company will be fed into this created model for prediction.
   3. If the historic data is neither too small nor too large, the system will follow these steps:
      * Calculate statistical measures for the new data and its corresponding historic data.
      * Calculate statistical measures for each reference model's historic data, considering only the data with the same start and end dates as the new data's history range.
      * Compare the statistical measures of the new data with those of the reference models. The new company will be assigned to the reference model with the most similar statistical measures. Subsequently, incoming data from the new company will be used by the chosen reference model. This process will continue until 3 years' worth of data has been accumulated for the new company.
      * After accumulating 3 years' worth of data for the new company, a new model will be created using this stored data. The new model will be added to the list of reference models, resulting in a total of four reference models. Simultaneously, the previously chosen reference model will undergo complete retraining using the new 3-year data along with the old historic data.

By implementing this proposal, we aim to provide an effective cash flow prediction solution for hotel reservation companies. The development of reference models based on diverse datasets will allow new companies to seamlessly integrate into the system, regardless of their own history data availability. We are confident that our approach will improve cash flow management and contribute to the success of the hotel reservation businesses.

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