
CAPSTONE PROJECT

AI AGENT FOR DIGITAL FINANCIAL LITERACY USING RAG ON IBM CLOUD

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OUTLINE

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PROBLEM STATEMENT

With the increasing shift to digital finance, many individuals—especially from rural or less tech-savvy backgrounds—struggle to understand essential financial tools and avoid digital fraud. There's a critical need for an AI-based system that makes digital financial literacy accessible, reliable, multilingual, and culturally inclusive.

PROPOSED SOLUTION

- The proposed system is an AI-powered assistant integrated with RAG (Retrieval-Augmented Generation) architecture, hosted on IBM Cloud. It retrieves reliable and up-to-date information from trusted sources to help users improve their digital financial literacy in their preferred language.**Data Collection:**
 - Crawl and index content from trusted sources such as RBI, NPCI, banking portals, and financial literacy platforms. Ensure coverage of topics like UPI usage, online scam prevention, interest rates, and budgeting tips . Support multilingual data for wider accessibility. **Data Preprocessing:**
 - Clean and preprocess the collected data to handle missing values, outliers, and inconsistencies.
 - Feature engineering to extract relevant features from the data that might impact bike demand.
- **Machine Learning Algorithm:**
 - Use Retrieval-Augmented Generation (RAG) pipeline
 - The Model suggested is Granite-3.3-8B-Instruct because of it's capabilities like Thinking, Summarization, Text classification, Text extraction, Question-answering, Retrieval Augmented Generation (RAG) and many more.
- **Deployment:**
 - Develop a user-friendly interface, question-answer type interface of an AI agent that guides the users regarding their financial doubts and queries.
 - Deploy the solution on a scalable and reliable platform, considering factors like server infrastructure, response time, and user accessibility . The appropriate platform for this is IBM cloud.
- **Evaluation:**
 - Assess the model's performance using appropriate metrics such as Mean Absolute Error (MAE), Root Mean Squared Error (RMSE), or other relevant metrics.
 - Fine-tune the model based on feedback and continuous monitoring of prediction accuracy.
 - Result: A user friendly, context aware, multilingual and intelligent AI agent that answers the queries of the users related to digital finance tools like UPI, online safety, interest rates, budgeting, and personal finance—quickly and clearly

SYSTEM APPROACH

- FRAMEWORK-LANG GRAPH
- ARCHITECTURE-ReAct
- Tools for searching used by the agent-
 - Google search
 - DuckDuckGo search
 - Webcrawler
- MODEL- Granite-3.3-8B-Instruct
- DEPLOYMENT PLATFORM-IBM CLOUD

ALGORITHM & DEPLOYMENT

- **Algorithm Selection:**

- The chosen model for this AI agent is **Granite-3.3-8B-Instruct**, an 8-billion parameter large language model developed by IBM and trained using the **ReAct architecture** and **LangGraph framework**. It is specifically fine-tuned for instruction-following, multilingual dialogue, reasoning, and Retrieval-Augmented Generation (RAG) tasks.

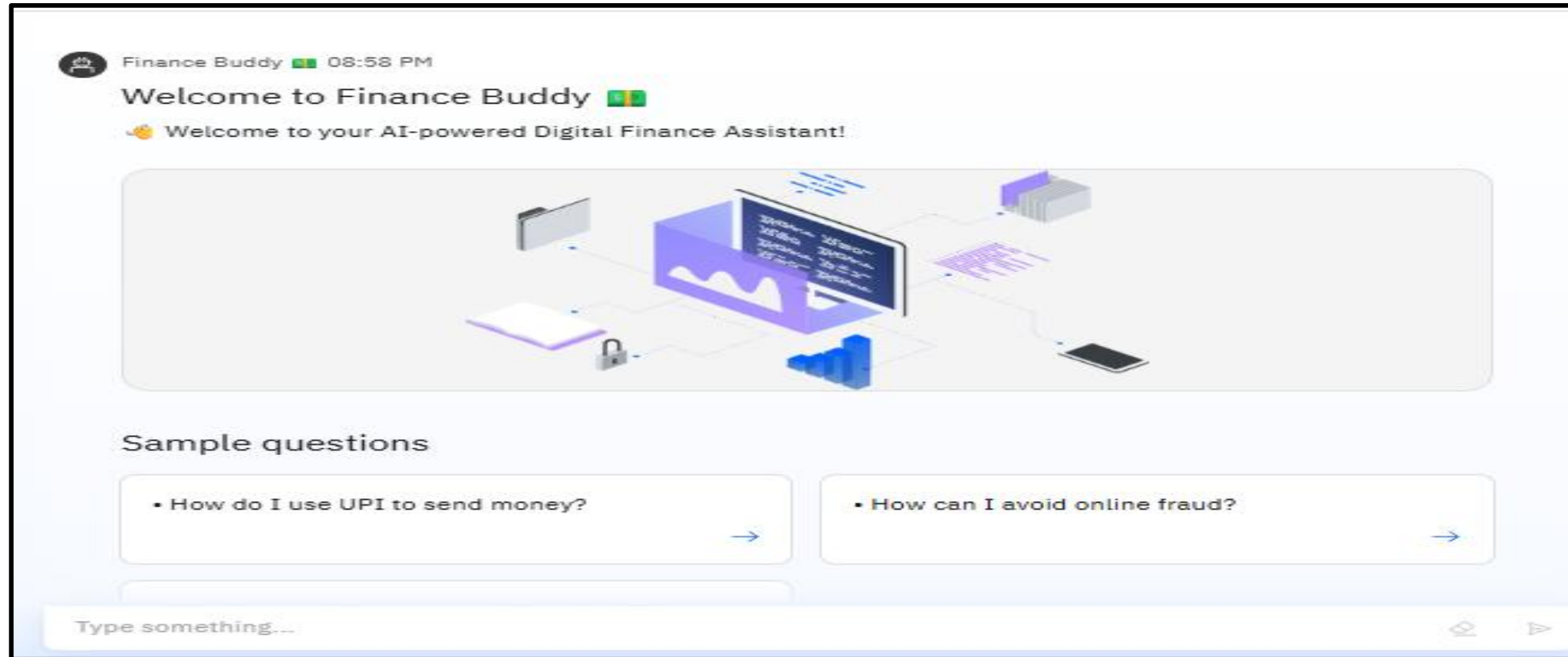
- **Training Process:**

Training Data: Overall, our training data is largely comprised of two key sources: (1) publicly available datasets with permissive license, (2) internal synthetically generated data targeted to enhance reasoning capabilities. We train Granite-3.3-8B-Instruct using IBM's super computing cluster, Blue Vela, which is outfitted with NVIDIA H100 GPUs. This cluster provides a scalable and efficient infrastructure for training our models over thousands of GPUs.

- **Prediction Process:**

- The AI agent performs web search relevant to the user's query using the tools specified by the creator of the agent and then responds in a simple step by step guidance manner.

RESULT



OUTPUT AI AGENT INTERFACE ALONG WITH INITIAL BUTTON-TYPE SAMPLE QUESTIONS

RESULT



You: 09:02 PM

• How do I use UPI to send money?



Finance Buddy 09:02 PM

To send money using UPI (Unified Payments Interface), follow these steps:

1. Open your preferred UPI app (like Google Pay, PhonePe, Paytm, etc.) on your smartphone.
2. Login to your account using your registered mobile number and PIN.
3. Select the 'Pay' or 'Send Money' option.
4. Enter the VPA (Virtual Payment Address) of the recipient or select them from your contact list. The VPA is a unique identifier of the recipient, usually their email address or mobile number linked with their UPI app.
5. Enter the amount you want to send.
6. Enter a note if you wish (optional).
7. Confirm the transaction. You might need to authenticate the transaction using your UPI PIN or biometric authentication (fingerprint or face recognition).
8. You will receive a confirmation message once the transaction is successful.

Remember, UPI transactions are instant and do not charge any transaction fees.

For more detailed instructions, you can refer to the official UPI website or contact your bank.

UPI cha vapar kasha prakare karava?



Finance Buddy 09:03 PM

UPI (Unified Payments Interface) vadhile kasha prakarana karava tyaa taru, follow kare:

1. Smartphone-ye UPI app (Google Pay, PhonePe, Paytm, etc.) aheto vhata.
2. Vhaisat registra aheto, vhaisat PIN aheto, tyaaavalaa app-aalaa login kela.
3. 'Pay' or 'Send Money' aaplika vhata.
4. Recipient-aalaa VPA (Virtual Payment Address) tyaa aheto, aavajane aheto, ya phir contact list-aalaa recipient tyaa select kela. VPA recipient-aalaa unique identifier aheto, yaanche email address or mobile number aheto jo vhaisat app-aalaa registra aheto.
5. Transfer kela jaa vaat kelli amount.
6. Optional, note tyaa aheto.
7. Transaction confirm kela. Tyaa UPI PIN aheto, ya biometric authentication (fingerprint or face recognition) aheto, tyaaathi authentication vhaisato.
8. Transaction successful hoyto, vhaichi confirmation message aheta.

UPI transactions instant aheta aavajte, aavat keli fees naitat.

For more detailed instructions, you can refer to the official UPI website or contact your bank.

NORMAL REPLY OF THE AGENT TO A SAMPLE QUESTION

AGENT REPLYING IN MARATHI(MULTILINGUAL FUNCTIONALITY)

CONCLUSION

- In conclusion, the AI-powered digital finance assistant provides accessible, multilingual support to improve financial literacy across diverse user groups. By leveraging Retrieval-Augmented Generation and IBM Cloud services, it delivers accurate, trustworthy, and user-friendly responses. This solution empowers users to navigate digital finance with confidence, reducing risks of fraud and misinformation.

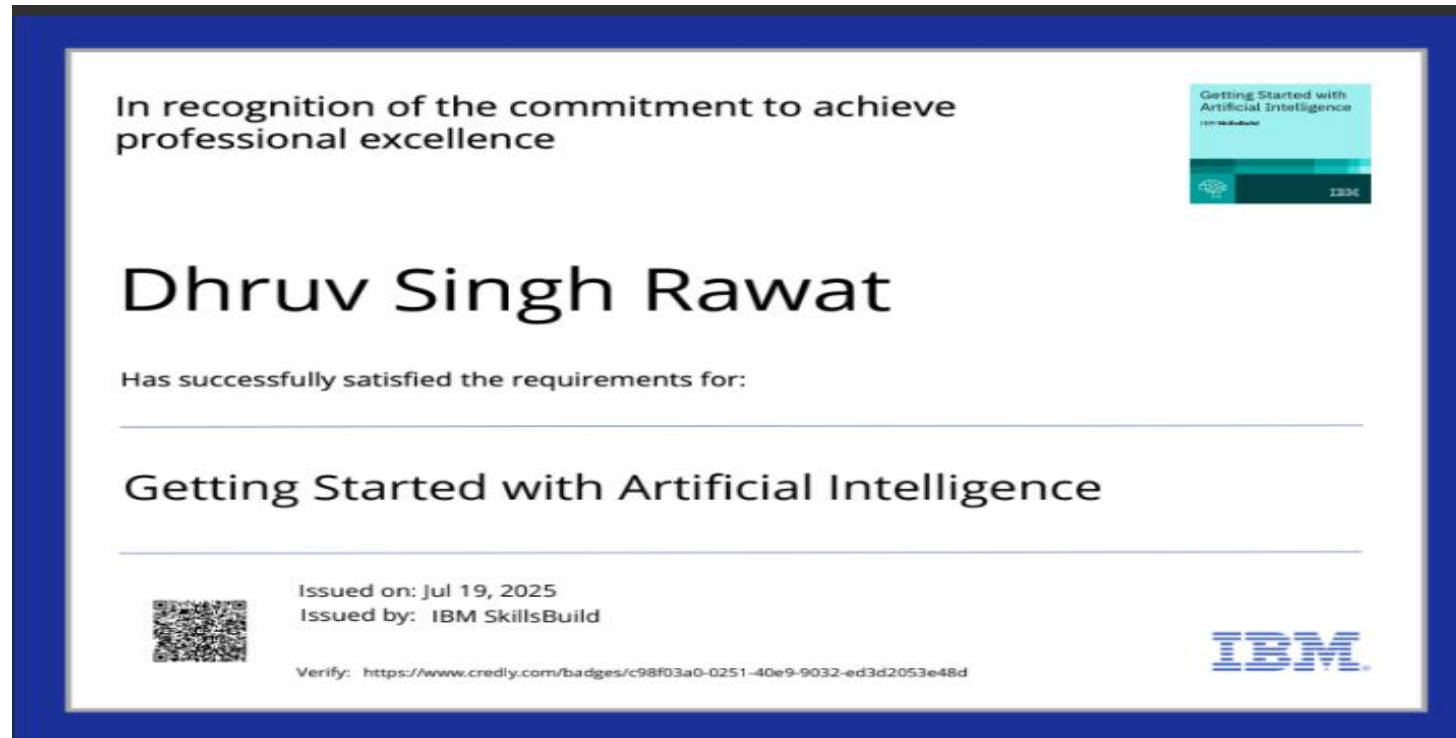
FUTURE SCOPE

- **Voice-based Interaction:** Integrate speech-to-text and text-to-speech systems for hands-free usage, especially beneficial for users with low literacy or visual impairments.
- **Support for More Regional Languages:** Expand multilingual capabilities to include Indian dialects and lesser-known regional languages for wider inclusivity.
- **Offline Accessibility:** Develop a lightweight mobile version with offline access to preloaded financial literacy content for users in low-connectivity areas.
- **Integration with Financial Institutions:** Collaborate with banks and government platforms to offer real-time support for digital services like UPI, KYC, or loan queries.
- **AI-Driven Personal Finance Coaching:** Evolve the assistant into a personalized advisor that can track user goals, spending patterns, and suggest budgeting tips or financial products.

REFERENCES

- IBM GRANITE- <https://www.ibm.com/granite/docs/>
- Agent Creation- <https://datapatform.cloud.ibm.com/docs/content/wsj/analyze-data/fm-agent-lab.html?context=wx&audience=wdp>
- RAG Pipeline- <https://docs.langchain.com>
- IBM Cloud Documentation- <https://cloud.ibm.com/docs>

IBM CERTIFICATIONS



- Screenshot/ credly certificate(getting started with AI)

IBM CERTIFICATIONS



- Screenshot/ credly certificate(Journey to Cloud)

IBM CERTIFICATIONS



- Screenshot/ credly certificate(RAG Lab)



THANK YOU