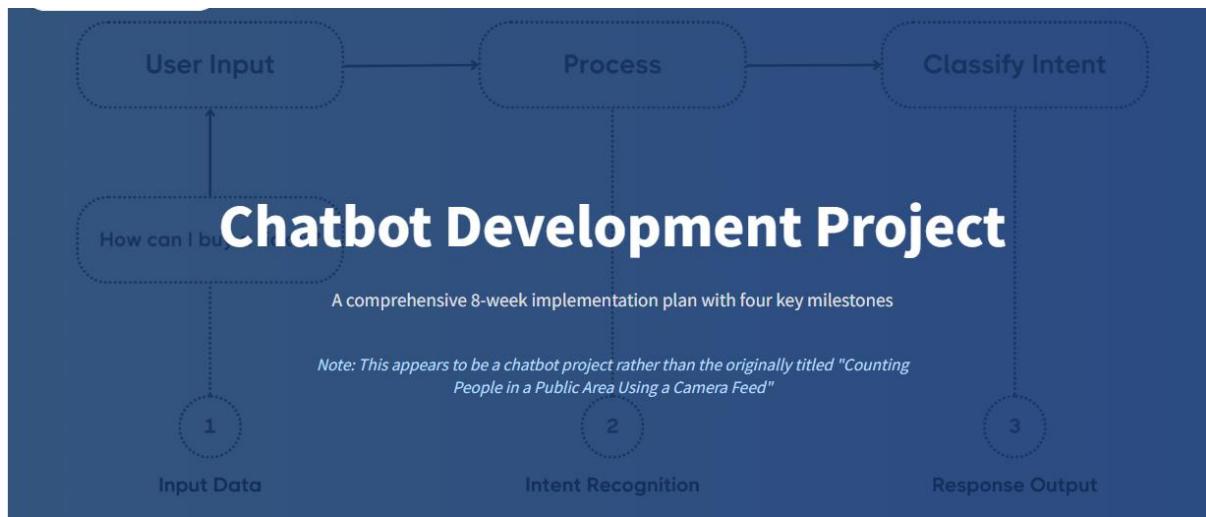


1. Title

Creating a Chatbot for Bank-Related Questions



2. Project Statement

Customers often have recurring banking queries related to account balance, interest rates, loan eligibility, transaction status, branch details, etc. Relying on manual customer service teams leads to delays and high operational costs. This project aims to build an intelligent chatbot that can handle these questions through natural conversations. It will support both rule-based and machine learning approaches to ensure accuracy and scalability. The chatbot will be accessible via web interface and possibly integrated into mobile apps or WhatsApp.

3. Outcomes

- AI-powered chatbot to answer customer queries 24/7.
- Handles intents like balance check, loan inquiry, card blocking, branch locator, and more.
- Interactive UI (text-based) for web interface with support for common banking queries.
- Role-based backend for training data management and chatbot improvement.
- Optionally supports voice input and multilingual capabilities.

4. Modules to be Implemented

1. Intent & Entity Recognition Engine

- Train an NLU model (using Rasa, spaCy, or Hugging Face)
- Define intents: e.g., "Check Balance", "Apply for Loan", "Find ATM", etc.

- Extract entities like account type, location, date, card type.

2. Response & Dialogue Management

- Use rules and stories (or LLMs) to handle back-and-forth conversation.
- Context tracking to remember user details in a session.
- Fallback handling for unknown questions.
- Option to escalate to human agent if needed.

3. Web Interface & UI Integration

- Chat window with typing animation and response bubbles.
- Responsive design for mobile/desktop.
- Avatar or logo branding for the bank.
- Optional: Integrate with WhatsApp using Twilio or Meta API.

4. Admin Panel & Training Manager

- Upload/edit intents and training examples.
- View logs of user interactions.
- Trigger model re-training.
- Role-based login using JWT.

5. Knowledge Base & External API Integration

- Connect to external APIs for real-time data (e.g., exchange rate, account balance via dummy endpoints).
- FAQs and static content stored in a local database or Firebase.
- Admin can manage answers from backend.

5. Week-wise Module Implementation and High-Level Requirements

✓ Milestone 1: Weeks 1–2

Module 1: Intent & Entity Recognition Engine

- Define key intents and examples.
- Build and test NLU model using spaCy or Rasa NLU.
- Add entity extraction and slot filling logic.

Milestone 1: Intent & Entity Recognition Engine

Weeks 1-2 • Working Application

NLU Engine in Action

User Query:

"I want to transfer \$500 from my savings account to checking account 4532"

Intent Recognition

| | | |
|--|----------------|------|
| | transfer_money | 0.95 |
| | check_balance | 0.12 |
| | account_info | 0.08 |

Entity Extraction

| | |
|--|---------------------------|
| | amount: \$500 |
| | from_account: savings |
| | to_account: checking 4532 |

Working Application Features

- ✓ Accurate intent classification for banking queries
- ✓ Precise entity extraction from user messages
- ✓ Confidence scoring for intent predictions
- ✓ Slot filling for banking parameters
- ✓ Real-time processing of user queries

spaCy Rasa NLU Banking Intents
 Entity Types

✓ Milestone 2: Weeks 3–4

Module 2: Response Handling & Dialogue Flow

- Build conversation flow with rules and ML-based stories.
- Implement fallback and chitchat handling.
- Test sessions with sample conversations.

Milestone 2: Response Handling & Dialogue Flow

Weeks 3-4 • Working Application

Dialogue Management in Action

Bank Assistant

Hello! How can I help you today?
10:02 AM

I want to check my account balance
10:03 AM

I'd be happy to check your balance. Please provide your account number. [check_balance](#)
10:03 AM

My account number is 458293746
10:04 AM

Your current balance is \$5,432.78. Is there anything else I can help you with?
10:04 AM

How's the weather today?
10:05 AM

I'm here to help with your banking needs. For weather information, I'd recommend checking a weather app or website.
[Chitchat Response](#)
10:05 AM

Working Application Features

- ✓ Structured conversation flows for banking queries
- ✓ Context-aware responses based on dialogue history
- ✓ Graceful fallback handling for unrecognized queries
- ✓ Natural chitchat responses for conversational elements
- ✓ Slot filling for gathering required information

95%
Intent Recognition

87%
Dialog Completion

92%
User Satisfaction

Rule-based Flows ML Stories
 Fallback Policy Chitchat Handler

Milestone 3: Weeks 5–6

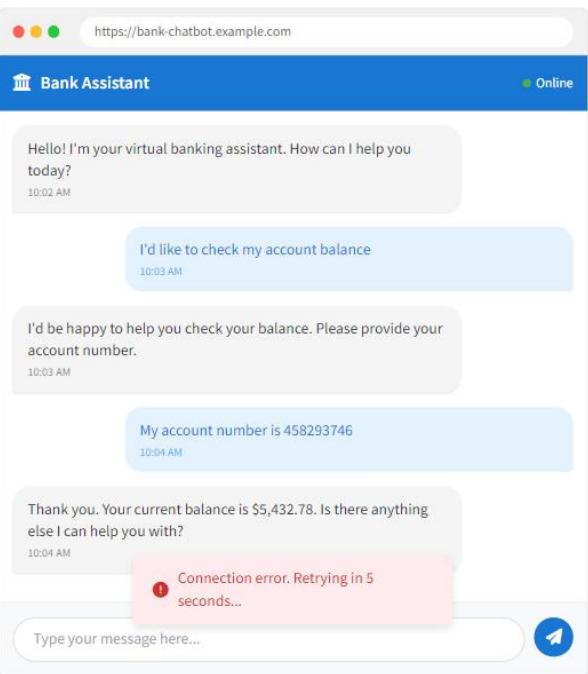
Module 3: UI Integration & Chat Interface

- Create web-based chat interface using Flask/Streamlit/React.
- Connect frontend to backend chatbot service.
- Handle edge cases and errors in UI gracefully.

Milestone 3: UI Integration & Chat Interface

Weeks 5-6 • Working Application

Web-Based Chat Interface



The screenshot shows a web-based chat interface for a "Bank Assistant". The user asks to check the account balance at 10:03 AM. The bank assistant responds, asking for the account number. The user provides it at 10:04 AM. The assistant then informs the user of their current balance of \$5,432.78. A red callout box indicates a "Connection error. Retrying in 5 seconds...".

Working Application Features

- ✓ Responsive web interface for all devices
- ✓ Real-time communication with backend service
- ✓ Graceful error handling for network issues
- ✓ Seamless user experience with intuitive design
- ✓ Secure connection for sensitive banking data



Backend API Database Security

React REST API HTTPS Responsive

Milestone 4: Weeks 7–8

Module 4: Admin Panel & Knowledge Base

- Admin panel to edit training data, view user queries, and retrain model.
- Manage FAQs and dynamic question-answer pairs.
- Export logs and analytics as CSV.

Milestone 4: Admin Panel & Knowledge Base

Weeks 7-8 • Working Application

Admin Dashboard in Action

| Query | Intent | Confidence | Date |
|----------------------------|----------------|------------|------------|
| What's my account balance? | check_balance | 95% | 2023-07-28 |
| Transfer \$100 to savings | transfer_money | 92% | 2023-07-28 |
| How do I apply for a loan? | loan_info | 88% | 2023-07-27 |

Working Application Features

- ✓ Training data editor for intents and entities
- ✓ Query monitoring with confidence scores
- ✓ FAQ management for knowledge base
- ✓ Analytics dashboard with performance metrics
- ✓ CSV export for further analysis

Data Management Analytics Export Tools
Admin Access

6. Evaluation Criteria

Milestone 1 Evaluation (Week 2):

- Model correctly identifies top 10 intents.
- Entities like amount, account type, and dates extracted accurately.
- Sample conversations pass NLU tests.

Milestone 2 Evaluation (Week 4):

- Dialogue flow works without crashing.
- Handles unknown intents gracefully.
- Manages contextual queries like follow-up questions.

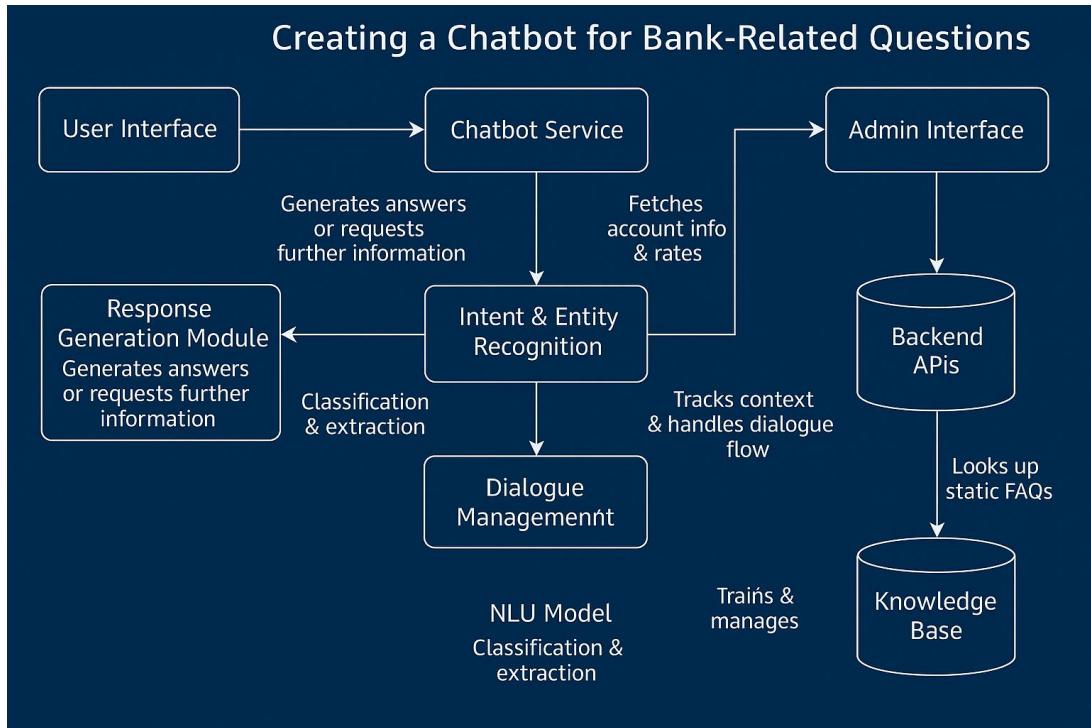
Milestone 3 Evaluation (Week 6):

- UI is responsive and user-friendly.
- Real-time chatbot connection functional.
- Error handling and bot restarts work.

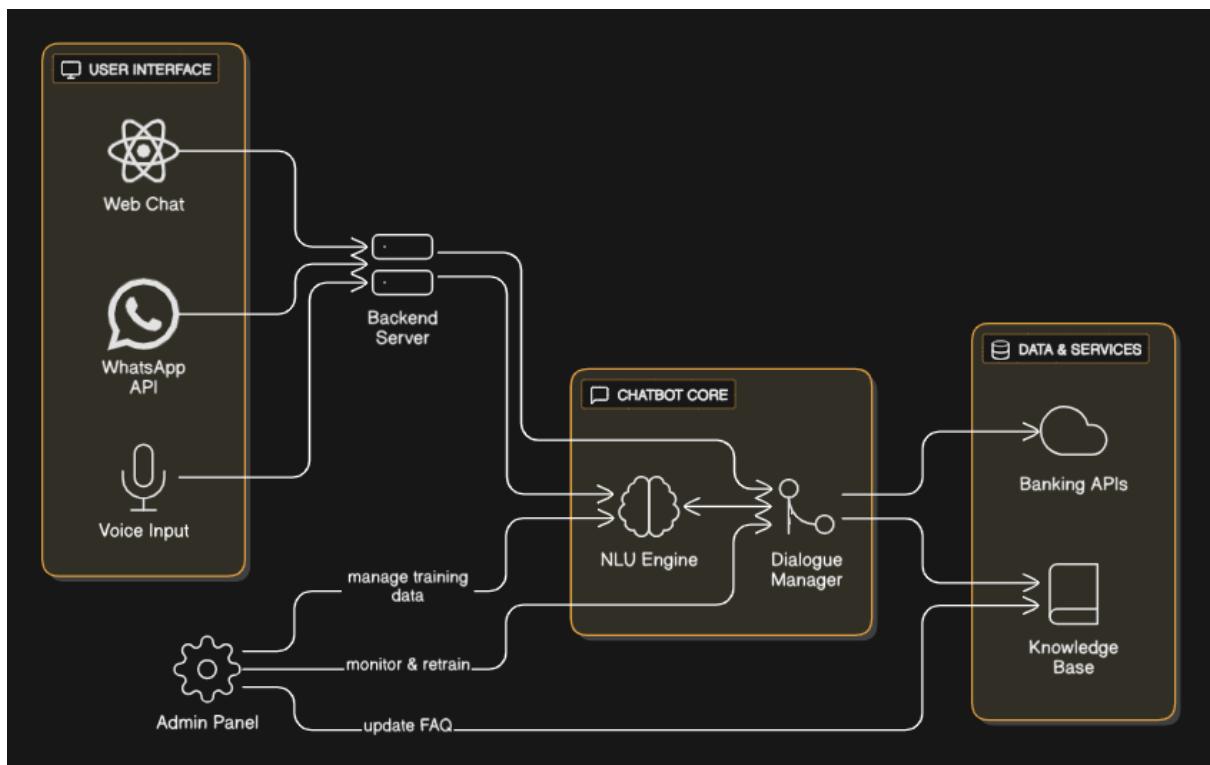
Milestone 4 Evaluation (Week 8):

- Admin can view user logs and edit training data.
- Model re-training triggered from UI works.
- Analytics (intent distribution, top queries) are visible.

7. Workflow Diagram



8. Architecture Diagram



9. Database Schema

