Lorena C. Madeline G., Connor G., Rashia H., Munpreet K., Zaina K., Sofia M., Sarah M., Yana N., Julia P., Alex P., Skyler P., Bader R., Jordana T., Valerie T.

PROJECT BACKGROUND

dormakaba creates access and security solutions in residential and commercial spaces. Using the company's data, we delegated tasks through the following teams of: Artificial Intelligence (AI), Machine Learning (ML), and Software Engineering (SWE) to clean and display clear results of invoices, patterns, locations, and findings.

OBJECTIVE

This project develops a machine learning model that helps dormakaba to better:

- Identify at-risk credit customers
- Match unapplied cash receipts to the correct customer and invoice
- Streamline customer data management to improve financial accuracy
- Support better strategic decisions across the organization

CENTRAL QUESTIONS

- Can we utilize the data we were given to optimize customer trends?
- How can we train a Machine Learning model on payment and invoice data?
- How can we best predict a customer's likelihood to pay on time?

METHODS AND DATA

Figure 1.1





Developing a Predictive Model

Data Given:

- Customer Locations (International and Domestic)
- Current Customer Payments
- Past Customer Invoices

Fall 2024 : Using Python techniques, we organized the data set we were given by sorting each entry by hotel chain, handling null values

Spring 2025: Received the AR dataset to predict customer payment behavior based on their past payment history.

- Machine Learning team cleaned the given data, correctly handled null values, and created regression and linear models and sent results to Artificial Intelligence team

- Artificial Intelligence team then created a RAG model that utilized the Machine Learning team's findings using open-source software sent their results to the Software Engineering team

- Software engineering team created a user-friendly interface that allows a user to interact with the AI model created by the AI team





Figure 1.4

inst. Shilo Wyndham Vacation Re McMM Hotels & Ca Bar Spritteria Bar Spritteria Marganitaville Hotels & Ka Marganitaville Hotels & Ka Marganitaville Hotels & Multihou Hospitality International Hospitality International Hospitality International Multihou Multihou & Copthorne H Hostelling Internat Werbur See Distri Starwood Capital C Cobblestone Hotel C Cobblestone Hotel Cobblestone Hotel Cobblestone Hotel Cobblestone Hotel Cobmon Red Lion Loews H Hyat Hotels Corpor Wyndham Vacation Owne Red Lion Loews H Hyat Hotels Corpor Ked Lion Hotel C Omnit Intercontinental Hotel C Omnit Intercontinental Hotel C Omnit Hitton Hotels Corpor Hitton Hotels Internat Best Western Internat Best Western Internat		
Vyndham Vacation Caesars Entertain Bluegreen Re Margaritaville Hotels & Re Ameristar C Vantage Hospitality (1997) Hospitality Internation Budge Hospitality Internation Budge Hospitality Internation Budge Hospitality Internation Budge Millennium & Copthorne H Hostelling Internat Web-Test Acc Four See Distri Starwood Capital C Cobblestone Hotel C Accort Red Iton Kets Starwood Capital C Cobblestone Hotel C Accort Red Kon Extended Stay of A Distri Unbranded Red Lon Hotels Corpor Hydt Hotels Corpor Hydt Hotels Corpor Hydt Hotels Corpor Hilton Hotels Internat Best Western Internat		Insta
 Micki Hotels & Ca Casars Entertain Bluegreen Re Marganizaville Hotels & Ca Marganizaville Hotels & Marganizaville Hospitality Internationa Longhouse Hospitality Internationa Hospitality Internationa Hospitality Internationa Web Test Ac Web Test Ac Busing Starwood Capital C Cabblestone Hospitality Automotion Starwood Capital C Cabblestone Hospitality Accord Red Look Extended Stay of Am Son Logham Vacation Owne Red Lion Loews H Hyatt Hotels Corpor Windham Vacation Owne Red Lion Loews H Hyatt Hotels Corpor Windham Vacation Owne Red Lion Hotel C Omnit H Marriott Internat Intercontinental Hotel C Omnit H Intercontental Hotel C Omnit H Marriott Corpor Hilton Hotels Corpor End Drury Hotels Corpor Hilton Hotels Internat Best Western Internat Best Western Internat 		Wyndham Vacation Rei
Caesars Entertain Bluegreen Re Margaritaville Hotels & Re Ameristar C Vantage Hospitality (D Baggier Hospitality Internation Longhouse Hospi Peninsula & Copthome H Millennium & Copthome H Starwood Capital C Cobblestone Hotel C Cobblestone Hotel C Cobblestone Hotel C Red Lion Kers Red Lion Hotels Corpor Myndham Vacation Owne Red Lion Hotels Corpor G Marrist Intercontinental Hotel C Momin Intercontinental Hotel C Momin Hilton Hotels Corpor Hilton Hotels Internat Best Western Internat		MGM Hotels & Cas
Buegreen Re Margaritaville Hotels & Ameristar C Budget Budget Hospitality International Longhouse Hospi Hospitality International Hospitality International Hospitality International Note Budget Millennium & Copthorne H Hostelling Internation Starwood Capital C Lodging Integr Cobblestone Hotel C Cobblestone Hotel C Dews H Hyatt Hotels Corpor Windham Vacation Owne Red Lion Hotel C Omnit H Marriott Internat Intercontinental Hotel C Omnit H Hitton Hotels Corpor Hitton Hotels Corpor Hitton Hotels Internat Best Western Internat Best Western Internat		Caesars Entertain
Marganitaville Hofels & Re Ameristar C Vantage Hospitality O Budget Hospitality Internata Longhouse Hospi Peninsula Millennium & Cophone Millennium & Cophone Millennium & Cophone Millennium & Cophone Starwood Capital C Cobblestone Hotel C Red Each Hotel C Red Each Hotel C Millennium Kettel Millennium Kettel Mille		Bluegreen Re
Ameristar C Budget Budget Hospitality Internationa Longhouse Hospi Nutlihouse Hospi Multihou Millennium & Cophorne H Hostelling Internat Were Four See Cobblestone Hotel C Cobblestone Hotel C C Huten Hotel C Omnit H Marriott Internat Intercontinental Hotel C Omnit H Hiton Hotels Corpor Hiton Hotels Corpor E Hiton Hotels Corpor Best Western Internat Best Western Internat		Margaritaville Hotels & Re
Vantage Hospitality G Budget Hospitality Budget Hospitality Internationa Longhouse Hospi Peninsula Coptition Millennium & Coptition Millennium & Coptition Millennium & Coptition Millennium & Coptition Millennium & Coptition Starwood Capital C Cobblestone Hotel C Cobblestone Hotel C Cobblestone Hotel C Cobblestone Hotel C Red Root Extended Stay of Am Loe Star Cobblestone Hotel C Red Root Red Root Red Root Red Root Hotels Corpor G Mindham Hotel C Marriott Internat Intercontinental Hotel C Mompan Hilton Hotels Corpor Hilton Hotels Corpor Hilton Hotels Corpor Choice Hotels Internat Best Western Internat Best Western Internat		Ameristar Ca
Budget Budget Hospitality Indemisiona Longhouse Hospi Peninsula H Multihou Hospitality International Web Corptome H Hostelling Internation Starwood Capital C Cobblestone Hotel C C Numbrand Lossestone Red Lion Hotel S Omni H Marriott Internat Intercontinential Hotel C Omni H Intercontential Hotel C Omni H Intercontential Hotel C Omni H Best Western Internat Best Western Internat		Vantage Hospitality G
Hospitality International Hospitality International Peninsula Hospitality International Millennium Keyner Hostelling International Hostelling International Berger Starwood Capital C Cobblestone Hotel C Red Lion Hotels Corpor G G Hospi G G Hospi G Marinet Internation Hotel C Marinet Internation Omni H Marriott Internation Omni H Hiton Hotels Corpor Hiton Hotels Corpor Hiton Hotels Corpor Choice Hotels Internat Best Western Internat		Budget
Hospitality mations Hospitality mations Longhouse Hospi Peninsula H Multihou Hostelling Internat Werder See Starwood Capital C Cobblestone Hotel Cobblestone Hotel Screen Wyndham Vacation Owne Red Lion Hotels Corpor Unbranded Intercontinential Hotel Commental Hotel Company Choice Hotels Internat Best Western Internat Best Western Internat		Budge
Anglouse Hospi Peninsula – Weter Multinoum & Conphrme H Weter Hostellingheter Starwood Capital C Cobblestone Hotel C Cobblestone Hotel C Cobblestone Hotel C Cobblestone Hotel C Red Roc Red Roc Red Roc Red Roc Red Loc Hotels Corpor G 6 Hospi Wyndham Vacation Owne Red Lion Hotels Corpor G 6 Hospi Wyndham Hotel C Intercontinental Hotel Marriott Internat Intercontinental Hotel Meters Corpor Dury Hotels Company, Choice Hotels Internat Best Western Internat Best Western Internat		Hospitality Internationa
Antiperior and a set of the set o		Longhouse Hospit
vote Multinovi Multinovi Multinovi Hotseling interna Distri Starwood Capital C Lodging integr Cobblestone Hotel C Accor C Red Roc Extended Stay of Am Leewsy Hyatt Hotels Corpor Wyndham Vacation Owne Red Lion Hotels Corpor G Hospi Wyndham Hotel C Unbranded Radisson Hotel C Hadisson Hotel C Hintercontinental Hotel C Intercontinental Hotel C Drury Hotels Corpor End Drury Hotels Corpor End		Peninsula H
Multihon Millennium & Cophorne H Hostelling Internat Web-Test Acc Cobbiestone Hotel C Cobbiestone Hotel C Son Loews H Hyatt Hotels Corpor Windham Vacation Owne Red Lion Hotels Corpor C Munbranded I Nearisot Intercontinential Hotel C Omnit H Hitton Hotels Corpor Hitton Hotels Corpor Choice Hotels Internat Best Western Internat Best Western Internat		Yote
Millennium & Cophorne H Hotstelling interna Veb-Test Acc Four See Starwood Capital C Lodging integr Cobblestone Hotel C Red Roc Extended Stay of Am Leews H Hyatt Hotels Corpor Wyndham Vacation Owne Red Lion Hotels Corpor G Hospi Wyndham Hotel C Unbranded Radisson Hotel C Mariott Ioniaal Intercontinental Hotel C Mariott Ioniaal Intercontinental Hotel C Drury Hotels Corpor End Drury Hotels Corpany, Choice Hotels Internat Best Western Internat		Multihou
Hostelling internat Web-Test Acc Four Starwood Capital C Lodging Integr Cobblestone Hotel C Cobblestone Hotel C Cobblestone Hotel C Capital C Extended Stay of Am Extended Stay of Am Extended Stay of Am Extended Stay of Am Hyatt Hotels Corpor Wyndham Vacation Owne Red Lion Hotels Corpor Unbranded Radisson Hotel C Unbranded Radisson Hotel C Omnit Intercontinental Hotel C Om Internationental Hotel C Om Intercontinental Hotel C Om Drury Hotels Corpor Hilton Hotels Corpor Hilton Hotels Corpor Hilton Hotels Corpor Hotels Hotel Internat Best Western Internat Best Western Internat		Millennium & Copthorne H
Starwood Capital C Starwood Capital C Lodging Integr Cobblestone Hotel C Accor C Red Roo Extended Stay of Am Leewsi Hyatt Hotels Corpor Wyndham Vacation Owne Red Lion Hotels Corpor G Hospi Wyndham Hotel C Unbranded I Radisson Hotel C Radisson Hotel C Hoterst Internet Martot Dimit Intercontinental Hotel C Drury Hotels Corpor End Drury Hotels Corpor End		Hostelling Internat
Starwood Capital C Lodding integr Cobblestone Hotel C Cobblestone Hotel C Cobblestone Hotel C Red Core Red Lion Hotels Corpor Wyndham Vacation Owne Red Lion Hotels Corpor Wyndham Hotel C Wyndham Hotel C Wyndham Hotel C Wyndham Hotel C Mariott Internat Intercontinental Hotel C Omni H Marriott Internat Intercontinental Hotel C Omni H Marriott Internat Best Western Internat Best Western Internat		Web-lest Acc
Starwood Capital C Lodging Integr Cobblestone Hotel C Accor C Red Raco Extended Stay of Am Loews H Hyatt Hotels Corpor Wyndham Vacation Owne Red Lion Hotels Corpor G Hospi Wyndham Hotel C Unbranded I Radisson Hotel C Mariott Internat Intercontinental Hotel C Mariott Internat Intercontinental Hotel C Drury Hotels Corpor End Drury Hotels Corpor End	2	Distrit
Starwood Capital C Lodging Integr Cobblestone Hotel C Accore C Extended Stay of Am Extended Stay of Am Extended Stay of Am Extended Stay of Am Hyatt Hotels Corpor Wyndham Vacation Owne Red Lion Hotels Corpor Munbranded Radisson Hotel C Omni H Marriott Internat Intercontinental Hotel C Milton Hotels Corpor Hilton Hotels Corpor Hilton Hotels Corpor Hilton Hotels Company, Choice Hotels Internat Best Western Internat	2	bistin
Lodging integr Cobblestone Hotel C Accor C Red Rac Extended Stay of Ass Loews H Hyatt Hotels Corpor Wyndham Vacation Owne Red Lion Hotels Corpor G Hospi Wyndham Hotel C Unbranded I Radisson Hotel Radisson Hotel C Marrot Internat Intercontinental Hotel C Indepen Hilton Hotels Corpor End Drury Hotels Corpany, Choice Hotels Internat Best Western Internat	i	Starwood Capital G
Cobblestone Hotel C Accor C Retended Stay of Am Extended Stay of Am Loews H Hyatt Hotels Corpor Wyndham Vacation Owne Red Lion Hotels Corpor Unbranded Radisson Hotel C Unbranded Radisson Hotel C Omni H Marriott Internat Intercontinental Hotel C Mitton Hotels Company, Choice Hotels Internat Best Western Internat		Lodging Integra
Accor C Red Roo Extended Stay of As Loews H Hyatt Hotels Corpor Wyndham Vacation Owne Red Lion Hotels Corpor G Hospi Wyndham Hotel C Unbranded I Radisson Hotel G Marriot Infernat Intercontinental Hotel C Indepen Hilton Hotels Corpor End Drury Hotels Corpor End Drury Hotels Corpor End	C,	Cobblestone Hotel G
Extended Stay of So Loews H Hyatt Hotels Corpor Wyndham Vacation Owne Red Lion Hotels Unbranded Radisson Hotel C Omni H Marriott Internat Intercontinental Hotel O Intercontinental Hotel O Drury Hotels Company, Choice Hotels Internat Best Western Internat		Accor G
Leveix Stay of So Loevis H Hyatt Hotels Corpor Wyndham Vacation Owne Red Lion Hotels Corpor G Hospi Wyndham Hotel C Unbranded I Radisson Hotel G Marriot Internat Intercontinental Hotel C Indepen Hilton Hotels Corpor End Drury Hotels Corpor End Drury Hotels Corpor End		Extended Stay of Am
Loews H Hyatt Netes Corpor Wandham Vacation Owne Red Lion Hotels Corpor Wynd Gif Hospi Wynd Gif Hospi Unbranded Radisson Hotel C Omni H Marriott Internat Intercontinental Hotel C Drury Hotels Company, Choice Hotels Internat Best Western Internat		Sor
Hyatt Hotels Corpor Wyndham Wacation Owne Red Lion Hotels Corpor G6 Hospi Wyndham Hotel C Unbranded I Radisson Hotel C Mariott Internat Intercontinental Hotel C Indeper Hilton Hotels Corpor End Drury Hotels Company, Choice Hotels Internat Best Western Internat		Loews H
Wyndham Vacation Owne Red Lion Hotels Corpor Wyndio G Hospi Unbranded Radisson Hotel C Omni H Marriott Internati Intercontinental Hotel C Mitton Hotels Cond Drury Hotels Company, Choice Hotels Internat Best Western Internat		Hyatt Hotels Corpora
Red Lion Hotels Corpor G6 Hospi Wyndham Hotel C Unbranded I Radisso Jonni H Marriot Internat Intercontinental Hotel C Indeper Hilton Hotels Corpor Encry Hotels Corpor Drury Hotels Company, Choice Hotels Internat Best Western Internat		Wyndham Vacation Owner
Ge Hospi Wyndum Hotel C Radisson Hotel C Omni H Marriott Internat Intercontinental Hotel C Hilton Hotels Company, Choice Hotels Internat Best Western Internat		Red Lion Hotels Corpora
vyndham hodel (Unbranded) Radisson hotel (Mariott Internat Intercontinental Hotel (Indeper Hilton Hotels Corpor Entry Hotels Corpor Drury Hotels Company, Choice Hotels Internat Best Western Internat		G6 Hospit
Characteria and the constraints of the constraints		Wyndham Hotel G
Omi H Marriott Internat Intercontinental Hotel C Indeper Hilton Hotels Corpor End Drury Hotels Company, Choice Hotels Internat Best Western Internat		Badisson Hotel G
Marriott Internat Intercontinental Hotel C Indepen Hilton Hotels Corpor Drury Hotels Company, Choice Hotels Internat Best Western Internat		Omni H
Intercontinental Hotel C Indeper Hilton Hotels Corpor End Drury Hotels Company, Choice Hotels Internat Best Western Internat		Marriott Internat
Indeper Hilton Hotels Corpor End Drury Hotels Company, Choice Hotels Internat Best Western Internat		Intercontinental Hotel G
Hilton Hotels Corpor End Drury Hotels Company, Choice Hotels Internat Best Western Internat		Indepen
Drury Hotels Company, Choice Hotels Internat Best Western Internat		Hilton Hotels Corpor
Choice Hotels Internat Best Western Internat		Drury Hotels Company.
Best Western Internat		Choice Hotels Internat
		Best Western Internat
		Énd Drury Hotels Company, Choice Hotels Internat Best Western Internat





Locking in Trends: A RAG-Based Approach to Secure Consumer Predictions

developed by the SWE team, enabling users to interact with the model's insights in real time.

dormakaba

RESULTS AND FINDINGS

Used a combination of HTML, CSS and JavaScript to create a page that would allow users to access the most updated data. Users can enter prompts about the data into an AI chatbot to predict the payment history of past customers.

5 1.00, 1.00				
			Here is what we found	Ð
		Create New	Response to question here	
How Can We Assist You?				
Type Here	•			
			Anything else we can help with?	
			Type Here	

Utilized Accounts Receivable (AR) data to analyze customer payment patterns by comparing actual payments to expected amounts. Regression and linear modeling was used to analyze data and create visuals.



Figure 1.10

Figure 1.10 represents the average Bleu Score our rag model achieved using a T5 model to comply with the company's privacy policy; then used natural language processing (NLP) to understand user questions and generate relevant and accurate responses.

graph generation.

ACKNOWLEDGEMENTS

- Corporate TA: Lucas Zamiel Ugaz
- dormakaba Mentor: Matthew Frazier
- UIC Support: Professor Gonzalo A. Bello, Elena Lathos
- DUNY Support: **Professor Jovan Zigic**
- SVP Finance: Nick O'Carrol
- Sr. Mgr Hospitality Sales Operations: **Dena** Reyes
- SVP Specialty Access Solutions: Darien Long
- ML dormakaba Support: **Deborah Kozuch**

The Data Mine Corporate Partners Symposium 2025