PROJECT MILESTONE 4 REPORT

PROJECT NAME	ChatBot Flight Booking System	**DATE OF STATUS ENTRY**	December 02, 2023
PROJECT CODE	BDM3035 T3F23 CFBS	**PERIOD COVERED**	November 20, 2023 to December 02, 2023
PROJECT MANAGER	Auradee Castro	**DATE OF COMPLETION**	December 15, 2023
MEMBERS	Auradee Castro (c0866821), Bhumika Babu (c0867081), Miraj Sinya (c0863371), Olivia Deguit (c0878491), Roger Mais (c0863147)		

PROJECT STATUS

PROJECT STATUS	POTENTIAL RISKS / DELAYS	**SUMMARY**	Finished implementing flight booking and real-time flight tracking functionalities in chatbot app but not thoroughly tested due to databse-related enhancements. Concluded the development of sentiment generator model for user reviews. Completed the necessary prerequisites for Power BI development.
TASKS	Finished the implementation for flight booking and real-time flight tracking using the Landbot platform. However, unexpected errors may arise in the chatbot due to enhancements made to the DynamoDB tables. This requires an additional round of testing.		
	Completed the evaluation for sentiment analysis models, determining that VADER outperforms RoBERTa. The chosen model will be integrated into the chatbot to generate sentiments on user reviews.		
	Completed data gathering and initial examination on the dataset before proceeding with the development of data models and visualizations using Power BI		

PROJECT COMPONENTS

COMPONENT	STATUS	OWNER / TEAM	NOTES
BUDGET	UNDER	MetaMorph Team	Reduced expenses allocated for the development of passport reader feature by saving on resources
RESOURCES	ON TRACK	MetaMorph Team	Tools installation and configuration completed - Python and Jupyter Notebook - Power BI Desktop - AWS account and services - Landbot - Github Repository - Microsoft Teams - CDATA (for DynamoDB and Power BI connection)
TIMELINE	ON TRACK	MetaMorph Team	Project is progressing as planned without major blockers
SCOPE	POTENTIAL RISKS / DELAYS	MetaMorph Team	a. Passport reader feature using machine learning was excluded from the project plan, which was discussed and approved by the stakeholder b. Enhacenment to the chatbot application, involving modifications of DyanmoDB tables, which might result to error-free features. Further testing is necessary.

PROJECT PLAN ADJUSTMENTS: SCOPE AND DESIGN REVISIONS

TASK NUMBER	DESCRIPTION	OWNER / TEAM	NOTES
CFBS-13	Selection of a pre-trained model for extracting text from US passports	MetaMorph Team	PaddleOCR and Pytesseract, which are open-source Optical Character Recognition (OCR) tools, were considered as potential models for the passport reader feature in the chatbot application. However, due to the models' limited accuracy in extracting texts from passports, with issues such as misspellings and incorrect date displays, the team decided to drop the passport reader feature from the original project plan. See results on https://github.com/abccastro/ChatBot-Online-Flight-Booking/blob/main/Passport%20Reader.ipynb. Reasons for removing the passport reader feature: 1. Using machine learning model for text extraction was deemed error-prone, leading to potential inaccuracies that customers would need to correct manually, negatively impacting the user experience. 2. Aiming to simplify the chatbot's functionality, with users having the alternative to manually input information when booking a flight. Stakeholder was informed on this modification and agreed to exclude the passport reader feature from the original project plan. Nevertheless, a section allowing users to upload passports in chatbot will be retained, with plans to enhance this feature in future project phases, potentially enabling useful functionalities like automatic check-in before flights.

WORK ACCOMPLISHED

TASK NUMBER	DESCRIPTION	OWNER / TEAM	NOTES
CFBS-07	Fully functional flight booking capability, that includes ticket booking, search functionality, and cancellation, along with the integration of additional validations on input fields	Roger Mais	Successfully implemented the flight booking feature on the chatbot app through the Landbot platform, enhancing user experience. a. Booking for flight ticket b. Searching for flight ticket c. Cancelling flight ticket Link for chatbot app: https://landbot.pro/v3/H-1762252-XMGB0WW049SS8UP1/index.html Additional validations and improvements have been incorporated to enhance functionality. **However, as part of restructuring DynamoDB tables to ensure overall data integrity, the flight booking feature wasn't thoroughly tested with these changes. This may result in potential errors that require investigation by the developers.** See list of database tables below. • *customers:* contains customer details (name, email address) • *flights:* contains flight details (airport name, time, flight number) • *transactions:* contains flight booking transaction details (cost, cancelled flights) Error-free feature will be completed before next milestone.
CFBS-08	Fully functional, real-time flight tracking with simulated FlightAPI's Flight Tracker API	Roger Mais	Successfully implemented the real-time flight tracking functionality within the chatbot application, featuring a page that visually displays the aircraft's movement between airports using Python programmng language. See video on https://drive.google.com/file/d/1Se2puLmReY9b8mwx-Ozhp5z5mA7dQVYh/view?usp=sharing Currently, the feature has a limited number of airports to cater. Expansion is possible once the application has integrated Flight Tracker API from FlightAPI.

CFBS-13	Selection of a pre-trained model for analyzing sentiment on user flight experience reviews	Auradee Castro, Olivia Deguit	The team used two pre-trained models, RoBERTa and VADER, for analyzing sentiment on reviews. We leveraged the metrics from Python's scikit-learn package to calculate accuracy, recall, precision, and F1-score for both actual and predicted classes. The comparison is conducted using two different datasets. According to the results (as indicated in the files below), VADER achieves higher accuracy, with 74% and 70%, compared to RoBERTa, which has accuracy rates of 47% and 64% a. https://github.com/abccastro/ChatBot-Online-Flight-Booking/blob/main/Flight%20Sentiment%20Analysis%20Dataset%201.ipynb b. https://github.com/abccastro/ChatBot-Online-Flight-Booking/blob/main/Flight%20Sentiment%20Analysis%20Dataset%202.ipynb The team has decided to use VADER on generating sentiments for user reviews.
CFBS-14	Establishing a connection between Power BI and AWS DynamoDB	Auradee Castro	For Power BI to connect to AWS DynamoDB, a third-party application like Simba or CData is necessary to establish connection. Despite the initial plan on using Simba, the team opted for CData due to its smoother integration and well-documented setup instructions for connecting to DynamoDB (see AWSIAMRoles in https://cloud.cdata.com/docs/AmazonDynamoDB.html). Information for CDATA configuration in ODBC Data Sources: - *AWS Access Key:* access key of AWS user - *AWS Secret Key:* secret key of AWS user - *AWS Role ARN (Amazon Resource Name):* access role set for CDATA, i.e. DynamoDBReadOnlyAccess - *AWS External Id:* ID attached to AWS Role ARN - *AWS Region:* Central Canada Following CDATA setup installations, the CData data resource becomes available in Power BI ODBC list, facilitating seamless integration and data access.
CFBS-14	Gathering and analyzing data on customer flight bookings and reviews for Power BI data visualizations	Bhumika Babu, Miraj Sinya	Completed data gathering and inital analysis on flight bookings and user reviews extracted from DynamoDB. The database tables listed below are necessary for this task. • *customers:* contains customer details (name, email address) • *flights:* contains flight details (airport name, time, flight number) • *transactions:* contains flight booking transaction details (cost, cancelled flights) • *reviews:* contains user reviews Power BI, a business analytics tool, will be leveraged to create data models and visualizations. This will help business to have a clear understanding of the data and guide them in making informed decisions.

RISKS AND ROADBLOCKS

TASK NUMBER	DESCRIPTION	OWNER / TEAM	FIX / RESOLUTION
CFBS-13	Limitations of pre-trained models on extracting texts from US passports	MetaMorph Team	The decision to exclude this feature from the initial plan was made with the stakeholder's approval. See detailed explanation under Project Plan Adjustments: Scope and Design Revisions section of the report (page1)

HIGHLIGHTS AND KEY TAKEAWAYS

Completed the development of features related to flight booking and real-time flight tracking. However, the enhancements made to the chatbot app concerning the restructuring of the database may cause possible project delays. The application requires comprehensive testing due to unforeseen bugs or errors. The team provided a publicly accessible link for stakeholders to review and test the chatbot application.

Finalized the selection of model, i.e. VADER, as the sentiment generator for user reviews. Started the development of the customer review feature in the chatbot app where the model will be integrated thereafter.
Held a stakeholder meeting to get feedback regarding the removal of passport reader from original project plan. Ensured thorough communication of the changes and obtained the necessary approvals.

UPCOMING WORK

TASK NUMBER	STATUS	DETAILS
CFBS-07	POTENTIAL RISKS / DELAYS	Completed the development and testing for the enhancements introduced in the flight booking feature, which is related to the restructuring of the database. This modification has big impact on overall application, which could potentially introduce on unexpected errors/bugs.
CFBS-14	ON TRACK	Examine client data, generate models and visual representations to see patterns and trends in customer flight bookings, and unfold customer sentiments about their airline or application experiences. This information aims to provide insights guiding the business in making well-informed decisions.
CFBS-09	ON TRACK	Integrate a functionality into the chatbot that prompts users to share their airline experience and leave reviews in the app. Utilize VADER, a pre-trained sentiment analysis model to categorize the reviews as 'Positive', 'Neutral', or 'Negative' before storing them in DynamoDB.

PROJECT MILESTONE AND TIMELINE