BANKBOT_AI CHATBOT FOR BANKING FAQ'S

Abstract

BankBot is an AI-powered banking chatbot designed to automate frequently asked banking queries and basic banking operations using Natural Language Processing (NLP). The system enables users to interact with banking services through natural language, providing fast, accurate, and secure responses. The project is developed in multiple milestones, where each milestone focuses on specific functionalities and technologies, gradually building a complete, scalable, and intelligent banking assistant.

Milestone_1

Intent Detection & Entity Recognition

The goal of this milestone is to enable the chatbot to understand user intent from natural language queries and extract key information required for banking operations. This milestone forms the foundation of the chatbot’s intelligence.

Functionalities Implemented

- Definition of core banking intents such as:
  - ❑ Check Balance
  - ❑ Transfer Money
  - ❑ Card Block
  - ❑ Find ATM
- Collection of multiple user query variations for each intent
- Intent separation to avoid overlap between similar queries
- Entity extraction for:
  - ❑ Amount
  - ❑ Account Number
  - ❑ Account Type
  - ❑ Keywords and location
- NLU Visualizer to display detected intent, confidence score, and extracted entities

TECHNOLOGIES USED

- Python – Core implementation language
- NLP Concepts – Understanding natural language queries
- TF-IDF Vectorizer– Text vectorization
- Cosine Similarity – Intent similarity measurement
- JSON Files – Storage of intents and training data
- Regular Expressions (re) – Entity extraction

Result

Intents (edit & add)

> check_balance (40 examples)

> transfer_money (40 examples)

> card_block (40 examples)

> find_atm (40 examples)

NLU Visualizer

User Query

Analyze

Train Model

Train Model

Create New Content

New Intent Name

Example Sentence

Add Example

Milestone_2

Dialogue Management & Response Handling

This milestone focuses on controlling the conversation flow after intent recognition and handling multi-step banking operations securely and reliably.

Functionalities Implemented

- Dialogue flow control based on detected intent
- Multi-step money transfer process:
  - Login verification
  - Balance display
  - Receiver account validation
  - Amount verification
  - Transaction confirmation
  - Balance update
- Error handling for:
  - Invalid credentials
  - Insufficient balance
  - Invalid receiver account
- Fallback responses for unsupported queries

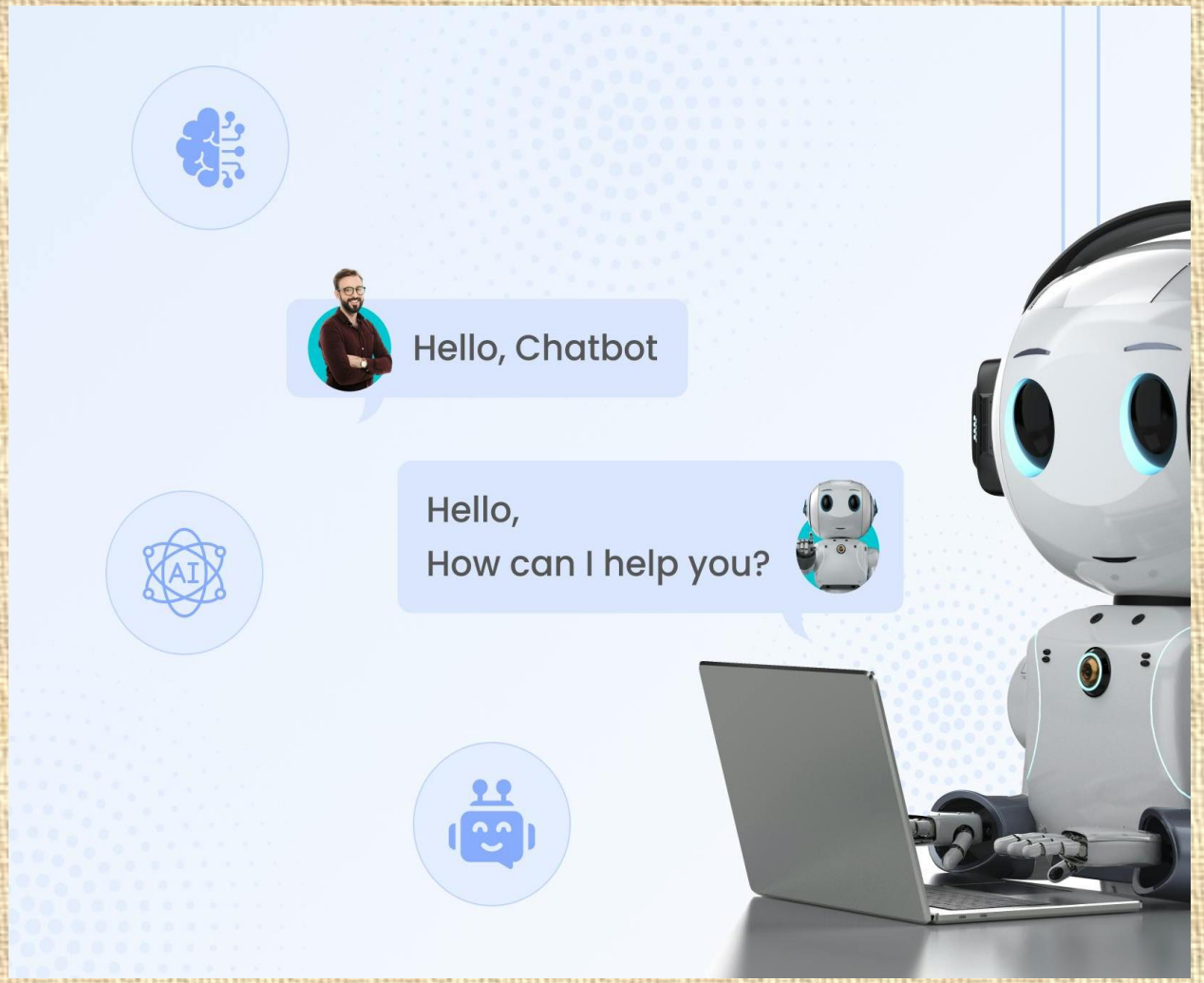
TECHNOLOGIES USED

- Python – Dialogue logic implementation.
- Conditional Programming – Step-by-step conversation control.
- SQLite Database – Account validation and transaction handling.
- Streamlit Session State – Maintaining user and transaction state.
- Datetime Module – Transaction timestamps.

MILESTONE 3

UI Integration & Chat Interface

The aim of this milestone is to provide a user-friendly, interactive, and responsive interface for users to interact with the chatbot in real time.



Functionalities Implemented

- ❑ Home page with project overview and navigation.
- ❑ User account creation and login interface.
- ❑ Chatbot interface for natural language interaction.
- ❑ Sidebar navigation for easy access to banking features.
- ❑ Real-time response display.
- ❑ Graceful handling of user input errors.

Technologies Used

- Streamlit – Frontend UI framework
- HTML & CSS– UI styling and layout
- Streamlit Components – Input fields, buttons, sidebar
- Python Backend Integration – Connecting UI with NLP and database

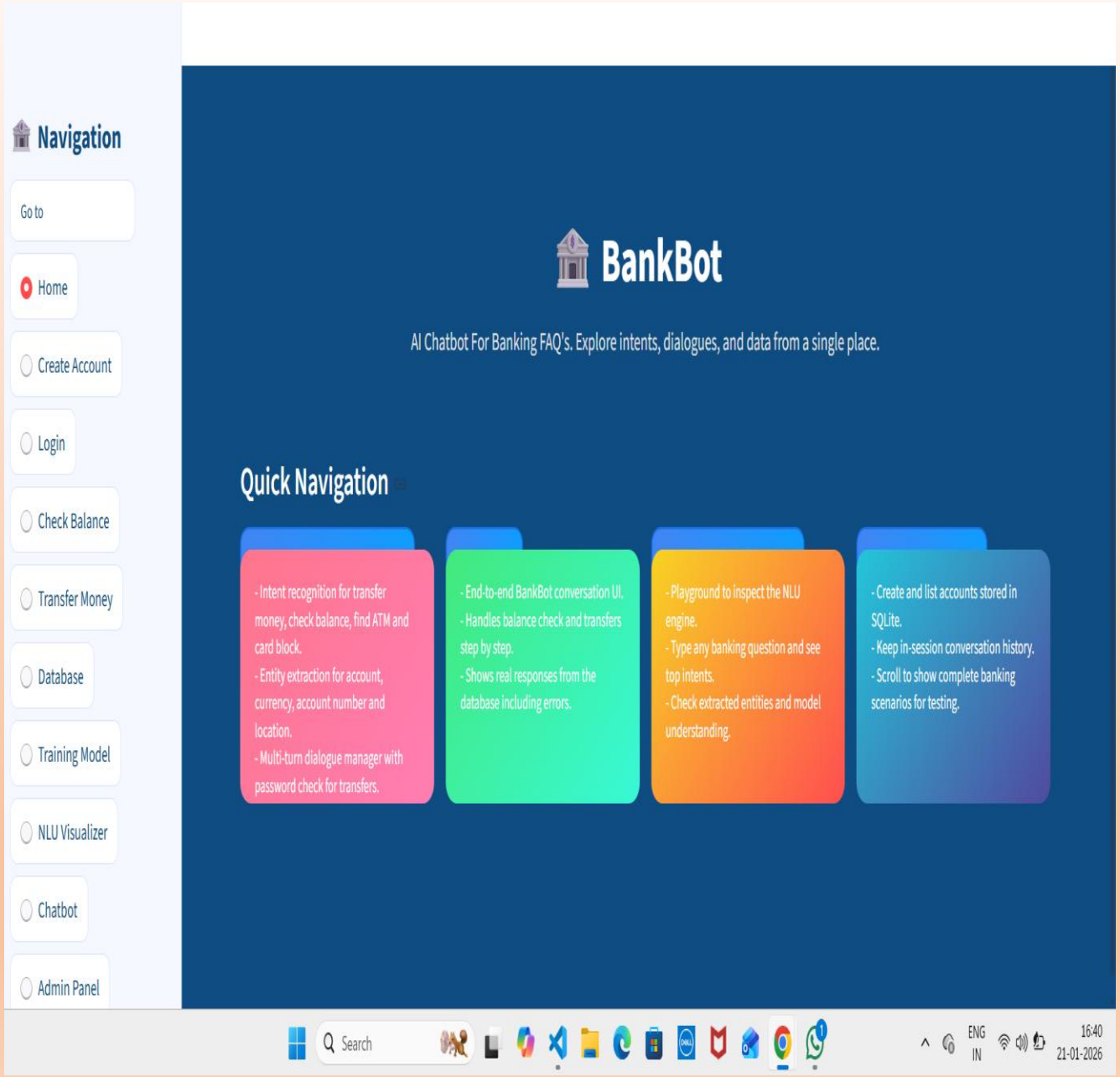
Milestone_4

ADMIN PANEL & ANALYTICS

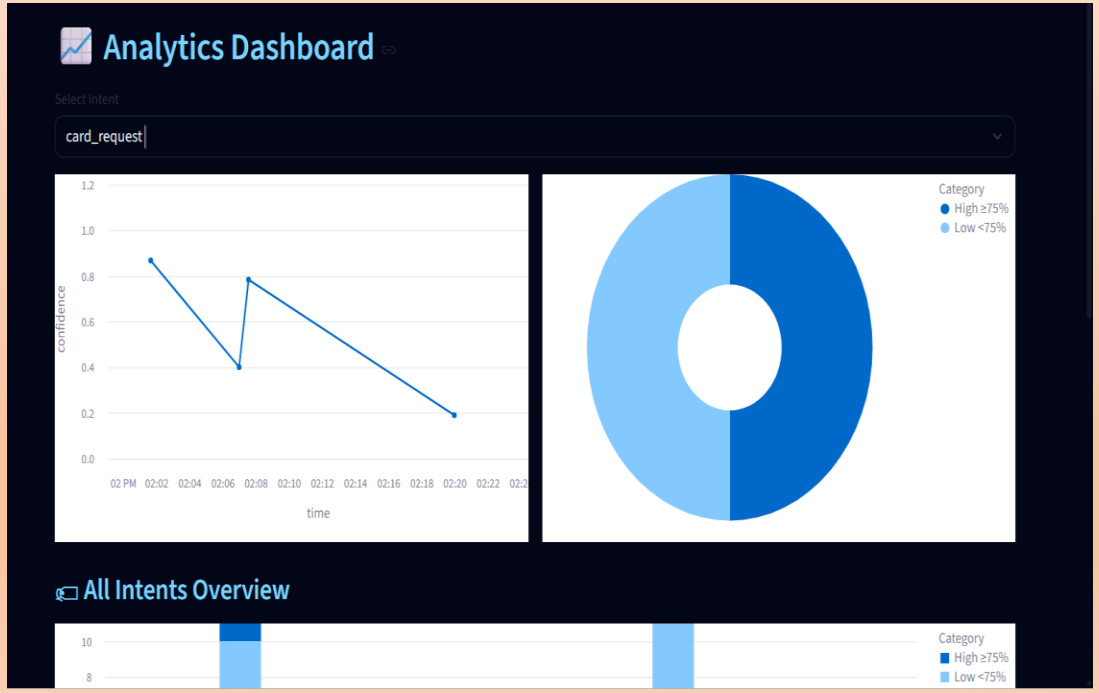
This milestone introduces administrative control and performance monitoring to make the chatbot scalable, maintainable, and suitable for real-world deployment.

FUNCTIONALITIES IMPLEMENTED

- Admin authentication and access control
- Dashboard displaying:
  - Total intents
  - Total user queries
  - Top-used intents
- Intent Manager to add, edit, and delete chatbot intents
- Knowledge Base management for FAQs
- Analytics module to track:
  - User queries
  - Detected intents
  - Confidence scores over time
- Data visualization using charts
- Export of analytics reports in PDF format


Navigation
Go to
Home
Create Account
Login
Check Balance
Transfer Money
Database
Training Model
NLU Visualizer
Chatbot
Admin Panel
BankBot
AI Chatbot For Banking FAQ's. Explore intents, dialogues, and data from a single place.
Quick Navigation
- Intent recognition for transfer money, check balance, find ATM and card block.
- Entity extraction for account, currency, account number and location.
- Multi-turn dialogue manager with password check for transfers.
- End-to-end BankBot conversation UI.
- Handles balance check and transfers step by step.
- Shows real responses from the database including errors.
- Playground to inspect the NLU engine.
- Type any banking question and see top intents.
- Check extracted entities and model understanding.
- Create and list accounts stored in SQLite.
- Keep in-session conversation history.
- Scroll to show complete banking scenarios for testing.
Search
ENG
IN
16:40
21-01-2026


Dashboard Overview
Total Intents
22
Total Queries
47
Top Intent
account_balance (11)
All Intents (Click to Open Analytics)
greeting
goodbye
account_opening
account_balance
loan_request
card_request
forgot_password
transfer_money
branch_location
interest_rates
complaint
account_closure
update_info
loan_eligibility
credit_score
card_limit
atm_block
"account_statement",
"mobile_banking",
fund_transfer",
online_payment
foreign_exchange


Analytics Dashboard
Select Intent
card_request
confidence
time
Category
High ≥75%
Low <75%
All Intents Overview

TECHNOLOGIES USED

- Streamlit – Admin panel UI.
- JSON Files – Storage for analytics, intents, and knowledge base.
- Pandas – Data processing and filtering.
- Altair – Interactive charts and visualizations.
- ReportLab – PDF report generation.

Conclusion

BankBot is a complete AI-based banking chatbot that demonstrates the practical application of NLP, chatbot systems, and data analytics in the banking domain. Through milestone-wise development, the project successfully integrates intent recognition, dialogue management, interactive UI, and admin analytics into a single intelligent system, improving customer experience and operational efficiency.


Thank you