

A graphic at the top of the slide features the word 'Agentical' in a glowing yellow font. The background is a dark blue field with a grid of glowing yellow dots and lines, suggesting a digital or data environment. The word 'Agentical' is slightly tilted and has a soft glow around it.

Agentical

Bank-iMitra

BANK CUSTOMER CHATBOT WITH PROMPT ENGINEERING, RAG, AND AGENTIC AI

BANK-MCP

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Project Problem Statement

- ▶ Build an intelligent banking assistant that can:
 - ▶ Answer customer queries about interest rates, loan options, fees, dispute timelines, card limits, and general banking policies using **cited policy text**.
 - ▶ Execute customer actions such as **block card**, **initiate dispute**, and **fetch account balance** through tool integrations.
- ▶ **Expected Output**
 - ▶ A unified chatbot system that may output something like this:
 - ▶ Answers customer queries with cited policy text.
 - ▶ Executes banking actions through tool integrations.
 - ▶ Returns structured, auditable responses suitable for production banking workflows.

High Level Flow

UI (Streamlit) | Orchestrator (intent + agents) | Action API | Knowledge store (FAISS)

- ▶ High-level flow (text):
 - ▶ User uploads documents or types a question in UI.
 - ▶ UI sends the prompt to an orchestration service (chat endpoint).
 - ▶ Orchestrator classifies intent; either:
 - ▶ FAQ -> retrieve supporting documents (FAISS) and return an answer, or
 - ▶ Action -> request authentication (if needed) and call a domain action (e.g., block card) and return result.
- ▶ Business benefits / value:
 - ▶ Faster self-service (balance checks, card controls).
 - ▶ Document-driven answers (uploaded documents become searchable knowledge).
 - ▶ Clear separation of conversational behavior and domain operations reduces risk for production actions.

Libraries/Tech stack

1. Retrieval-Augmented Generation (RAG)
2. Agentic AI Architecture
 - RouterAgent
 - AnswerAgent
 - ActionAgent

- ▶ LLM (GPT – Open AI)
- ▶ Streamlit (UI)
- ▶ FastAPI + Pydantic (orchestrator and action API)
- ▶ requests (for HTTP between services)
- ▶ FAISS (+ numpy) for vector search (index binaries exist)
- ▶ PDF extraction tooling (pdfminer or similar)
- ▶ JSON and file storage for index metadata
- ▶ NLU-NLU (Natural Language Understanding)

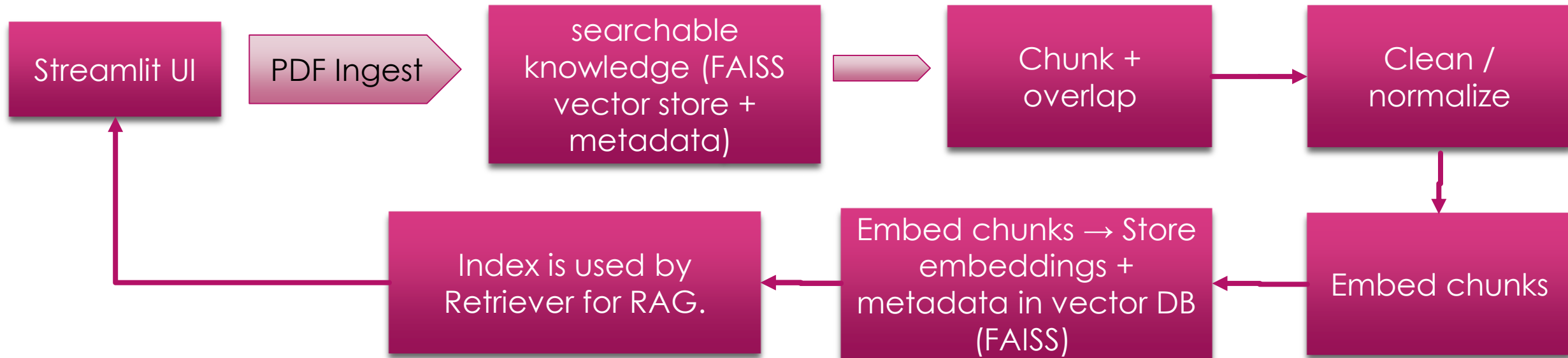
GitHub Repo:

https://github.com/pankajmishra/pkm_genairep

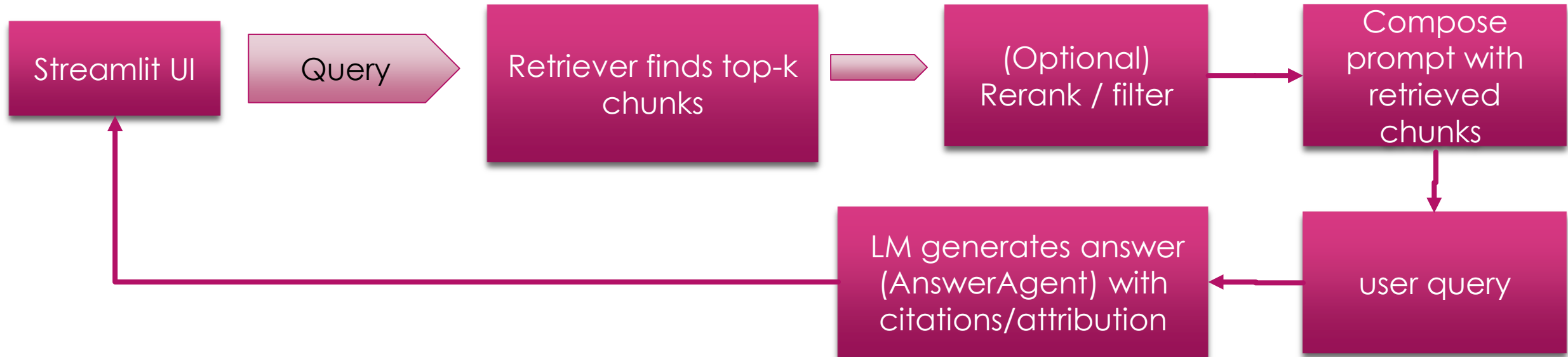
Data Flow

- ▶ Data flow & control flow (detailed)
 - ▶ Streamlit -> POST /chat -> orchestrator
 - ▶ orchestrator:
 - ▶ `classify_intent(user_text)`
 - ▶ `redact_pii(user_text)`
 - ▶ if `faq`:
 - ▶ `AnswerAgent` -> retriever -> FAISS index -> fetch documents -> compose answer -> return
 - ▶ if `action`:
 - ▶ validate authentication & `account_id`
 - ▶ `ActionAgent.execute(action_name, params)` -> likely calls action API endpoints (`requests.post`)
 - ▶ return action result

Ingestion Flow



Query Flow

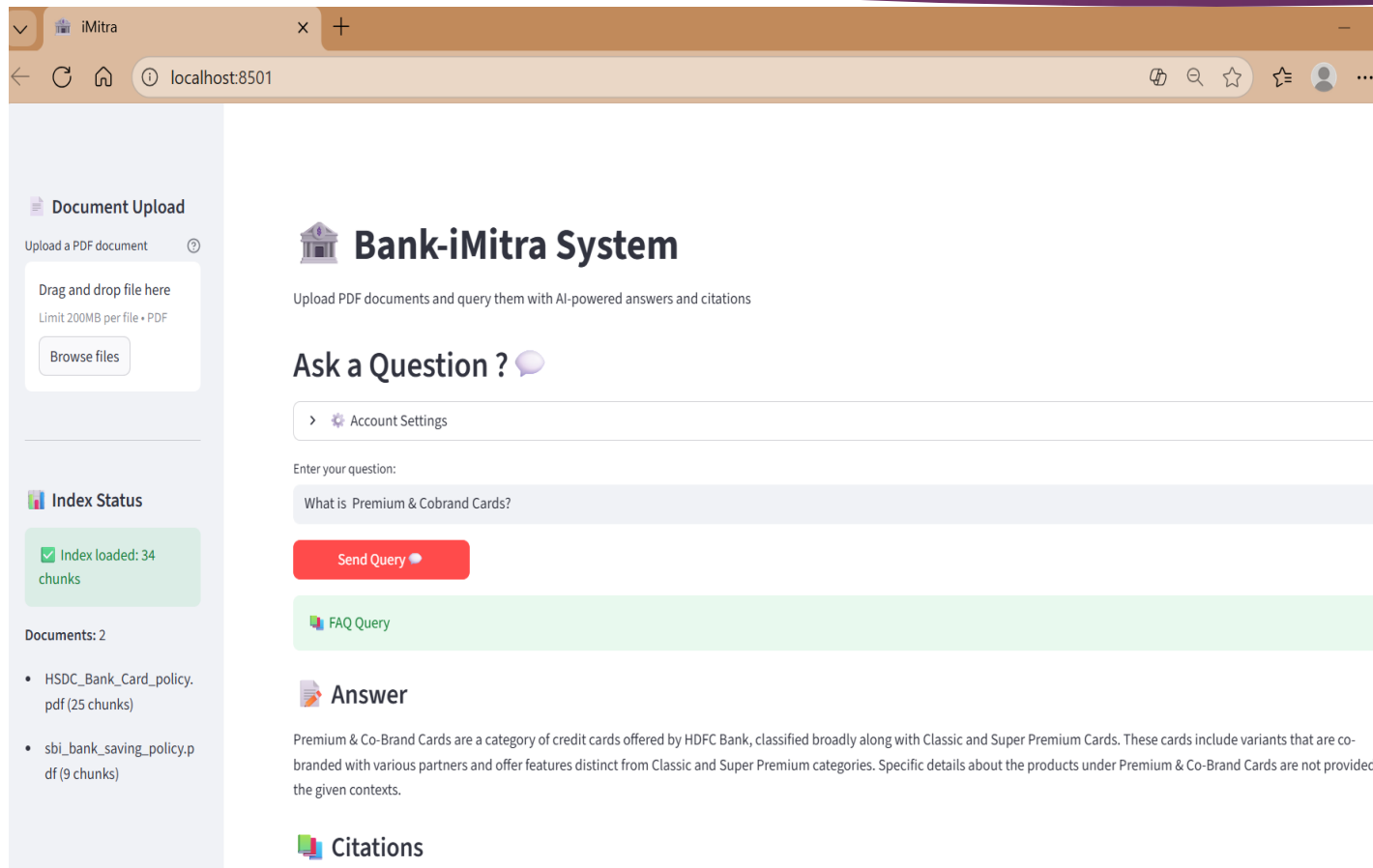


Future Scope:

- ▶ Orchestrator currently performs simple text checks to route actions — this is a demo pattern and can be hardened (explicit intent labels, robust NLU).
- ▶ Action endpoints use in-memory stores (ACCOUNTS/DISPUTES) — It can be replaced with persistent/data store & transactional handling for production.
- ▶ PII redaction occurs in orchestrator before sending to AnswerAgent/ActionAgent — keep that step and extend to logging scrubbing.
- ▶ Authentication gating: orchestrator checks authenticated flag and account_id before action invocation; integrate real auth provider for production.



Demo: BANK-iMitra (MCP-Model Context Protocol)





Home Screen

- Demo notes (how to run/what to show) Start action API (server_fastapi.py) on port 8001
- Start orchestrator (server_orchestrator.py) on port 8000
- Run Streamlit app (app.py); upload a PDF (optional)
- Demonstrate FAQ path and Action path (balance, block)



Usage Steps – Home Screen


 Document Upload


Upload a PDF document 

Drag and drop file here

Limit 200MB per file • PDF


Browse files

 Index Status


 Index loaded: 34 chunks


Documents: 2

- HSDC_Bank_Card_policy.pdf (25 chunks)
- sbi_bank_saving_policy.pdf (9 chunks)

 **Bank-iMitra System**


Upload PDF documents and query them with AI-powered answers and citations


Ask a Question ? 


>  Account Settings

Enter your question:


What is Premium & Cobrand Cards?

Send Query 

 FAQ Query

 Answer

Premium & Co-Brand Cards are a category of credit cards offered by HDFC Bank, classified broadly along with Classic and Super Premium Cards. These cards include variants that are co-branded with various partners and offer features distinct from Classic and Super Premium categories. Specific details about the products under Premium & Co-Brand Cards are not provided in the given contexts.

 Citations

Usage Steps



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Bank-iMitra System

Upload PDF documents and query them with AI-powered answers and citations

Index loaded successfully!

Ask a Question ?

Account Settings

Enter your question:

e.g., What is the ATM withdrawal limit? or Block my card

Send Query

Example Queries

FAQ Queries:

What is the ATM withdrawal limit?

What are the account balance requirements?

Ingest pdf

Document Upload

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bank_accounts_detail.pdf 59.8KB

Ingest Document

Index Status

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Bank-iMitra System

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Ask a Question ?

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Example Queries

FAQ Queries:

What is the ATM withdrawal limit?

What are the account balance requirements?

Action Queries:



Ingestion Completed with Prompt ready

Document Upload

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bank_accounts_detail.pdf
59.8KB

Ingest Document

Index Status

Index loaded: 36 chunks

Documents: 3

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- bank_accounts_detail.pdf (2 chunks)
- sbi_bank_saving_policy.pdf (9 chunks)



Bank-iMitra System

Upload PDF documents and query them with AI-powered answers and citations

Index loaded successfully!

Ask a Question ?

Account Settings

Account ID
acct_125

Authenticated

Account changed to acct_125. Cleared loaded index and uploaded files for this session. Please ingest documents for the new account.

Enter your question:
e.g., What is the ATM withdrawal limit? or Block my card

Send Query

Action Query - Classification

Data Sampling:

```
{
  "acct_123": {
    "balance": 1250.75,
    "cards": [{"last4": "4242", "status": "active"}]
  },
  "acct_124": {
    "balance": 3420.10,
    "cards": [{"last4": "1111", "status": "active"}]
  },
  "acct_125": {
    "balance": 875.00,
    "cards": [{"last4": "2222", "status": "blocked"}]
  },
  "acct_126": {
    "balance": 5600.50,
    "cards": [{"last4": "3333", "status": "active"}]
  },
  "acct_127": {
    "balance": 150.25,
    "cards": [{"last4": "4444", "status": "inactive"}]
  },
  "acct_128": {
    "balance": 9999.99,
    "cards": [{"last4": "5555", "status": "active"}]
  }
}
```

Ask a Question ?

▼  Account Settings


Account ID


acct_125

☒ Authenticated

Enter your question:

What is account balance of account?

Send Query 

 Action Query

Action Result

```
{
  "status" : "ok"
  "balance" : 875
}
```



FAQ Query with — Routing, RAG, LLM, faiss-Facebook AI

Similarity Search

Document Upload

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Browse files

Index Status

✓ Index loaded: 36 chunks

Documents: 3

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- bank_accounts_detail.pdf (2 chunks)
- sbi_bank_saving_policy.pdf (9 chunks)

Ask a Question ?

> Account Settings

Enter your question:

What is procedure of Issuance of Credit Cards?

Send Query

Processing your request...

Example Queries

Example FAQ: What is procedure of Issuance of Credit Cards?

Send Query

FAQ Query

Answer

Credit cards are issued by the Bank at its sole discretion, subject to adherence to the Bank's credit norms and documentation requirements. The Bank may issue any types of credit cards permissible under applicable laws and RBI regulations, in physical and/or virtual form. Add-on cards may also be issued to persons having a predefined relationship with the primary cardholder. All required information, including terms and conditions such as the Most Important Terms and Conditions (MITC), Key Fact Statement (KFS), and Card Member Agreement (CMA), are communicated transparently to the applicant at the time of issuance to maximize transparency and customer convenience.

Citations

▼ Citation 1: HSDC_Bank_Card_policy.pdf (Chunk 13)

Source: HSDC_Bank_Card_policy.pdf

Chunk Index: 13

> Citation 2: HSDC_Bank_Card_policy.pdf (Chunk 3)

▼ Citation 3: HSDC_Bank_Card_policy.pdf (Chunk 15)

Source: HSDC_Bank_Card_policy.pdf

Chunk Index: 15



FAQ Query — Taking context from other uploaded PDF

Document Upload

Upload a PDF document

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Index Status

Index loaded: 36 chunks

Documents: 3

HSDC_Bank_Card_policy.pdf (25 chunks)

bank_accounts_detail.pdf (2 chunks)

sbi_bank_saving_policy.pdf (9 chunks)

PDF X - sbi_bank_saving_policy.pdf

Files

Home

Edit

Annotate

Page

Form

Convert

Protect

Tools

Help

Edit Text

Redact

Signature

Convert

166%

Typewriter

Highlight

Crop

Screenshot

Ans. Yes, SBI provides Savings Account for Minors namely PehlaKadam and PehliUdaan.

Q. What documents are required to open an SBI savings account for minors?

Ans. Documents required to open an SBI savings for minors is:

PehlaKadam: Date of Birth proof of the minor + KYC of the parent

PehliUdaan: Date of Birth proof of the minor + KYC of the parent

Enter your question:

What documents are required to open an SBI savings account for minors?

Send Query

FAQ Query

Answer

The documents required to open an SBI savings account for minors include those needed for the PehlaKadam and PehliUdaan accounts. However, the exact list of documents is not fully provided in the available context.

Citations

Citation 1: sbi_bank_saving_policy.pdf (Chunk 1)

Source: sbi_bank_saving_policy.pdf

Chunk Index: 1

Example FAQ: What documents are required to open an SBI savings account for minors?



FAQ Query — Taking Context from 3rd PDF File

Document Upload

Upload a PDF document

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Browse files

Index Status

Index loaded: 36 chunks

Documents: 3

HSDC_Bank_Card_policy.pdf (25 chunks)

bank_accounts_detail.pdf (2 chunks)

sbi_bank_saving_policy.pdf (9 chunks)

Account_ID	Customer_Name	Account_Type	Balance (₹)	Card_Number (masked)	Card_Limit (₹)	Loan_Type	Loan_Amount (₹)	Status
ACC1001	Ramesh Kumar	Savings	85,000	XXXX-XXXX-XXXX-1234	1,00,000	Home Loan	25,00,000	Active
ACC1002	Priya Sharma	Current	2,50,000	XXXX-XXXX-XXXX-5678	5,00,000	Car Loan	8,00,000	Active
ACC1003	Anil Mehta	Savings	12,000	XXXX-XXXX-XXXX-9012	50,000	Personal	1,50,000	Active

Ask a Question ?

Account Settings

Enter your question:

Give Account holder name of Account "ACC1002 " and Account Type

Send Query

FAQ Query

Answer

The account holder name for Account 'ACC1002' is Priya Sharma and the account type is Current.

Citations

Citation 1: bank_accounts_detail.pdf (Chunk 0)

Source: bank_accounts_detail.pdf

Chunk Index: 0

Example FAQ: What documents are required to open an SBI savings account for minors?

Detailed Tech

- ▶ Components and responsibilities:
 - ▶ Streamlit Frontend (app.py)
 - ▶ UI elements: file upload, example queries, query entry, authentication flags.
 - ▶ Manages session_id, account_id, authenticated flag.
 - ▶ Calls Orchestrator at /chat (HTTP POST) with a JSON payload: {session_id, user_text, account_id, authenticated}
 - ▶ Orchestrator Service (server_orchestrator.py)
 - ▶ Exposes /chat POST endpoint (Pydantic model ChatRequest).
 - ▶ Uses:
 - ▶ classify_intent(text) — detect faq vs action (from agents.py)
 - ▶ redact_pii(text) — remove/replace PII before processing
 - ▶ AnswerAgent — for FAQ/knowledge responses (retrieval + composition)
 - ▶ ActionAgent — executes domain actions (block_card, get_balance, raise_dispute)
 - ▶ Basic routing logic:
 - ▶ if intent == 'faq' -> AnswerAgent.answer(redacted)
 - ▶ else action routing: naive string checks (e.g., 'block' -> block card; 'balance' -> get balance)
 - ▶ Returns a JSON response with session_id, intent and either parsed response (FAQ) or action_result.

- ▶ Action API (server_fastapi.py)
 - ▶ Exposes domain endpoints:
 - ▶ POST /block_card {account_id, card_last4, reason}
 - ▶ POST /get_balance {account_id}
 - ▶ POST /raise_dispute {account_id, transaction_id, reason}
 - ▶ Holds in-memory ACCOUNTS and DISPUTES dictionaries (demo data).
 - ▶ Performs domain changes and returns status JSON.
- ▶ Retrieval & Indexing
 - ▶ FAISS index files (faiss_index.bin, faiss_meta.json, faiss_raw.json) used by AnswerAgent/retriever to locate relevant document chunks.
 - ▶ Ingestion code exists (ingest.py + retriever.py) to generate the index from PDFs.
- ▶ Agents & Tools (agents.py, tools.py, prompts.py)
 - ▶ Agents implement intent classification, PII redaction, retrieval + answer composition, and action execution (wrapping calls to action API).

▶ Data flow & control flow (detailed)

- ▶ Streamlit -> POST /chat -> orchestrator
- ▶ orchestrator:
 - ▶ classify_intent(user_text)
 - ▶ redact_pii(user_text)
 - ▶ if faq:
 - ▶ AnswerAgent -> retriever -> FAISS index -> fetch documents -> compose answer -> return
 - ▶ if action:
 - ▶ validate authentication & account_id
 - ▶ ActionAgent.execute(action_name, params) -> likely calls action API endpoints (requests.post)
 - ▶ return action result

Thanks You

- ▶ **GitHub Repo:**
- ▶ https://github.com/pankajmishra/pkm_gendirep
- ▶ **Contact:**
 - ▶ pankaj.mishra15@in.ey.com
 - ▶ pankaj.Mishra.7@gmail.com