Smart Customer Service with AI

Bank of Baroda Hackathon 2024

Team Name: icanseeyou

Team Bio : Pioneers of driving change in the banking sector.

Date :30 June 2024

Digital and Beyond ID8NXT

बैंक ऑफ़ बड़ौदा Bank of Baroda

In partnership with Microsoft Azure

Problem Statement?

Why did you decide to solve this Problem statement?

The main purpose of choosing this problem is that we believe **customers are the heart and soul** of any organization. It is our duty to satisfy our customers, providing them with ease and comfort so they can enjoy the bank's services without any problems.
According to a study, In the past year, **25% of customers switched banks**, with **39% citing poor customer service** as the reason.
Customers want to feel their needs come first, and banks that deliver on this will come out on top.

1) What is the **purpose of banking applications** if all the tasks done by it can be performed in bank?

So the main reason for having the banking application is to have the ease with which they can enjoy the services provided by bank without visiting the bank. This is the age of AI, and incorporating AI with banking applications will help users enjoy the services more efficiently.
Further, Salesforce research found that 63% of service professionals say generative AI will help them serve customers faster, saving them over four hours weekly (or nearly one month per year).

2) What the **traditional banking applications lack**?

The user has to figure it out that which services are offered by the bank or whenever they are facing any issue they try to get its solution from web or other sources which sometimes compromise data integrity of the user.

What we are suggesting is the idea to incorporate AI within the banking application to **get the user all the solutions** to their problem in just a click.

Pre-Requisite

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

Bank of Baroda's current AI assistant, **ADI,** helps by suggesting relevant documents, but users still need to read through these to find answers. Our project aims to **enhance ADI** by providing direct, interactive solutions, making customer support more efficient and user-friendly.

Competitive products in market :

- **HDFC Bank:** HDFC Bank uses **Eva**, an AI-powered chatbot, to handle customer queries. Eva can provide information on products and services, assist with banking transactions, and guide customers through various processes.

- **ICICI Bank:** ICICI Bank has **iPal**, an AI chatbot designed to answer customer inquiries. It offers product information, resolves queries, and performs banking transactions.

- **SBI (State Bank of India):** SBI uses **SIA**, an AI chatbot, to enhance customer experience by providing instant responses to customer inquiries about banking products, services, and transactions.

Tools or resources

Azure OpenAI Service:

1. **GPT-4** : For natural language processing (NLP), language translation, generating personalized financial advice, analysing patterns for fraud detection, understanding and classifying customer queries and complaints, and sentiment analysis.
2. **Embeddings** : To convert text into numerical vector form to facilitate text similarity in vector database.
3. **Whisper** and **Azure AI Speech**: speech to text and text to speech efficient conversion

Azure Kubernetes Service(AKS): For scaling and load balancing

Other Relevant Tech Stack:

1. **Bhasini AI** : Indian government DPI, DPG initiative, to provide multilingual support
2. **LangChain** : RAG framework to effectively build applications using large language models
3. **PineCone**: Vector Database to store data as embeddings and effective search
4. **MongoDB**: Database for all users

Frontend: Reactjs for web application and React Native for App development

Backend : Django framework

Any Supporting Functional Documents

Present your solution, talk about methodology, architecture & scalability

The AI agent will perform several key functions to address user needs efficiently:

- **User Issue Resolution:** The AI agent will handle a wide range of user issues, including providing information about investments, changing UPI pins, and guiding users through the process of applying for loans.

Process: Users can enter their issue as a prompt, and the AI agent will provide a solution based on the query.

- **Escalation and Classification:** If the user is not satisfied with the solution provided by the AI agent, the agent will classify the issue and automatically forward it to the respective customer care department.

Process: The user will need to verify their identity to ensure data integrity and privacy. User feedback will be updated in the RAG database to improve future responses to similar queries.

- **Multilingual AI Call Services:** The AI agent will support call services in 18 Indian languages, enabling users to interact comfortably in their native language.

Process: This feature ensures inclusivity and accessibility for users who may not be able to read or write in English.

- **Fraud Detection and Reporting:** The AI agent will transcribe and translate native language speech and text, summarize events, identify and analyse potential fraud, categorize it according to RBI (Reserve Bank of India) fraud classification guidelines, and help generate incident reports for cybercrime departments.

Process: The system will pre-fill parameters needed by the agencies and banks, allowing incidents to be submitted with just one click through automated API integration.

Key Differentiators & Adoption Plan

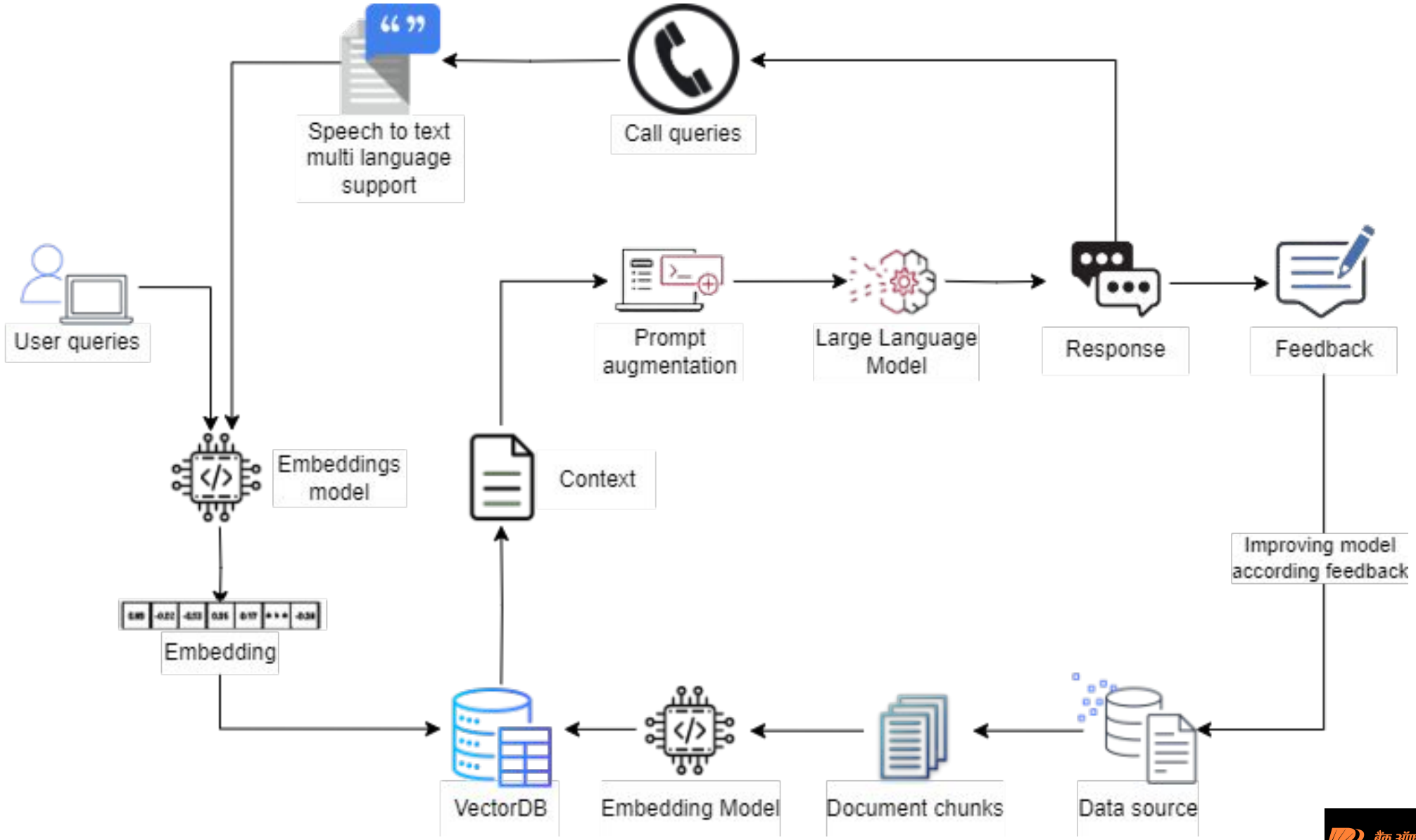
How is your solution better than alternatives and how do you plan to build adoption?

- **Proactive Support:** While existing solutions like ADI mainly provide document suggestions, our solution proactively addresses customer issues by offering direct solutions.
- **Personalization:** Our AI uses advanced models to tailor recommendations and solutions based on individual customer profiles and interaction history, ensuring highly personalized customer experiences.
- **Multi-Channel Integration:** Our AI assistant will integrate seamlessly across various channels such as mobile apps, websites and voice assistants, offering customers consistent and accessible support wherever they are.
- **Enhanced Security:** Incorporating Azure OpenAI services, our solution features advanced security mechanisms including real-time fraud detection and adaptive authentication processes.

Adoption techniques:

- Ensure a smooth transition by integrating the new features with existing systems, minimizing disruptions and maintaining a consistent user experience.
- Implement a feedback loop where users can provide input on their experience, allowing for continuous improvement and adaptation of the AI assistant based on real user needs and preferences.

Architecture Diagram



Business Potential and Relevance

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

1)**Enhanced Customer Service Efficiency**
According to a study by IBM, businesses spend over $1.3 trillion on 265 billion customer service calls each year. Automating responses to common queries can reduce these costs by up to 30%.

2) **Improved Customer Retention and Loyalty**
A report by PWC indicates that 73% of consumers point to customer experience as an important factor in their purchasing decisions.

3) **Operational Cost Reduction**
McKinsey estimates that AI-driven customer service technologies can help businesses reduce operational costs by up to 40%.

4)**Increased Accessibility and Inclusivity**
According to the Census of India, there are 121 languages spoken by 10,000 or more people in India.

Uniqueness of Approach and Solution

What is the unique aspects of the proposed idea?

- **Comprehensive Multilingual Support:** This inclusivity ensures that users from diverse linguistic backgrounds can access and benefit from banking services without language barriers, which is particularly important in a multilingual country like India.

- **Seamless Integration Across Channels:** This provides a consistent and unified customer experience, allowing users to switch between different modes of communication effortlessly.

- **Real-time Issue Resolution:** The immediate response capability reduces waiting times and enhances customer satisfaction by providing quick and accurate resolutions.

- **Automated Escalation and Classification:** This streamlined escalation process ensures that unresolved issues are quickly addressed by the right team, maintaining high service standards and efficiency.

- **Advanced Fraud Detection and Reporting:** This proactive approach to fraud detection and compliance enhances security and trust, providing robust protection for both the bank and its customers.

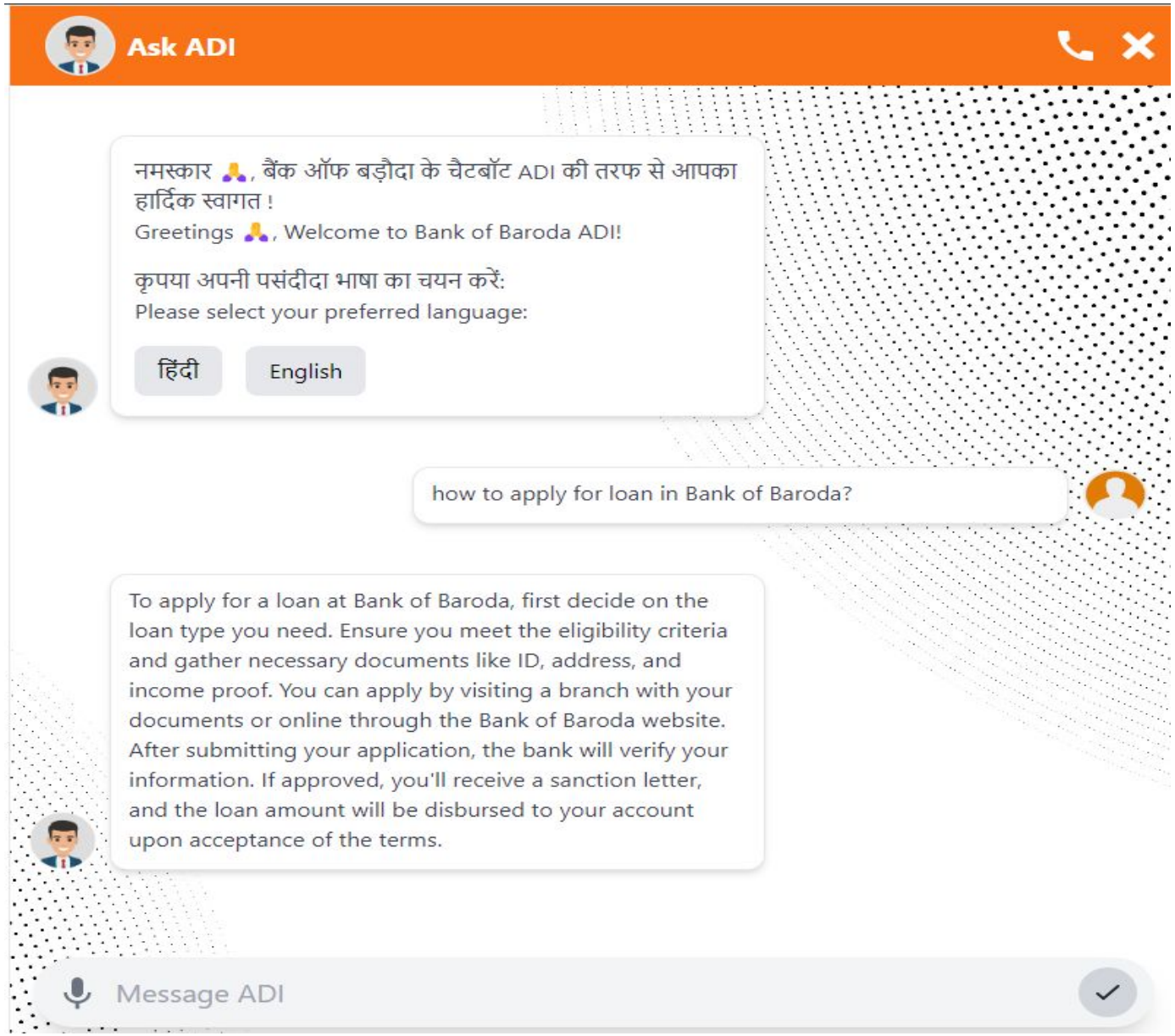
- **Continuous Improvement Through Feedback:** This adaptive learning mechanism ensures that the AI agent evolves and becomes more accurate over time, enhancing its effectiveness and user satisfaction.

- **End-to-End Data Privacy and Security:** This focus on security builds user trust by safeguarding sensitive information and complying with data protection regulations.

User Experience

How will your idea enhance the user experience?

The AI agent will improve user experience by providing quick and accurate help in 18 Indian languages, making it easy for everyone to get support. It will automatically forward complex issues to the right department and ensure your data is safe. Continuous updates based on feedback will make the service even better over time.



Scalability

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

Use of hybrid model : Combine rule-based and machine learning models to reduce the load on the generative models. Use rule-based models for common queries and generative models for more complex interactions.
Use **AKS Services** for the scaling the features .

Automatic Scaling:

- Cluster Autoscaler: AKS can automatically adjust the number of nodes in your cluster based on the resource needs. If your chatbot experiences increased traffic, the cluster autoscaler can add more nodes to handle the load.
- Horizontal Pod Autoscaler (HPA): This automatically scales the number of pods in a deployment or replica set based on observed CPU utilization, memory usage, or custom metrics. This ensures your chatbot can handle varying loads efficiently.

Load Balancing:

- AKS provides integrated load balancing to distribute incoming traffic across multiple pods. Azure Load Balancer or Azure Application Gateway can be used to route traffic efficiently and ensure high availability.

High Availability:

- AKS ensures high availability by spreading your application pods across multiple nodes and, if configured, across multiple availability zones. This redundancy helps maintain service continuity in case of hardware failures.

Resource Optimization:

- Virtual Nodes: AKS can use Azure Container Instances (ACI) to create virtual nodes. This allows for burst workloads without managing additional Kubernetes nodes directly.
- Node Pools: You can create multiple node pools within a single AKS cluster, each tailored to specific workloads. This allows for fine-grained resource allocation and scaling.

Ease of Deployment and Maintenance

How simple is your solution to implement and maintain on an ongoing basis?

- **Scalable Architecture Using AKS**: AKS services like Cluster Autoscaler and Horizontal Pod Autoscaler (HPA) dynamically manage resources, minimizing the need for continuous manual adjustments.
- **Resource Optimization**: Features like virtual nodes and node pools in AKS allow for fine-grained resource allocation and scaling. This flexibility in resource management simplifies ongoing maintenance
- **Comprehensive Tech Stack**: Utilizing robust technologies like GPT-4, Whisper, Azure AI Speech, Bhasini AI, LangChain, PineCone, MongoDB, React.js, React Native, and Django ensures a solid foundation for both web and mobile applications. These well-supported technologies provide extensive documentation, community support, and regular updates, making maintenance straightforward and ensuring the solution remains up-to-date and secure.
- **Integrated Scaling and Resource Management**: AKS's integration with Azure Container Instances (ACI) reduces the complexity of managing additional Kubernetes nodes directly, streamlining ongoing maintenance.

Security Considerations

What measures are incorporated to ensure the security and integrity of your solution?
Following are the issues that needs to be addressed

Data Leak Steps

- Poison: Poisoning involves the deliberate introduction of malicious data or code into a system to compromise its integrity or functionality. Attackers use this technique to corrupt data, alter the behavior of algorithms, or create vulnerabilities.
- ExFIL (Exfiltration): Exfiltration is the unauthorized transfer of data from a system. Attackers use various methods, such as malware, phishing, or exploiting vulnerabilities, to covertly extract sensitive information without detection.
- Leak: A leak refers to the unauthorized disclosure of confidential information. Once data is exfiltrated, it can be leaked through various channels like dark web forums, public websites, or by selling to third parties, causing significant harm to individuals or organizations.

To tackle the above issues following measures will be taken into account

Security Measures

- **Cryptography**: Cryptography involves the use of algorithms and protocols to encrypt data, ensuring that only authorized parties can access it. This measure protects data integrity and confidentiality, preventing unauthorized access and tampering.
- **Access Control**: Access control mechanisms regulate who can view or use resources in a computing environment. This involves authentication (verifying identity) and authorization (granting permissions) to ensure that only authorized users have access to sensitive data.
- **Monitoring**: Monitoring involves continuous surveillance of systems and networks to detect and respond to suspicious activities. It includes the use of tools and techniques like intrusion detection systems (IDS), log analysis, and real-time alerts to identify and mitigate potential threats.

Thank You

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