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# IBM AICTE PROJECT

## DIGITAL FINANCIAL LITERACY AI AGENT

Presented By

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# OUTLINE

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# PROBLEM STATEMENT

Many individuals, especially those from diverse linguistic and socio-economic backgrounds, struggle to access, understand, and navigate essential digital financial tools and practices. This leads to challenges in performing basic tasks like using UPI, recognizing online scams, budgeting, understanding interest rates, and accessing reliable financial information from trusted portals. The lack of accessible, multilingual, and personalized financial education increases the risk of fraud and hinders financial confidence and inclusion.

## Proposed Solution:

An AI Financial Literacy Agent powered by Retrieval-Augmented Generation (RAG) that helps users understand and utilize essential digital finance tools. It provides multilingual support and retrieves trustworthy content related to UPI, budgeting, loan interest, financial planning, and scam awareness from official sources. This AI-driven assistant delivers personalized, culturally relevant guidance to empower users, enhance digital financial literacy, reduce fraud risk, and promote financial inclusion.

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# TECHNOLOGY USED

- IBM cloud lite services
- Natural Language Processing (NLP)
- Retrieval Augmented Generation (RAG)
- LangGraph Framework
- ReAct Architecture
- IBM Granite model – granite 3-3-8b-instruct

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## IBM CLOUD SERVICES USED

- IBM Cloud Watsonx AI Studio
- IBM Cloud Watsonx.AI runtime
- IBM Cloud Agent Lab
- IBM Granite foundation model

# WOW FACTORS

This Agentic AI system marks a paradigm shift in the democratization of financial literacy by fusing Retrieval-Augmented Generation (RAG), multilingual NLP, and domain-specific grounding into one cohesive digital assistant. Designed to function as an intelligent, context-aware financial guide, the agent dynamically retrieves and distills real-time, authoritative information from government portals, central banks, and regulatory bodies—transforming static knowledge into personalized, conversational assistance. It seamlessly bridges the digital divide by supporting multiple Indian languages and dialects, enabling users to ask hyper-localized queries like - **“What is the safest way to use UPI?”** or **“How do I calculate EMI with changing interest rates?”** with zero prior financial background.

Its core strength lies in real-time retrieval pipelines backed by vector similarity search and semantic ranking, ensuring factually accurate, bias-mitigated responses even in low-data regions. By embedding financial risk indicators and fraud detection cues into the retrieval layer, it not only informs but actively protects users against digital financial threats. Moreover, the system is designed to adapt through continual fine-tuning on user interactions and evolving financial policies, making it a living, learning infrastructure for inclusive digital finance.

This isn't just a chatbot—it's an adaptive, knowledge-grounded financial co-pilot engineered to enhance trust, accelerate financial onboarding, and reduce fraud vulnerability across millions of underbanked and newly-digitized individuals. In the age of AI-first public infrastructure, this agent becomes a cornerstone of economic resilience and citizen empowerment.

# END USERS

## ■ Government and Regulatory Bodies:

- (i).For public financial literacy campaigns (e.g., RBI, NPCI, Ministry of Finance).
- (ii).Digital onboarding initiatives like PM Jan Dhan Yojana or Digital India.

## ■ Banks and NBFCs:

- (i).To reduce customer service load, increase safe digital banking adoption, and drive inclusion.

## ■ Educational Institutions:

- (i).Schools and colleges teaching students the fundamentals of personal finance and digital banking.

## ■ Financially Uninformed Individuals:

- (i).People with limited understanding of digital finance tools (e.g., UPI, banking apps, loan options).
- (ii).First-time internet and smartphone users in rural or semi-urban areas.

## ■ Fintech Platforms:

- (i).For integrating as a plug-and-play AI advisor to guide users through onboarding and usage.

# Parameters and Tools

## Parameters and Work

1. **Frequency penalty:** Reduces likelihood of repeating the same tokens in the output.
2. **Presence penalty:** Discourages using tokens already present in the prompt.
3. **Temperature:** Controls randomness—higher means more creative, lower means more focused.
4. **Top P (nucleus sampling):** Limits choices to the most probable tokens summing to P; balances diversity and relevance.
5. **Max tokens:** Sets the maximum number of tokens the model can generate in a response.
6. **Random seed:** Ensures reproducibility of results by fixing the randomness.

Model: granite-3-3-8b-instruct ✕ < A

### Model parameters

Frequency penalty

-2  2 0

Presence penalty

-2  2 0

Temperature

0  2 0

Top P (nucleus sampling)

0.01  1 1

Max tokens

2000

Random seed

Stop sequences

### Select a tool

Choose a tool to add to your agent.

Search for a tool

<b>Google search</b> Retrieve information from the internet with the Google search engine.	<b>DuckDuckGo search</b> Retrieve information from the internet with the DuckDuckGo search engine.	<b>Wikipedia search</b> Retrieve information from Wikipedia articles.	<b>Document search</b> Search documents with vector indexes.
<b>Tavily search</b> Retrieve information from the internet with the Tavily search engine.	<b>Webcrawler</b> Retrieve information from a website.	<b>Python Interpreter</b> Execute Python code generated by the agent.	<b>Weather</b> Retrieve the weather of a city.

## Tools and usages:

1. **Google search:** Uses Google to retrieve real-time information from the web.
2. **DuckDuckGo search:** Retrieves online content using the DuckDuckGo search engine.
3. **Wikipedia search:** Searches and retrieves facts and summaries from Wikipedia articles.
4. **Document search:** Finds information within uploaded documents using vector-based search.
5. **WebCrawler:** Crawls specific websites to extract and return relevant content.



# RESULTS

## Agent preview



Financial\_Agent 01:21 AM

Welcome to Financial\_Agent

I am your AI financial buddy—guiding you safely through digital finance, scams, and UPI.



## Sample questions

How do I send money via UPI?



What is a safe interest rate for a personal loan?



Type something...



# RESULTS

## Summary of Digital Financial Literacy AI agent

The AI Financial Agent advises users on how to avoid online fraud while using net banking. Key suggestions include using a secure internet connection, accessing only official bank websites or apps, enabling two-factor authentication, keeping apps and devices updated, using strong passwords, and regularly monitoring transactions for unauthorized activity.

### Agent preview



You: 01:27 AM

How can I avoid online fraud while using net banking?



Financial\_ Agent 01:27 AM

To avoid online fraud while using net banking, follow these steps:

1. **Secure Connection:** Always ensure you're using a secure and private internet connection. Avoid using public Wi-Fi for banking transactions.
2. **Official Bank Website/App:** Only use your bank's official website or mobile application. Be cautious of phishing sites that mimic your bank's interface.
3. **Two-Factor Authentication (2FA):** Enable 2FA for an extra layer of security. This usually involves receiving a one-time password (OTP) on your registered mobile number or email.
4. **Regular Updates:** Keep your device and banking app updated. Banks regularly release updates that include security patches.
5. **Strong Passwords:** Use complex and unique passwords for your net banking account. Avoid using easily guessable information like birthdays or names.
6. **Monitor Transactions:** Regularly check your bank statements for any unauthorized

Type something...



# RESULTS

## Step-by-Step Flow of the Agentic AI System

**Step 1:** Document loading and split it made small chunks.

**Step2:** Vector Indexing of supporting load document.(example: FAISS, ChromaDB.

**Step 3:** User Query Translation and Embedding

**Step4:** Vector-Based Retrieval

**Step5:** Context-Aware Answer Generation using IBM Granite LLM

**Step 6:** Answer the user's Query using LangGraph Framework and ReAct Architecture

### Agent preview



You: 03:20 AM

Bank A offers a ₹2,00,000 loan at 10% flat rate for 3 years. Bank B offers the same at 12% reducing balance. Which is cheaper overall?



Financial\_Agent 03:20 AM

To determine which loan is cheaper overall, we need to calculate the total amount to be paid in both cases.

For Bank A's flat rate loan:

- Principal (P) = ₹2,00,000
- Rate of interest (R) = 10% per annum
- Time (T) = 3 years

The total interest (I) for a flat rate loan is calculated as:  $[ I = P \times R \times T ]$

So,  $[ I = 2,00,000 \times 0.10 \times 3 = ₹60,000 ]$

The total amount to be paid (A) is the sum of the principal and the interest:  $[ A = P + I = 2,00,000 + 60,000 = ₹2,60,000 ]$

For Bank B's reducing balance loan:

- Principal (P) = ₹2,00,000
- Rate of interest (R) = 12% per annum

Type something...



# RESULTS

## Deployed AI Agent

### Step-by-Step Deployment Process in IBM watsonx

**Step 1:** Create a Deployment Space in IBM watsonx

**Step 2:** Deploy Your Project to the Deployment Space

**Step 3:** Create an API Key and Update in Your Code

The screenshot displays the IBM watsonx web interface. At the top, the navigation bar includes the IBM watsonx logo, an 'Upgrade' button, and user account information for 'Arindam Adhikari's Account' in 'Dallas'. The breadcrumb trail shows 'Deployment spaces / Agentic-ai / Financial\_Agent /'. Below this, the 'Financial\_Agent' deployment is shown with a green checkmark and 'Deployed' status, and an 'Online' button. Three tabs are visible: 'API reference', 'Test', and 'Preview', with 'Preview' being the active tab. The chat area shows a message from 'Financial\_Agent' at 03:30 AM: 'Welcome to Financial\_Agent. I am your AI financial buddy—guiding you safely through digital finance, scams, and UPI.' Below the message is a diagram illustrating a financial workflow involving a folder, a server, a bar chart, and a smartphone. At the bottom, there is a 'Quick start samples' section with a text input field labeled 'Type something...' and a send button.

# CONCLUSION

- ***Bridges the Financial Knowledge Gap***

The agent empowers individuals with little to no financial background by providing easy-to-understand, personalized guidance on key topics like UPI, interest rates, budgeting, and fraud prevention.

- ***Combats Fraud and Builds Trust***

By proactively educating users on safe banking practices, phishing risks, and fraud detection, the agent strengthens digital trust and financial security.

- ***Leverages Cutting-edge AI Technologies***

Using Retrieval-Augmented Generation (RAG), semantic search, and vector-based retrieval, the agent provides reliable, real-time answers grounded in credible sources such as government portals and banking sites.

- ***Reduces Dependence on Manual Financial Education***

Acts as a 24/7 virtual financial coach—eliminating the need for in-person financial training and support, especially in remote or underserved areas.

- ***Supports National Financial Inclusion Goals***

The solution aligns with initiatives like Digital India and financial inclusion schemes by enabling secure digital onboarding and responsible usage.

# FUTURE SCOPE

## ■ Global Financial Inclusion & Development

**Emerging Economies:** In regions like Sub-Saharan Africa, Southeast Asia, and Latin America, this agent can serve as the cornerstone of digital banking adoption, helping billions of unbanked and underbanked citizens access safe, reliable financial systems.

## ■ Banking & Fintech Revolution

**Neo-Banks & Microfinance Institutions:** Ideal for integration into digital-first banks, especially in rural and gig-economy-focused sectors.

## ■ Corporate Financial Wellness Tools

**HR & Payroll Integration:** Companies can offer this agent to employees to manage their finances better, understand taxes, plan savings, and avoid payday debt traps.

## ■ Government & Public Policy Applications

**Policy Feedback Loop:** By analyzing user interactions, governments can better understand gaps in financial knowledge and adjust policy communication strategies.

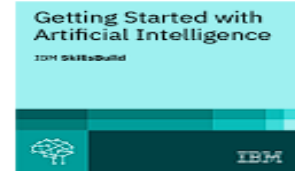
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## GITHUB LINK

- GitHub Link - [Click Here](#)

# IBM CERTIFICATIONS

In recognition of the commitment to achieve  
professional excellence



## ARINDAM ADHIKARI

Has successfully satisfied the requirements for:

### Getting Started with Artificial Intelligence



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## Journey to Cloud: Envisioning Your Solution

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Completion Certificate



This certificate is presented to  
**ARINDAM ADHIKARI**

for the completion of  
**Lab: Retrieval Augmented Generation with  
LangChain**

(ALM-COURSE\_3824998)

According to the Adobe Learning Manager system of record

**Completion date:** 24 Jul 2025 (GMT)

**Learning hours:** 20 mins



**THANK YOU**