# Bank of Baroda Hackathon 2024

Your Team Name : Mule

Your team BIO : Students Pursuing final year at
B.Tech Artificial Intelligence And Data Science.

Date : 27-06-2024

Digital and Beyond
ID8NXT

बैंक ऑफ़ बड़ौदा
Bank of Baroda

In partnership with
Microsoft Azure

# Problem Statement?

## Challenge 2 - Risk Management

- The banking sector is highly vulnerable to a multitude of risks, leading to significant financial losses, regulatory fines, and reputational damage.
  In 2022 alone, bank clients lost **$8.8 billion to various fraudulent activities.**
  The projected e-commerce loss due to online payment fraud is expected to **exceed $48 billion globally by 2024.**

- **On Personal side,** it was hard seeing our friend's brother being scammed by the social engineering attack, where his long savings worth in lakhs got vanished within minutes!

- As a result, **Our team "MULE" is destined to project a safe environment for the banking environment for gaining Banking reputation amongst the customers and Banks to run effectively with their planned annual budget.**

- **On the Customer Side** providing a ***WhatsApp Bot for Fraudulent Activities*** and Regular Customer Service in a NLP help them mitigating from fraud transactions

- **On the Bank Side** - ***SaaS Software for Risk Analysis*** this software will provide banks with an analytical dashboard displaying their current standing against active and potential risks across five categories: Credit Risk, Liability Risk, Operational Risk, Liquidity Risk, and Reputational Risk. The dashboard will feature a prompt interface, allowing banks to extract desired insights quickly and efficiently.

# Pre-Requisite

What are the alternatives/competitive products for the problem you are solving?

The following are the companies whose products made **Gartner** address them as **Leaders** and **Challengers** in the ERM field,

1. LogicManager **(ERM)**
2. Dell's RSA (Transaction Monitoring System)
3. Archer **(ERM)**
4. MetricStream **(GRC)**
5. Diligent **(ERM)**
6. SAI 360/ BWise **(GRC)**
7. Navex **(GRC)**

**All of the above products offer risk reporting and monitoring features which our solution aims to solve with a custom-built Agent interaction mechanism.**

# Tools or resources

Azure tools or resources which are likely to be used by you for the prototype, if your idea gets selected

Microsoft Azure Cognitive Services

Sentiment Analysis

Whisper

Voice Recognition

Azure Databricks

Azure SQL

Database

Azure Log Analytics

Azure Monitor

Monitoring

OpenAI

We make use the following services from Azure - Open AI

- Azure NLP
- Azure AI Document Intelligence
- Azure AI Search
- Azure Machine Learning

Frontend & Framework tools

HTML

CSS

django

# Any Supporting Functional Documents

## Customer Side - BOBcon
## (A WhatsApp Bot for Fraud Analysis)

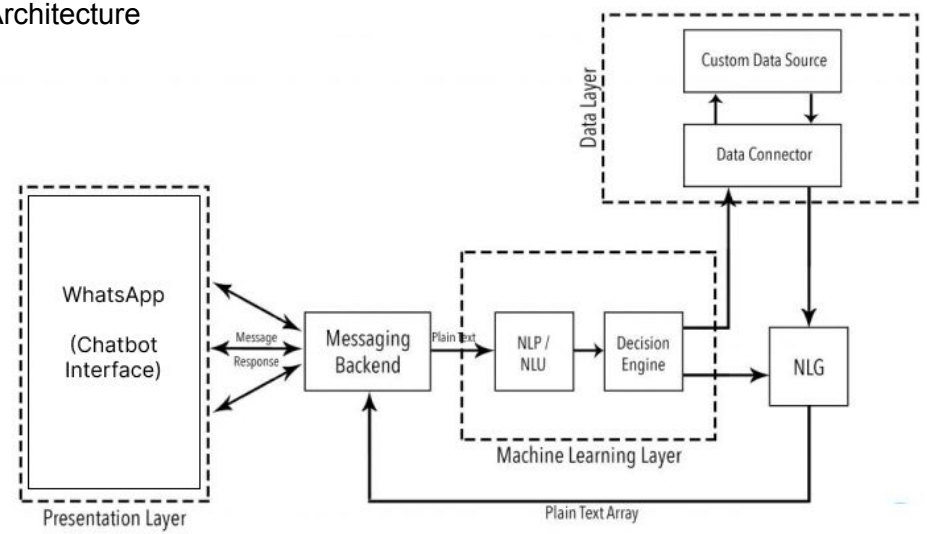
**Major Problem:** Users need a reliable and fast way to report and get help with suspicious activities.

**Solution:** Implement a WhatsApp chatbot to assist users with real-time queries related to fraudulent activities.

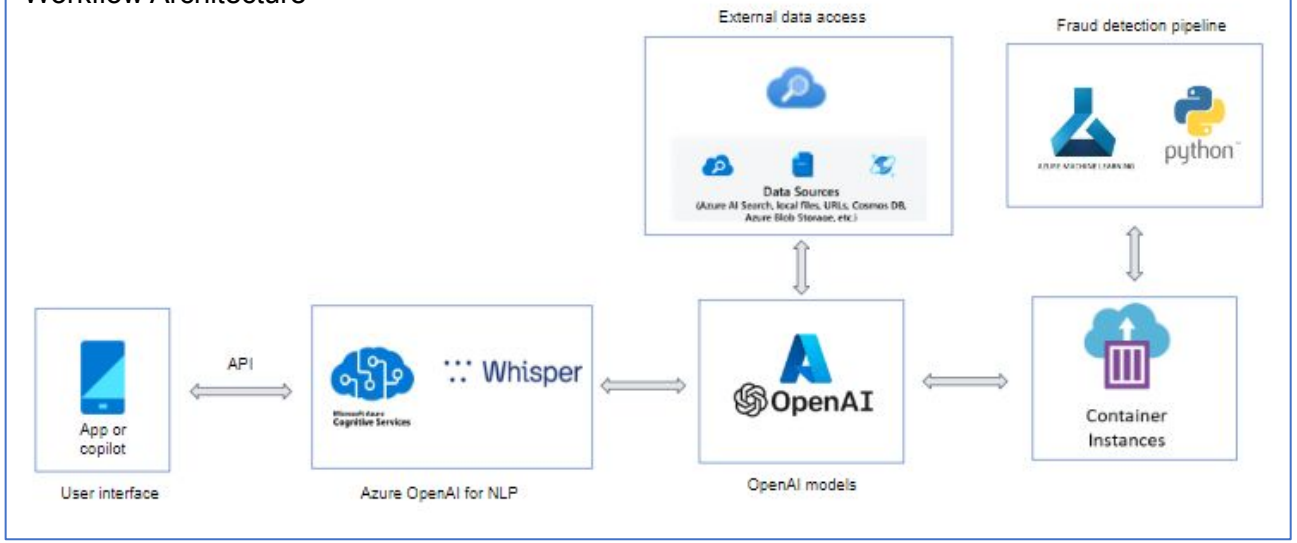
**Working:**

- User shares details of suspicious activity via WhatsApp.
- The bot uses NLP to understand user queries.
- The bot utilizes web scraping, app scraping, phishing link detection, and reverse engineering techniques to detect fraud apps, spam calls, and phishing activities.
- The bot will serve as a quick and reliable assistant, helping consumers understand financial transactions and terms, such as mortgage agreements.

General Architecture



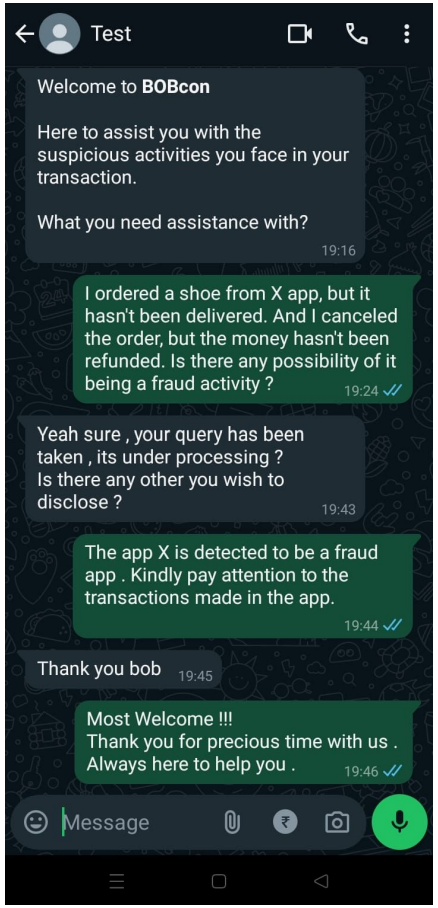

Workflow Architecture



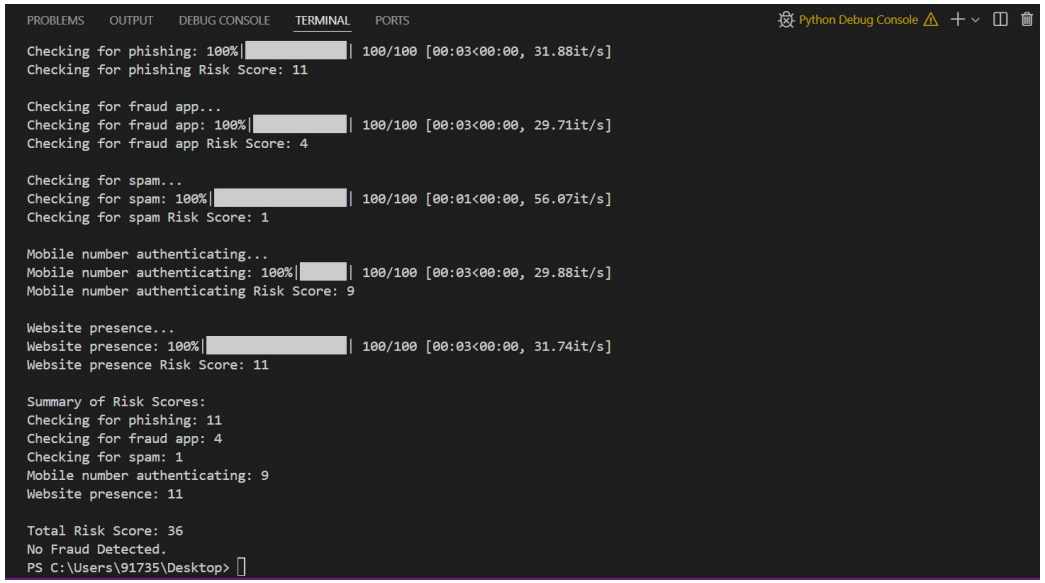
## Prototype

# WhatsApp Bot for detecting Fraudulent Activities

user




Chat interface (whatsapp)



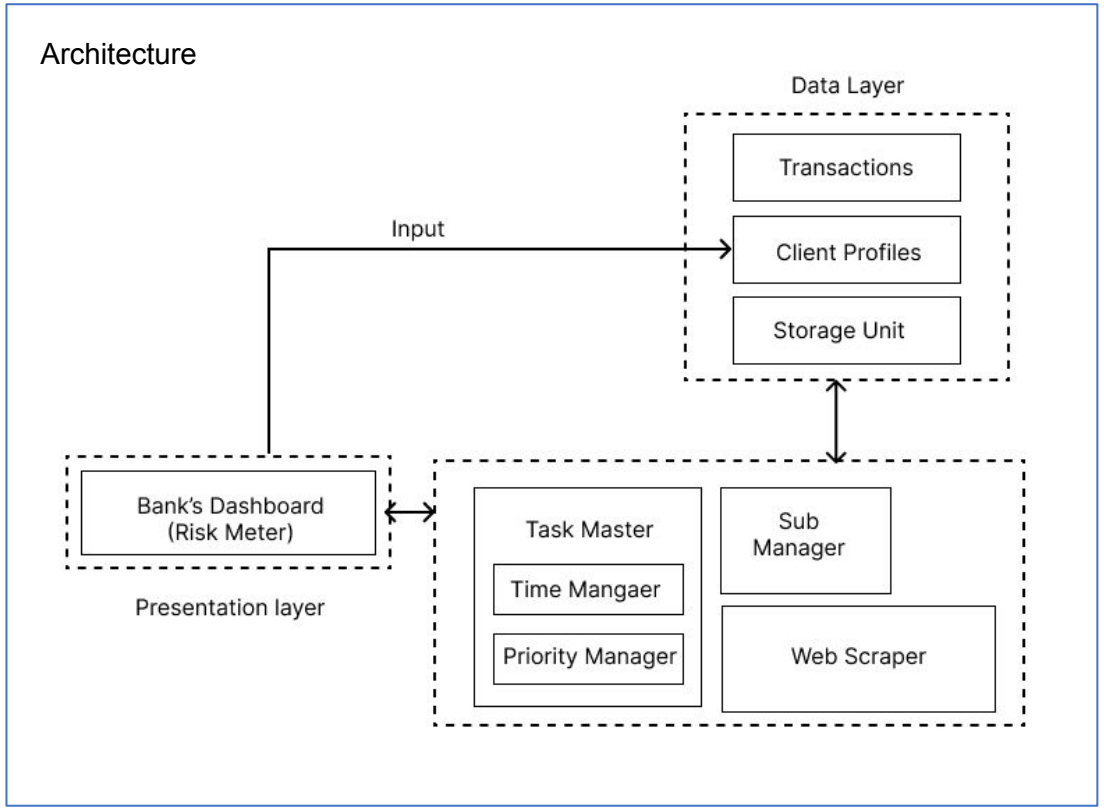

*Fraud detection with ML pipeline

# Bank Side - A SaaS Software for Risk Analysis

**Major Problem:** Banks need to analyze large datasets to identify potential risks and anomalies in real-time, provide predictive insights for various types of risks, and generate actionable risk mitigation strategies.

**Solution:**

- A SaaS software that integrates with cloud services to analyze large datasets, offering insights into the bank's risk profile.
- This software will provide banks with an analytical dashboard displaying their current standing against active and potential risks across five categories: Credit Risk, Liability Risk, Operational Risk, Liquidity Risk, and Reputational Risk.
- The dashboard will feature a prompt interface, allowing banks to extract desired insights quickly and efficiently.



# Key Differentiators

How is your solution better than alternatives

**Alternatives' solutions**

Use Manually coded instructions

Leading to

Compromise of performance in unforeseen scenarios

&

Requires active human supervision and waste of data potential

**Our solution**

A) Uses a context heavy design
B) Powered and operated by Agents
C) LAM integrated for web scraping and understanding the problem

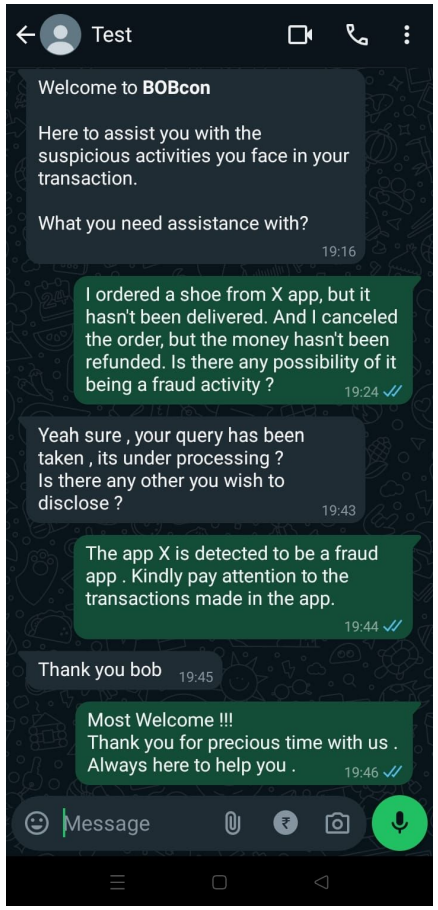
Leading to

A. System understanding the problem in a much more intuitive manner
B. By building a holistic view of the root cause and its effect
C. And using it to run a sandbox simulation and thereby maximizing the utilization of the available data

# GitHub Repository Link & supporting diagrams, screenshots, if any

## Customer Side - WhatsApp Bot for Fraudulent Activities

*Sample interaction between the bot and the user

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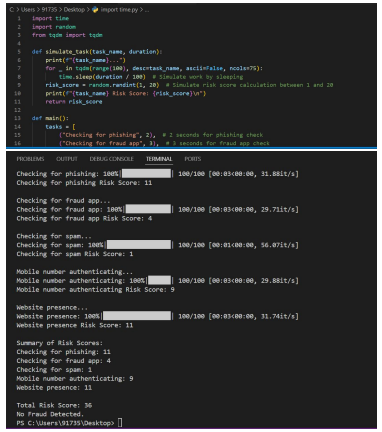
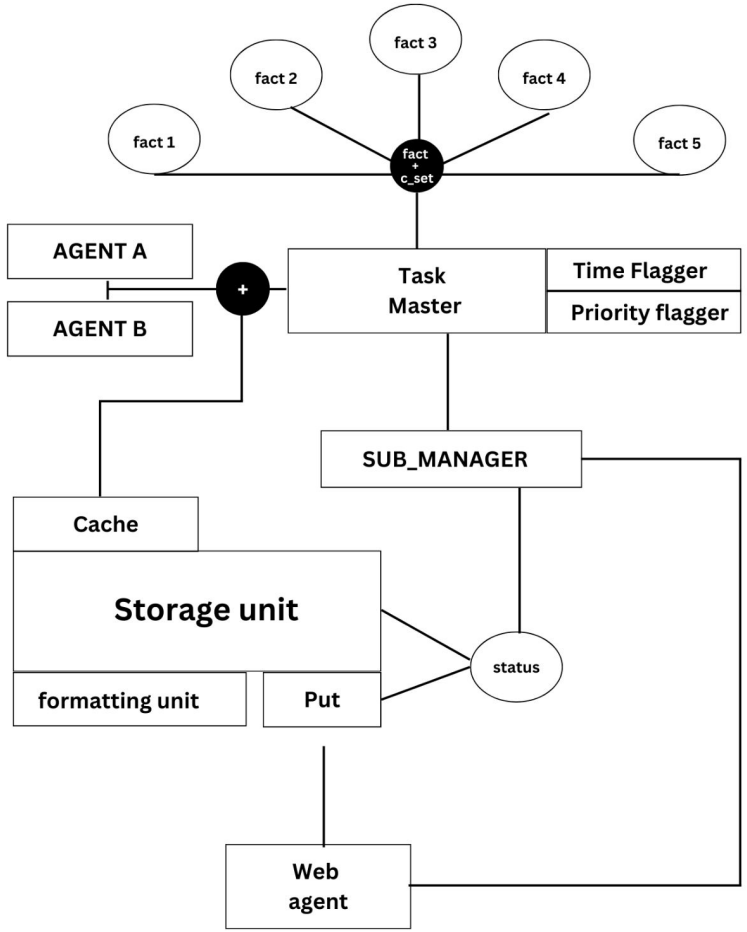


## Bank Side - SaaS Software for Risk Analysis




GitHub Repo : https://github.com/Dhanushprasana

# Business Potential and Relevance

What are the business applications of the problem you are solving?

### Fraud Detection and Prevention:

- **Customer Protection:** A WhatsApp bot helps protect customers from scams, enhancing trust and loyalty.

### Risk Management:

- **Predictive Analytics:** AI models predict risks, allowing preemptive measures.

### Financial Performance:

- **Cost Reduction:** Preventing fraud and managing risks reduces financial losses.
- **Enhanced Creditworthiness:** Effective risk management improves the bank's creditworthiness

### Market Competitiveness:

- **Innovative Services:** Advanced fraud detection and risk management attract tech-savvy customers.

### Strategic Risk Mitigation:

- **Comprehensive Analysis:** The five-category risk analysis provides a holistic view for strategic planning.

### Customer Relationship Management:

- **Improved Experience:** The bot provides timely information, enhancing customer satisfaction.
- **Building Trust:** Proactive risk management builds customer trust.

# Uniqueness of Approach and Solution

What is the unique aspects of the proposed idea?

**Aspects in terms of usability**

- The solution is designed to cater the risk needs for **both banks and their customers**.
- Scalability is one of the prominent design influences for this solution to make the product greatly **adaptive to increased work loads**.
- The solution uses a **sophisticated and intuitive NLP** unit that can be inputted with both voice and text.
- The Banks are given a **analytical dashboard** that shows their current standing against active and **potential risks in five categories** with a prompt interface for extracting desired insights respective to the desired view.
- The Customers are given a multimodal **chatbot** that can assess customer queries by understanding the context of their concerns or doubts and **assist in risk mitigation**

**Aspects in terms of mechanics**

Uses a Multi-Agent architecture with **LAM integration**:

The solution makes use of multiple agents with predefined functionalities to,

1. Improved operational efficiency through **load balancing** and **priority queue mechanics**,
2. Ease of management and usage through **natural language prompts**,
3. Enhanced fault tolerance through real time **agent tracking systems**,

Has a web agent to scrape the necessary information to build up inferences for understanding the problem and its impact.

# User Experience

How will your idea enhance the user experience?

**Proactive Fraud Detection**

- Users benefit from real-time monitoring and alerts for fraudulent activities, enhancing their sense of security and trust.

**Quick and Timely Feedback**

- The bot swiftly analyzes suspicious activities and provides users with timely feedback, ensuring prompt action and reassurance.

**Daily Use Communication Medium**

- By integrating with WhatsApp, the solution offers real-time customer support for fraud detection through a platform users interact with daily.

**Awareness and Prevention**

- The bot actively detects fraudulent activities and alerts users, helping them stay informed and protected against potential threats.

**Proactive Measures**

- Bank benefits from detailed insights and recommendations, empowering them to take proactive measures.

# Scalability

How effectively can your solution be scaled to accommodate growth without compromising performance?

**Core Mechanic:**

- **Extending chatbot service to a copilot** real-time monitoring spam calls , msgs , chats , phishing , fraud app installation

- **Scalability is one of the prominent design influences for this solution** and therefore **our core mechanic revolves around it** (.i.e)
  **Large Agentic Model and task-flow design**
  The LAM mechanism is used to break a complex tasks into a set of simple tasks and does two key things
  Flagging it with the time it takes to solve it.
  Defining a priority queue by understanding the problem and its impact
- It has a customizable throughput (which can be predefined) that changes based on the available flags it carries the tasks in the priority queue
- The task-flow design is used to provide a transparent view of what the agent does to the user and to the agent itself so it stays on track to avoid unnecessary wastage of efforts.

**To Summarize:**

- The solution can handle increased work loads by understanding the core cause of each task and its impact on the overall operations to break it into smaller quickly doable tasks.
- And Real-time monitoring of fraud activities.

# Ease of Deployment and Maintenance

- The solution uses agents with pre defined functionalities to optimally carry out the risk analysing operations.
- **Azure App services** manages *deployment* of webapps , APIs in a secure environment.
- Using a *task-flow design* **(Azure Logic Apps)** the users(bank end) can see as well as *define tasks* and their order for the agent
- The solution ultimately can be served as a *container* with the help of **Azure Container Instances** thus, eliminating the need for pre-requisites and will be highly optimized and ready to run
- Use of **Azure's elastic cloud** capabilities to automatically scale resources to *manage increased numbers of users*, ensuring consistent performance and availability.

# Security Considerations

- ➔ Strictly adhering to the regulatory compliances (Banking Regulation Act & G.D.P.R.)
- ➔ Data Assessing Operations require End-to-End encryption.
- ➔ Use of Azure tool ensures data and software security
  - ➔ **Azure SQL Database:** Use TDE for data encryption at rest.
  - ➔ **Azure Key Vault:** Securely manage keys, secrets, and certificates.
  - ➔ **Azure Blob Storage:** Encrypt data at rest and in transit.
- ➔ A Zero Trust Architecture is supported to give only the necessary permissions.
  - ➔ **Azure Active Directory (AAD):** Centralize identity management and authentication.
  - ➔ **Azure AD B2C:** Manage customer identities securely.
- ➔ Continuous security monitoring and threat detection.
- ➔ **Azure** makes use of **responsabile AI** for generative contents , ensuring ethical concerns

# Thank You

## Team Mule

1) Dhanush V
2) Francis Sharon J
3) Soorya Narayanan V
4) Sabarish