



BarodaSaathi

Bank of Baroda Hackathon 2024

Team Name : elasticSearch

Team bio : Revolutionizing customer outreach

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PROBLEM STATEMENT

Challenge 6: Personalized Content Generation

- In this day and age of social media and Generative AI, **manually curating content**, using computer graphics and shooting videos **loses out on a lot of time and money**.
- Even then it may **not** always be able to **carry a personal touch** at scale, which is crucial to enhance customer engagement and satisfaction, and can shape the brand's image and digital identity.
- In the banking sector, where **trust** and **personalized care** are paramount, using **generative AI** by **integrating customer data** to create **tailored marketing materials, financial reports, and educational content** can help foster **stronger customer relationships and loyalty**.
- Helping customers keep **track of incomes, expenses, savings and investments** in a single place, creating **awareness against fraudulent schemes** and providing **investment tips**, creates massive **goodwill**.
- This not only improves the overall customer experience but also **drives business growth** and **competitive advantage** for the bank in an increasingly digital and customer-centric marketplace.

PRE-REQUISITES

- We found **no existing GenAI-based alternatives/competitive** products for this PS
- Esp. in the banking sector, **most players** in the market are **only planning** on using GenAI for **summarizing** documents, generating **code** and making audio/text-based **chatbots**.
- Marketing, making financial/security related educational videos, etc. are **still heavily manual based** processes in other banking institutions.
- This is why we wish to **grab this opportunity** to **become a pioneer** in this space, leaving others to play catch-up. It is a **huge competitive advantage** that we currently hold.
- We intent to go a step further and **tap into** the current **craze of shorts/reels format** of content consumption. We will **auto-generate short video clips** using diffusion models to **help customers better understand and engage** with our content.
- Thus we can not only **save resources** in creating content, but **also generate revenue** by **greater yet personalized customer outreach**.



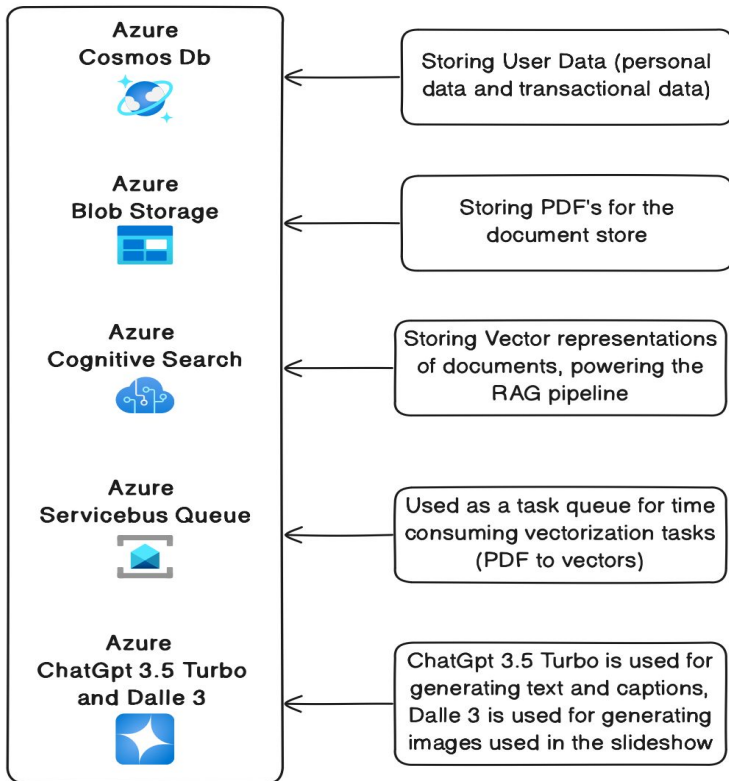
Overview

- Our project leverages generative AI to create personalized marketing content for banking customers, enhancing their engagement and experience.
- It processes client metadata, account summaries, and activity logs stored in **Azure Cosmos DB** to gather **Personalized Prior Information (PPI)**.
- This PPI is used in a **LlamaIndex agent pipeline** with **Azure OpenAI-GPT-3.5-turbo** model to generate **Personalized Retrieved Information (PRI)**.
- **PPI and PRI** are combined to produce interactive marketing content, **including text summaries, images, and short videos**, delivered through multiple channels with multilingual support.
- A chatbot assistant offers personalized help in users' **native languages** and improves PPIs based on chat history analysis.
- **Collaborative filtering** recommends items to clients based on similar users' interests, reducing content generation overhead.



TOOLS AND RESOURCES

Azure Services



Python



Llama
Index



React



Vercel

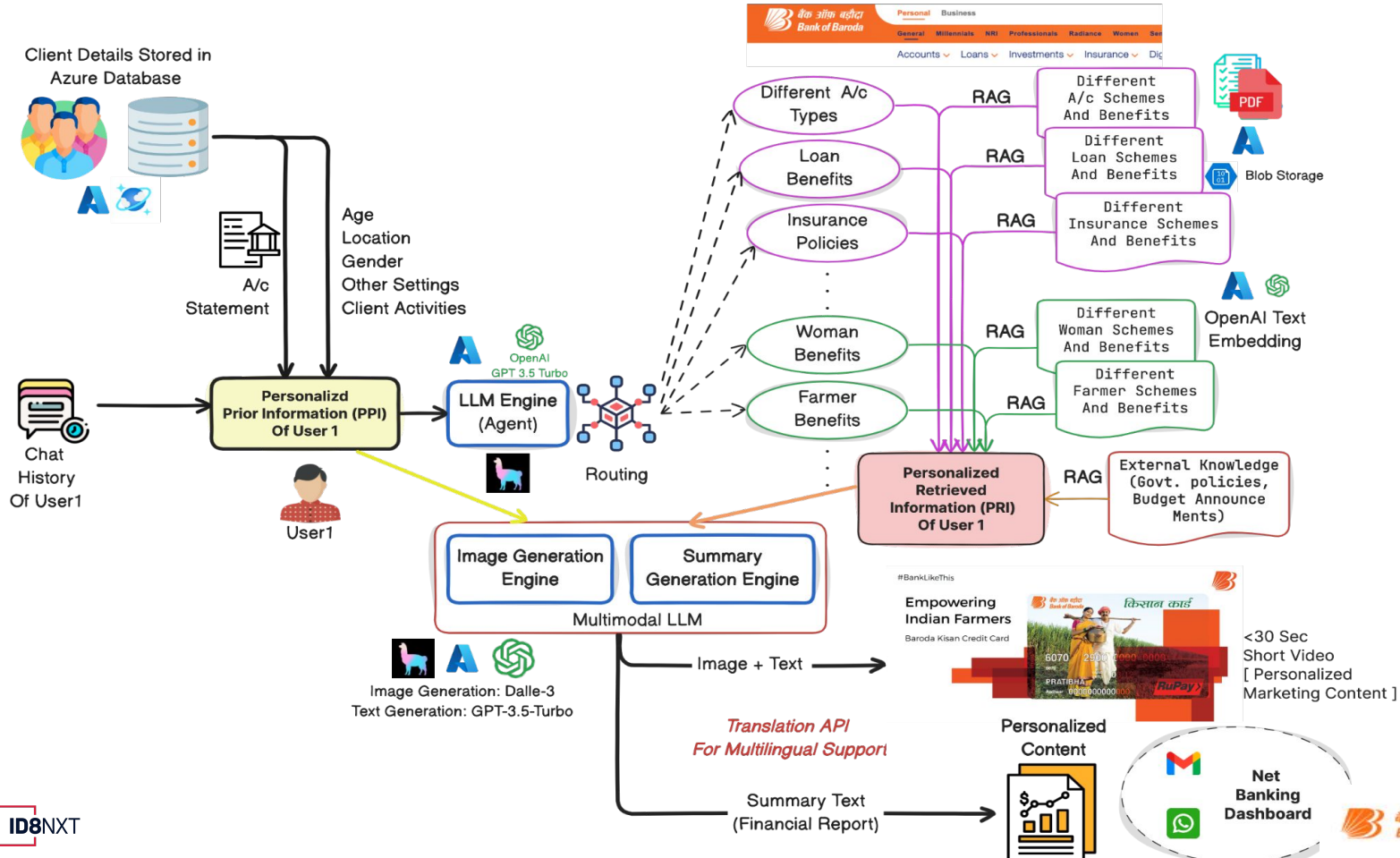


OpenAI



DALL-E

PERSONALIZED CONTENT GENERATION (1/3)



PERSONALIZED CONTENT GENERATION (2/3)

1. Personalized Prior Information (PPI):

This information is used to leverage **personalization** of content

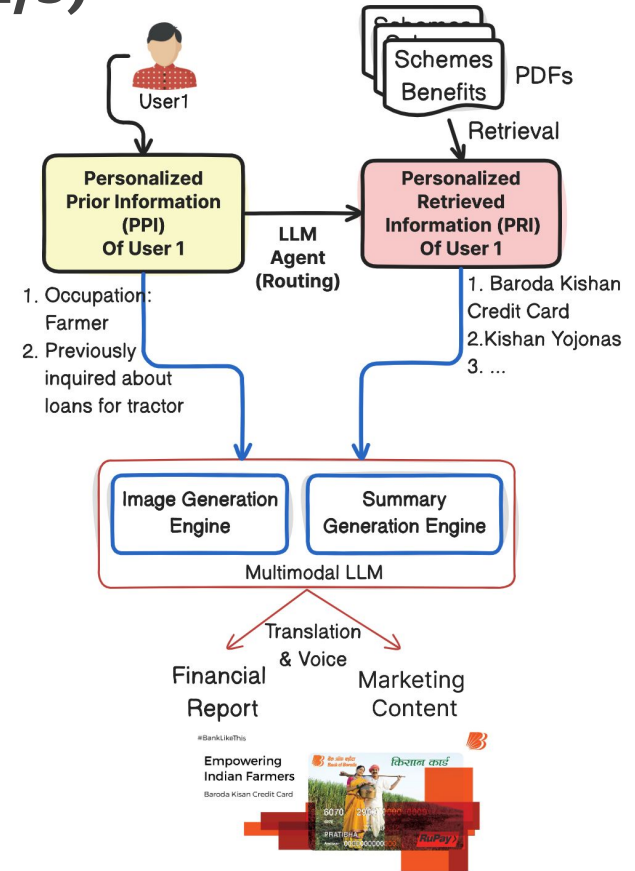
- Client metadata like age, gender, location etc.
- Summary of a/c statement
- Client's activity log and a/c settings

2. Personalized Retrieved Information (PRI):

- LlamaIndex** agent pipeline using **Azure OpenAI-GPT-3.5-turbo** model, is used to breakdown the PPI and route them to several retrieval modules for different banking services
- Retrieved content from several modules** are aggregated to form **PRI** for that user.

3. Personalized Content Generation:

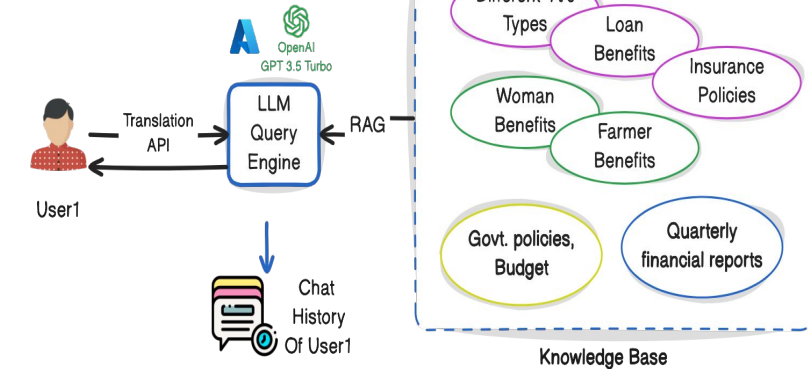
- The **PPI and PRI** of a particular user are passed to a **text-generation and image-generation LLM** module to generate a **summary of the content** and a **short video**, making the content more interactive.
- We use **Azure translation api** and **voice support** to provide multilingual support.
- The generated content is then passed to the user's **net banking dashboard** or sent via **email** or **WhatsApp** feeds.



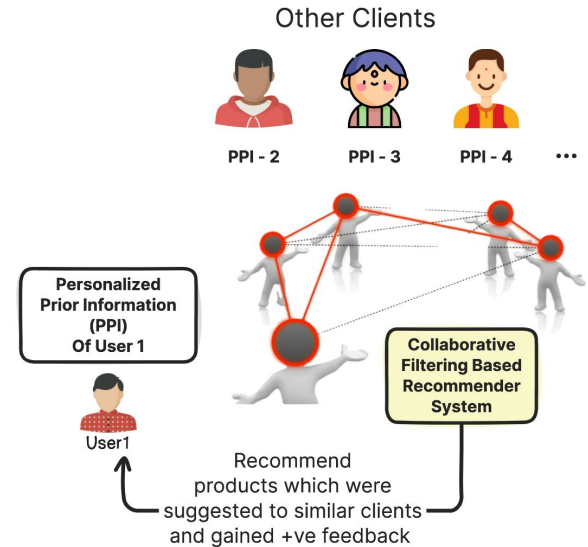
PERSONALIZED CONTENT GENERATION (3/3)

1. We provide a chatbot assistant to help users inquire about the different schemes and benefits offered by the bank in native language.
2. This chat history can be used to better analyze the users' concerns and create more personalized PPIs.

Chat Bot Assistant to Assist Client in Understanding Bank Policies and Benefits More Thoroughly



1. We use **collaborative filtering based recommender system** to bypass the overhead of content generation for similar clients.
2. **PPIs** of individual clients are used to **personalize their profiles**.
3. Collaborative filtering models can recommend an item to client A based on the interests of a client user B.



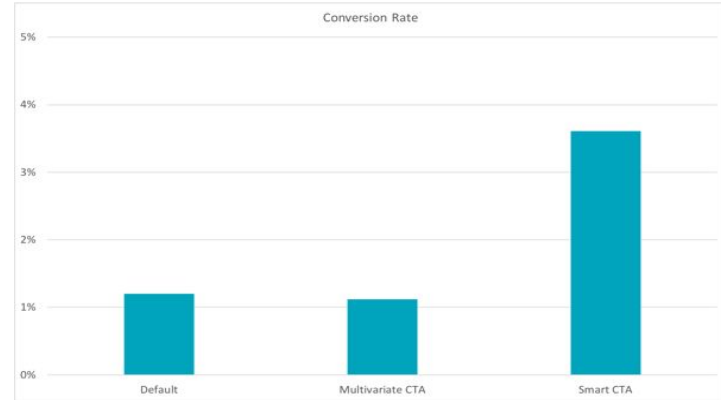
KEY DIFFERENTIATORS AND ADOPTION PLAN

1. **Comprehensive Personalization:** Unlike other banks, our solution generates personalized content for marketing, financial, and investment education, tailored to each customer's unique profile.
2. **Multi-Format Content Creation:** We auto-generate engaging shorts/reels, image banners, and textual content to enhance customer interaction and engagement across various platforms.
3. **Fraud Awareness Campaigns:** Our system creates informative content to educate customers about potential fraud schemes, helping to protect their financial well-being.
4. **Data-Driven Insights:** By leveraging customer transaction history and KYC data, we deliver highly relevant and personalized content that resonates with individual customer needs and preferences.
5. **Financial Tracking and Management:** Our solution assists customers in tracking their income, expenses, investments, and savings, providing a comprehensive view of their financial health and aiding in better financial planning.
6. **Policy and Investment Education:** We provide personalized investment tips, and explain our policies to our customers, so they can make informed decisions and optimize their financial growth.

BUSINESS POTENTIAL AND RELEVANCE (1/2)

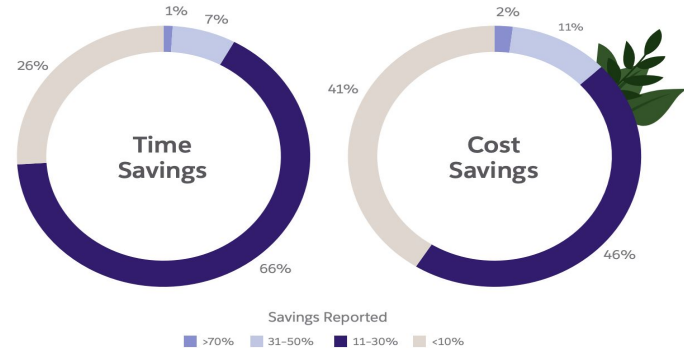
HIGHER CONVERSION RATES

Targeted marketing messages improve conversion rates by 202%, leading to a 10-15% increase in revenue from existing customers (Source: [HubSpot, Boston Consulting Group](#)).



OPERATIONAL EFFICIENCY

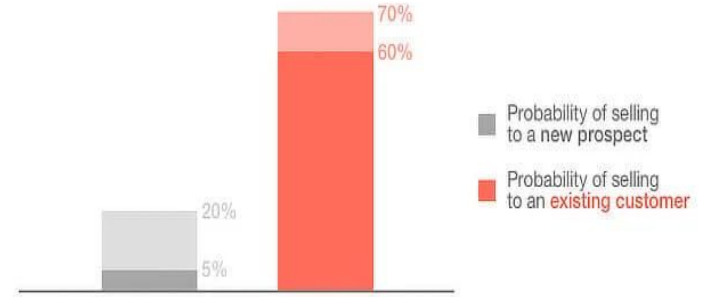
As manual personalization tasks shift from human to machine, employees have more time for strategic work. In fact, nearly 75% see time savings equivalent to at least four hours per 40-hour week (Source: [Salesforce](#)).



BUSINESS POTENTIAL AND RELEVANCE (2/2)

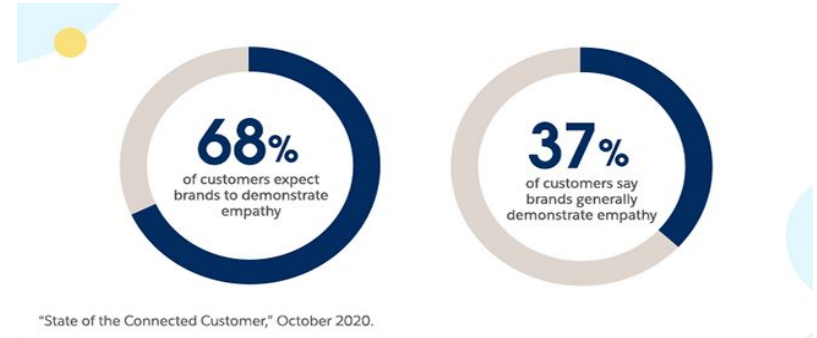
REVENUE GROWTH OPPORTUNITIES

The statistics show that the likelihood of selling to a new prospect is somewhere between 5 and 20 percent, while the probability of selling to an existing customer is 60 to 70 percent. (Source : leadfeeder)



CUSTOMERS EXPECT PERSONALIZATION

52% of customers expect offers to always be personalised – up from 49% in 2019 while 66% of customers expect companies to understand their unique needs and expectations, yet 66% say they're generally treated like numbers (Source: Salesforce)



UNIQUENESS OF SOLUTION AND APPROACH

DEEP PERSONALIZATION WITH PPI AND PRI

Personalized Prior Information (PPI): Utilizes detailed client metadata (age, gender, location), account summaries, activity logs, and account settings to inform content generation. Use of Personalized Retrieved Information (PRI) gathers tailored information across different banking services (accounts, loans, insurance).

Multi-Modal Content Generation

Combining Text-generation and Image-generation capabilities create comprehensive and visually appealing content ensuring high engagement. Interactive summaries and short videos make financial information more accessible and engaging for users.

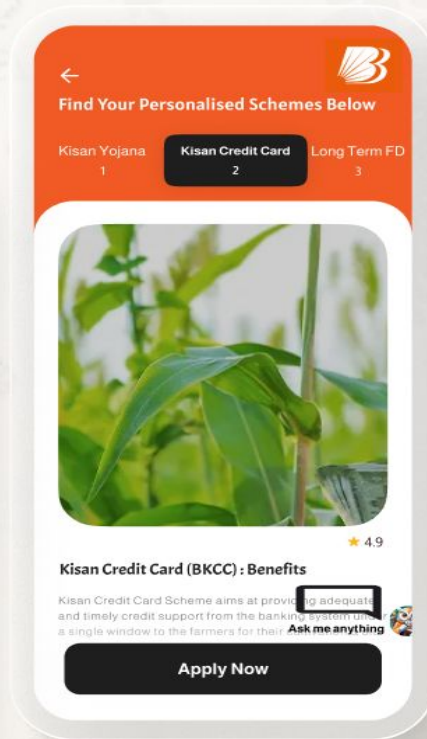
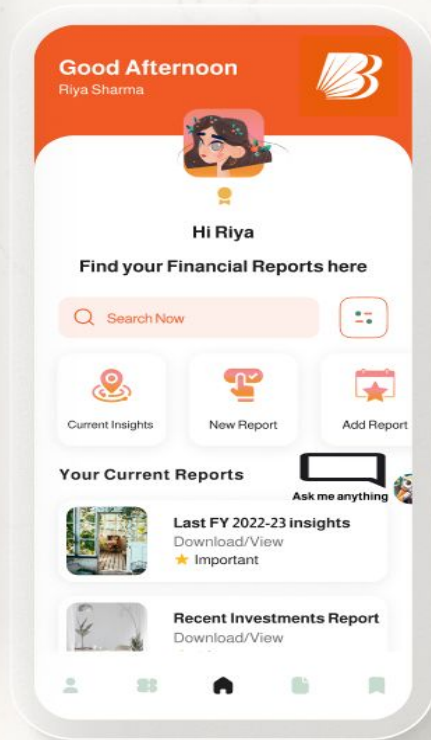
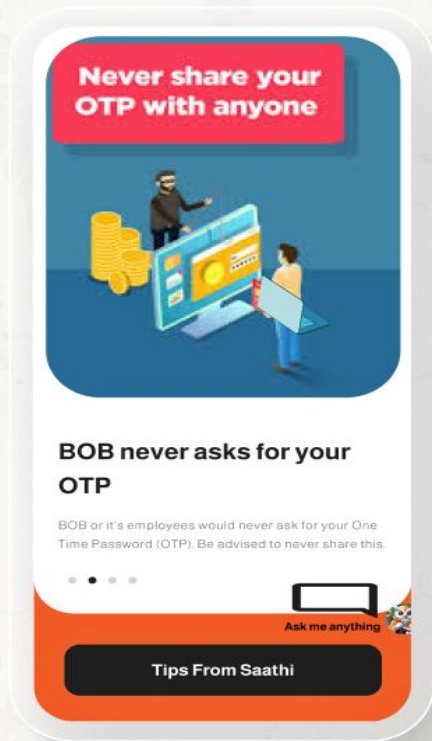
Seamless Integration and Delivery

Integrating translation APIs and voice support ensures the generated content is accessible to a diverse customer base in multiple languages while omnichannel delivery delivers personalized content directly to users via their net banking dashboard, email, and WhatsApp feeds, ensuring timely and convenient access.

ROBUST INFRASTRUCTURE

Azure Integration: Leverages Azure's robust data management and security infrastructure, ensuring that customer data is handled securely and efficiently. **RAG (Retrieve, Augment, Generate) Framework:** Ensures that all generated content is relevant, accurate, and up-to-date by continuously retrieving and integrating the latest customer and financial data.

USER EXPERIENCE



SCALABILITY

COLLABORATIVE FILTERING

To tackle an increasing number of users, the concept of collaborative filtering will be used. If marketing content has been generated for one user, the same content will be shown to similar users. This will avoid generation overhead.

ASYNCHRONOUS COUPLING

All internal services will be asynchronously coupled using Azure Service Bus message queues, this will allow all components to be scaled independently without hard coupling.

DYNAMIC DOCUMENT NODES

Since the RAG pipeline is used to moderate the generation of PRI, we can add and delete any number of document nodes according to their current relevance

MULTITHREADED SERVER

We use a multithreaded Flask server to allow multiple users to access the server at the same time.

EASE OF DEPLOYMENT AND MAINTENANCE



Azure Container Registry

STAGE 1

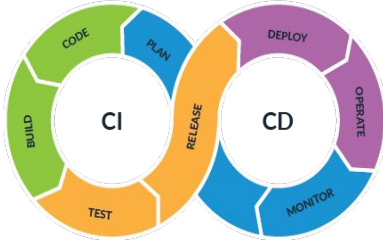
The backend code along with all related dependencies will be packaged as docker images published on **Azure Container Registry (ACR)**.

STAGE 2

The images will be deployed on **Azure Kubernetes Service (AKS)**.



STAGE 3



A **CI/CD** pipeline will be setup such that any pull request (PR) to the main repo that is merged will trigger a redeployment of the code after executing unit and integration tests.

SECURITY CONSIDERATIONS



1. No personally identifiable information (PII) like **PAN number**, **KYC information**, **transaction history** is used for generating personalized recommendations, i.e. OpenAI or Azure doesn't get access to BOB in-house data.
2. For example if a person from the village wants to take loans, the specific name, location or loan history is not passed, only the information that the person is from a village and wants to take loan is passed to OpenAI.
3. We have handled **hallucinations** so that the numbers and advice are ensured to not be wrong as we are using **RAG and agentic paradigm** to achieve more explainability.
4. **Azure Key Vault** is used to storing access keys securely.

Thank You

Kabir Raj Singh: <https://github.com/kabirrajsingh>

Anannyo Dey: <https://github.com/SirArthur7>

Debasmit Roy : <https://github.com/DEBASMITROY2002>

Aditya Ganguly : <https://github.com/the-chosen-wan>

Organization: <https://github.com/BOBHackathon2024>