Ashraf:

we have the following business use case that I want you to paraphrase to be written for a proposal idea of using A.i to predict cash flow ratio:

a company "X" reserves hotel rooms for specific nights

(let's call this operation "hotel reservation")

Two other terminologies are introduced:

1. "reservation sales": they are money that still needs to be collected from the company due to the hotel reservations they made.

2. "reservation collections": they are money that had been successfully collected from the company.

Now, for our system, we had received each day from company "X" reservation sales and reservation collections and our objective now is the following:

first preprocess this historic time series data into a ratio of reservation sales over reservation collections per day.

Then, use this data to predict the ratio (cash flow) for a specific duration in the future

Therefore, in order to fulfill this objective, we will use a forecasting model on this dataset of historic data.

Now, let's call of the logic mentioned above as "the business logic" for company "X".

We now want to use this same business logic on companies "Y" and "Z", so we'll therefore have 3 forecasting models; one for each of these 3 companies.

These 3 models will then act as reference models

Now, in production phase (i.e., when there are new incoming data from a company), we first see the company name from which the data of reservation sales/collection is coming from, and do the following logic based on the company name:

1. if the company is “X”, then we use the first reference model for prediction (i.e., the objective of the business logic that we previously talked about).

2. else, if the company is “Y”, then we use the second reference model for prediction.

3. else, if the company is “Z”, then we use the third reference model for prediction.

4. else, that means that the given company is not one of the companies used in the reference models’ list, so we check our system’s database for this company’s historic data, and do certain logic based on the size of this historic data:

4.1. If the historic data is very few (e.g., less than 3 months), then the program terminates stating that the system doesn’t contain enough historic data for this company, so we’ll wait until at least 3 months worth of data has been stored in the database.

4.2 else, if the historic data is very large (e.g., more than or equal to 3 years), then we automatically create a new model for this new company that is trained on this historic data, and we store that model as a reference model along with the 3 previously mentioned models. Now, any new data coming from this company will be fed to this created model.

4.3 else, that means the historic data is neither very few nor very large. In that case, we’ll do the following steps:

4.3.1 get a statistical measure of the new data (along with its historic data) related to the new company

4.3.2 get a statistical measure of the historic data that was used in each of the reference models, such that we’re only using the historic data with the same start and end dates as the new data’s history range.

4.3.3 compare the new data’s statistical measure with that of the reference models, such that we assign the new company to one of these reference models based on the most similar statistical measure. Now, any new incoming data from that new company will be used by the chosen reference model, and this will keep happening until 3 years worth of data have been stored for that new company. When that happens, the new company is not mapped to the chosen reference model anymore. Instead, a new model is created that is trained on this stored data, and is then used to predict cash flow coming from this new company. This model will be then also added to the list of reference models (so they’ll now be 4 instead of 3 reference models). Meanwhile, the old reference model that was being used, will also get completely retrained every 3 years on these 3 new years’ data along with the old historic data.

ChatGPT Ashraf:

Proposed Business Use Case: AI-Based Cash Flow Ratio Prediction for Hotel Reservation Companies

The proposed business use case involves developing an AI system to predict the cash flow ratio for hotel reservation companies. The system aims to analyze the reservation sales and reservation collections data received from three companies: X, Y, and Z. The primary objective is to forecast the ratio of reservation sales over reservation collections for a specific duration in the future. This predictive model will be referred to as "the business logic" for each company.

To implement this system, the following steps are outlined:

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 companies: X, Y, and Z. 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:

a. For Company X: The first reference model, which represents the business logic for Company X, will be used for prediction.

b. For Company Y: The second reference model, specific to Company Y, will be used for prediction.

c. For Company Z: The third reference model, designed for Company Z, will be used for prediction.

d. 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:

i. 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.

ii. 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.

iii. If the historic data is neither too small nor too large, the system will follow these steps:

1. Calculate statistical measures for the new data and its corresponding historic data.

2. 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.

3. 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.

4. 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 proposed business logic, the AI system will provide accurate cash flow ratio predictions for hotel reservation companies, adapt to new companies, and continually update the reference models to ensure accurate forecasting.

Adam:

[Your Name]

[Your Position]

[Company Name]

[Date]

Proposal: Cash Flow Prediction for Hotel Reservation Company

Introduction:

We are pleased to present this proposal to address 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 reservation collections. The former represents the amount of money owed by debtors, 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.

Objectives:

1. Preprocess the historic time series data to calculate the collection over sales ratio per day.

2. Develop machine learning models for cash flow prediction, using the preprocessed data.

3. Create reference models for different business categories based on the data from three different companies.

4. Facilitate the integration of new companies into the system by comparing their data patterns with the existing models and assigning them to the most suitable reference model.

Methodology:

To achieve our objectives, we will follow the following methodology:

1. Data Preprocessing:

- Apply suitable techniques to transform the historic time series data into a ratio of collection over sales per day.

- Clean the data, handle missing values, and address any outliers to ensure the accuracy of the subsequent analysis.

2. Machine Learning Model Development:

- Utilize the preprocessed data to develop accurate and robust machine learning models for cash flow prediction.

- Explore various algorithms such as regression, time series forecasting, or ensemble methods to determine the best-performing model.

3. Reference Model Creation:

- Collect data from three different companies representing diverse business categories.

- Train separate machine learning models for each category using their respective datasets.

- Document and store these models as reference models for future comparisons.

4. Integration Process for New Companies:

- Assess the data provided by new companies seeking to join the system.

- Compare the patterns and characteristics of their data with the existing reference models.

- Assign the new company to the most suitable reference model based on the compatibility of their data patterns.

Implementation Plan:

We propose the following timeline for the implementation of the project:

- Month 1:

- Gather historic time series data from the target company.

- Perform data preprocessing and create the initial cash flow prediction model.

- Month 2:

- Evaluate and refine the initial model.

- Collect data from three different companies to create reference models.

- Month 3:

- Develop separate machine learning models for each business category.

- Test and validate the reference models.

- Month 4:

- Create a framework for comparing new companies' data with the reference models.

- Conduct initial tests with pilot companies.

- Month 5:

- Refine the integration process based on feedback from pilot companies.

- Finalize the implementation framework and documentation.

Conclusion:

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 hotel reservation businesses.

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

Sincerely,

[Your Name]

[Your Contact Information]