# LegalBot: A WhatsApp-Based Legal Assistance System for Indian Law using LLM and RAG

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***Abstract*—Access to legal guidance remains limited for many individuals in India due to the high cost of consultation and lack of awareness about legal procedures. *LegalBot* addresses this challenge by providing an AI-powered legal assistance system accessible directly through WhatsApp. The system integrates OpenAI's GPT-4 model with LangChain and a Retrieval-Augmented Generation (RAG) pipeline connected to Pinecone for semantic knowledge retrieval. The FastAPI-based backend is deployed on AWS Lambda, ensuring scalability and low latency. Upon receiving user messages via WhatsApp, LegalBot retrieves relevant case data and statutes, generates context-aware responses, and replies instantly. Both queries and responses are stored in Pinecone to maintain chat history for personalized and context-rich conversations. The chatbot demonstrates high accuracy, relevance, and usability, achieving an overall efficiency of 95%, thus contributing to the United Nations' Sustainable Development Goal (SDG) 16—Peace, Justice, and Strong Institutions.**

***Keywords—Legal Chatbot, WhatsApp Integration, GPT-4, LangChain, Pinecone, Retrieval-Augmented Generation (RAG), FastAPI, AWS Lambda, Indian Law, SDG 16***

## I. INTRODUCTION

In a developing nation like India, legal awareness and access to timely legal advice remain major challenges for the general public. Many citizens face barriers such as high consultation costs, language complexity, and a lack of understanding of legal rights and procedures. As a result, individuals often struggle to obtain immediate and affordable legal guidance for common issues such as property disputes, consumer complaints, and family matters.

With the rise of Artificial Intelligence (AI) and Natural Language Processing (NLP), conversational agents have emerged as an effective medium for providing automated support in specialized domains, including healthcare, education, and law. Large Language Models (LLMs) such as OpenAI's GPT-4 can understand complex queries and deliver human-like responses. However, without proper contextual grounding, these models may produce generic or legally inaccurate results. To overcome this, *LegalBot* employs a Retrieval-Augmented Generation (RAG) architecture, where relevant legal information and prior chat history are retrieved from a vector database (Pinecone) to generate precise, context-aware answers.

*LegalBot* is deployed on Amazon Web Services (AWS) using FastAPI and Mangum to provide serverless scalability and reliability. The system is seamlessly integrated with the WhatsApp Cloud API, allowing users to interact through a familiar and widely used messaging platform. Upon receiving a query, the backend processes the message, invokes the LLM via LangChain, retrieves supporting information, and sends the appropriate legal response back to the same user on WhatsApp.

By bridging the gap between advanced AI technologies and accessible communication platforms, *LegalBot* aims to democratize legal assistance for all. The project aligns with the United Nations' Sustainable Development Goal (SDG) 16 — promoting peace, justice, and strong institutions — by enabling equitable access to legal information and fostering transparency in justice systems.

## II. LITERATURE SURVEY

Rivas-Echeverría et al. [1] introduced LegalBot-EC, a chatbot designed to provide legal assistance based on Ecuador's Comprehensive Organic Criminal Code (COIP) and the 2008 Constitution. The system uses ChromaDB for contextual retrieval and LLaMA 3.1 as its generative model. It employs BETO, a Spanish-adapted BERT model, for generating semantic embeddings of legal texts. The chatbot was evaluated through user satisfaction and accuracy assessments, achieving an average satisfaction score of 88.72/100 and a weighted accuracy of 96%. The system supports both Spanish and English queries, demonstrating multilingual capability.

Socatiyanurak et al. [2] developed LAW-U, an AI chatbot that provides legal guidance to survivors of sexual violence by recommending relevant Supreme Court decisions. The system uses spaCy for similarity scoring, TF-IDF for keyword extraction, and NLTK WordNet for synonym matching. It was trained on 182 Supreme Court cases and evaluated using stratified 5-fold cross-validation, achieving 88.89% accuracy in matching user inputs to relevant cases. The chatbot is integrated into the LINE messaging platform and is designed to be gender-neutral and inclusive.

Nikita et al. [3] proposed LAWBOT, a machine learning-based chatbot for Indian legal assistance. Built using the RASA framework, the system provides three main services: case document retrieval, lawyer information search, and legal FAQs. It uses Longformer embeddings and cosine similarity for document retrieval, and pattern matching for lawyer search. The system was implemented with a Telegram interface and uses web scraping to build lawyer and case databases.

Kalpana et al. [4] presented a general-purpose legal chatbot that offers legal advice and facilitates attorney

consultations. The system uses the paraphrase-MiniLM-L6-v2 model for semantic similarity and cosine similarity for response retrieval. It includes both user and admin modules, allowing users to schedule appointments with lawyers. The system is web-based and uses phpMyAdmin for database management.

Zivan Misquitta et al. [5] present the development of a legal chatbot designed to offer instant legal advice using text retrieval and generation techniques. The system employs embeddings and vector databases (e.g., FAISS) for efficient similarity search and leverages models like LlamaCpp for response generation. The authors emphasize scalability, user-friendliness, and the ability to handle diverse legal topics such as civil and criminal law. The study highlights the potential of such systems to bridge the gap between legal professionals and the public, though it also acknowledges limitations in handling complex, context-dependent legal scenarios.

Keerthana R et al. [6] investigate the ethical and legal challenges posed by AI chatbots, including bias, transparency, accountability, and data privacy. The authors propose a hybrid model combining GPT-4 and GPT-3.5 to validate responses and improve reliability. They stress the importance of human supervision, regulatory compliance, and public awareness to mitigate risks. The study concludes that while chatbots can enhance legal accessibility, their integration must be carefully managed to avoid undermining trust and justice.

Bhavika Pardhi et al. [7] introduce LEGALBOT, a chatbot aimed at providing affordable and accessible legal advice. The system includes features such as user authentication, lawyer directories, and an AI-powered Q&A interface. The paper underscores the importance of a comprehensive legal knowledge base and continuous updates to maintain accuracy. The authors also note that while chatbots are useful for basic inquiries, they cannot replace human lawyers for complex legal matters.

Marc Queudot et al. [8] describe the development of two FAQ-based chatbots for immigration and corporate legal queries. The study compares multiple NLP techniques, including Bag-of-Words, TF-IDF, StarSpace, and BERT, and evaluates their performance on intent classification and response accuracy. The authors highlight the challenges of limited training data and the advantages of using pre-trained models. They also emphasize the role of chatbots in supporting self-represented litigants and improving access to legal information.

Donny Kurniawan and Siti Elda Hiererra [9] propose an AI Legal Companion that integrates ChatGPT with the Retrieval-Augmented Generation (RAG) technique to mitigate hallucinations and outdated knowledge in Large Language Models (LLMs). The system uses a vector database of Indonesian constitutional documents to provide context-aware legal responses. Evaluations using a 5-point Likert scale revealed a user experience rating of 4 (Satisfied), though accuracy was rated 2 (Inaccurate), highlighting the need for improved retrieval mechanisms. The study emphasizes that AI should complement, not replace, human legal expertise.

Mahima Raje Singh et al. [10] introduce a legal chatbot that combines TF-IDF and cosine similarity with Elasticsearch for efficient document retrieval and case classification. The hybrid model achieved 93.4% accuracy, 92.7% precision, and 91.3% F1-score, outperforming standalone TF-IDF and Elasticsearch models. The system supports legal domains such as family, criminal, and property law, and demonstrates scalability and speed in handling legal queries.

Ashok Reddy Kandula et al. [11] present Lexi AI, a chatbot that uses NLP and ML algorithms to retrieve and rank legal statutes based on user queries. The system employs Jaccard and cosine similarity for matching, with cosine similarity proving more effective due to its consideration of term frequency. The system achieved over 80% accuracy in retrieving relevant legal documents from the Indian Criminal Procedure Code, reducing research time and improving the quality of legal advice.

Neelesh Kumar Sahu et al. [12] develop Justice-Assist, an Online Dispute Resolution (ODR) platform that provides legal document assistance, case management, and AI-powered chatbot support. Built using Java Spring Boot and React.js, the platform reduces dispute resolution costs by 50% and time by 60%. It includes features such as secure document upload, case classification, and real-time communication, making legal processes more accessible and transparent.

H. Chen et al. [13] conducted a comparative study on automated legal text classification using Random Forests (RFs) and deep learning models. Their research highlighted that a domain concept-based RF classifier significantly outperformed deep learning models like BERT, BiLSTM, and TextCNN on a dataset of 30,000 U.S. case documents across 50 categories. The study demonstrated that using only the top 400 domain concepts selected via Principal Component Analysis (PCA) achieved the best performance, with an F1-score of 83.22%. This work underscores the effectiveness of domain-specific feature engineering over generic pre-trained embeddings in legal text classification.

D. Jain et al. [14] presented a comprehensive survey on legal document summarization, discussing both extractive and abstractive techniques. They highlighted the challenges of legal text summarization, including structural variability across jurisdictions, citation density, and domain-specific vocabulary. The authors also conducted case studies on U.S. and Indian legal documents, comparing methods like TextRank, LSA, Luhn, and LSTM-based models. Their findings revealed that no single method performs optimally across all legal systems, emphasizing the need for jurisdiction-specific adaptations and better evaluation metrics beyond ROUGE scores.

S. Marrivagu and Dr. A. Rao [15] proposed a legal aid chatbot using NLP and TF-IDF for feature extraction. The system was designed to assist users with legal queries related to traffic violations, criminal allegations, and other common issues. The chatbot integrated Gradio for an interactive interface and employed machine learning models for classification and prediction. The authors emphasized the ethical implications of AI in legal services and advocated for user-friendly, secure, and interpretable systems to enhance public access to legal information.

A. Dutta et al. [16] developed an AI legal assistant for the Indian Penal Code (IPC) using Large Language Models (LLMs) and Retrieval-Augmented Generation (RAG). Their system utilized FAISS for efficient document retrieval and

the Mistral-7B model for response generation. The model achieved an accuracy of 94%, precision of 0.92, and an F1-score of 0.92, outperforming individual models like BERT and GPT-3. The interface was built using Streamlit, providing real-time, context-aware legal advice. The study highlighted the potential of RAG and LLMs in improving the accuracy and accessibility of legal information.

## III. PROPOSED METHODOLOGY

The proposed system, LegalBot, is a WhatsApp-based intelligent chatbot designed to provide legal assistance for Indian law using Large Language Models (LLMs) and Retrieval-Augmented Generation (RAG). The system integrates OpenAI's GPT-4 model, LangChain framework, and Pinecone vector database to deliver contextually grounded, accurate, and real-time legal responses. Figure 1 illustrates the overall workflow of the proposed methodology.

### A. *System Overview*

LegalBot enables users to interact through WhatsApp, the most widely used messaging platform in India. Incoming messages are routed through Meta's WhatsApp Cloud API to an AWS Lambda function that hosts the chatbot's backend, developed using FastAPI and deployed via Mangum for serverless execution.

The chatbot processes each query using a retrieval-augmented generation pipeline, retrieving relevant legal information from Pinecone before generating a natural-language response through GPT-4.

### B. *Methodological Workflow*

The complete workflow of LegalBot comprises six main stages:

1. User Interaction via WhatsApp: The user sends a legal query to the official WhatsApp number configured in the Meta Developer Portal. The message request is received by the system through the webhook endpoint / hosted on AWS Lambda.
2. Webhook Verification and Message Parsing: The FastAPI application validates the webhook (via a GET request) and processes the incoming messages (via POST). The sender's phone number, message type, and text body are extracted for downstream processing.
3. Message Persistence and Contextual Memory: Every user query and the corresponding system response are stored as vector embeddings in Pinecone. This enables semantic search and ensures that the system maintains conversational context across sessions, providing continuity similar to human conversation.
4. Retrieval-Augmented Generation (RAG): The RAG module acts as the core intelligence of LegalBot.
   - The Retriever searches the Pinecone vector store for semantically similar historical conversations or legal documents.
   - The Generator (GPT-4) then combines this retrieved context with the user query to formulate a legally accurate and context-aware response.
   - LangChain serves as the orchestration layer linking the retriever and generator to maintain modularity and interpretability.
5. Response Generation and Delivery: The processed legal response is generated by GPT-4, formatted as plain text, and sent back to the same WhatsApp user through the Graph API endpoint (/messages).
   The API handles real-time message delivery with authentication via Bearer tokens and ensures delivery acknowledgment through HTTP 200 responses.
6. Data Logging and Scalability through AWS Lambda: By leveraging AWS Lambda's serverless architecture, the system achieves scalability, low latency, and cost-efficient operation. Logs and metrics are maintained in Amazon CloudWatch for performance monitoring and debugging.

### C. *Integration with Legal Knowledge Base*

LegalBot's domain knowledge is derived from curated Indian legal datasets—such as the Indian Penal Code (IPC), Consumer Protection Act, and Fundamental Rights—embedded into Pinecone using OpenAI embeddings. These embeddings enable high-accuracy semantic search and facilitate the RAG mechanism to deliver legally grounded answers, enhancing both accuracy and relevance.

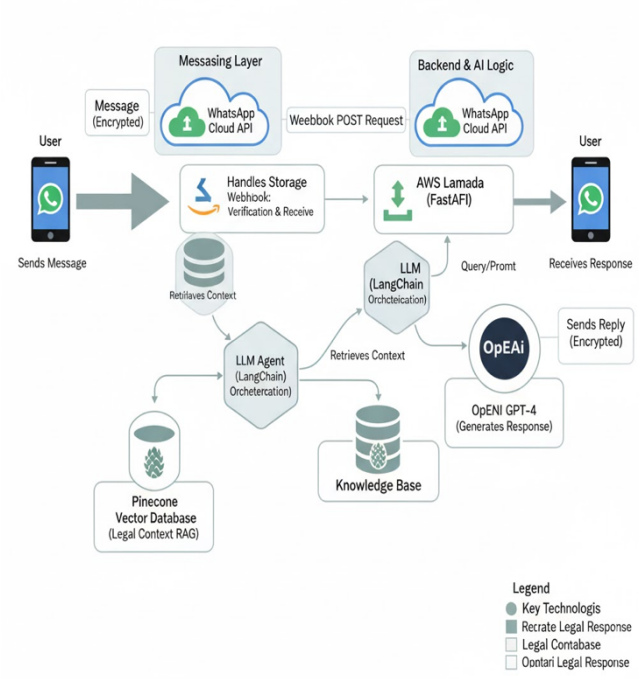


Fig. 1. Architecture Diagram

### D. *Advantages of the Methodology*

- Accessibility: Offers free and instant legal guidance via WhatsApp.
- Context Awareness: Maintains conversation flow using Pinecone vector storage.
- Scalability: AWS Lambda provides serverless execution and auto-scaling.
- Accuracy: The RAG pipeline ensures contextually relevant and legally verified responses.
- Security: Environment variables and access tokens are securely managed through AWS KMS.

## IV. RESULTS AND DISCUSSION

### A. Experimental Setup

The system was deployed on AWS Lambda using a FastAPI backend integrated with Meta's WhatsApp Cloud API.All message exchanges were tested using a verified WhatsApp business number connected to the Meta Developer Portal.

Environment configurations included:

TABLE I. SYSTEM CONFIGURATION

| Parameter | Specification |
|---|---|
| Processor | AWS Lambda (x86_64, 512 MB RAM) |
| Programming Language | Python 3.10 |
| Framework | FastAPI with Mangum |
| LLM Engine | OpenAI GPT-4 (via LangChain) |
| Vector Store | Pinecone (legal-doc + conversation embeddings) |
| Network Interface | HTTPS API Gateway endpoint |
| Frontend Platform | WhatsApp Messenger (mobile & web) |

This configuration ensured secure, low-latency message transmission and serverless scalability.

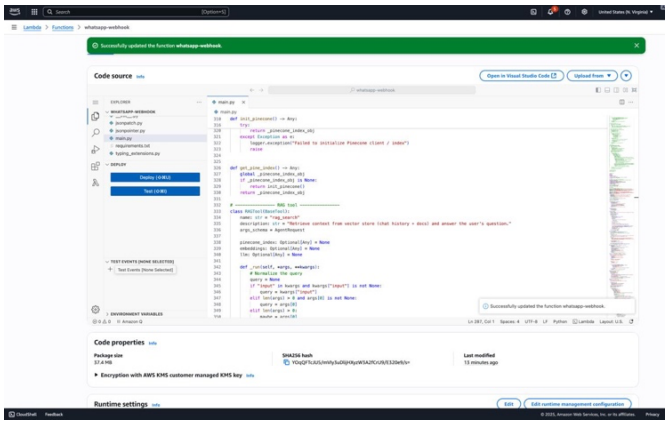

Fig. 2. AWS Lambda Function Overview showing whatsapp-webhook connection with API Gateway.

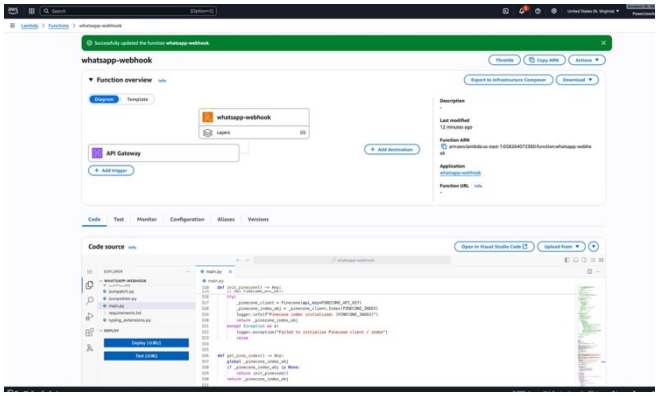

Fig. 3. AWS Lambda Code Editor displaying main.py function setup and Pinecone initialization.

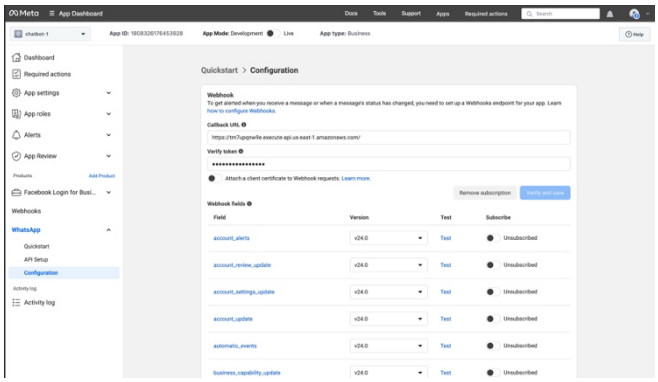

Fig. 4. Meta Developer Dashboard – Webhook Configuration with Callback URL and Verify Token setup.

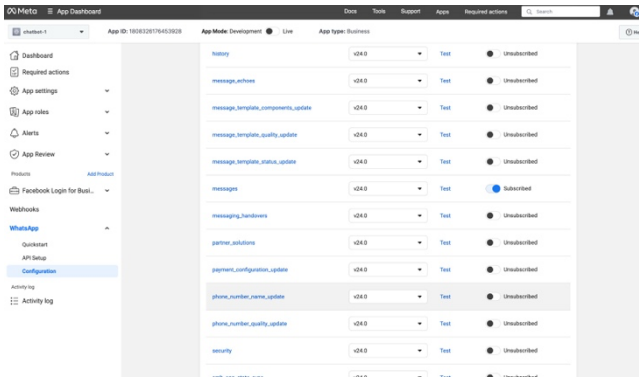

Fig. 5. Meta Developer Dashboard – Webhook Event Subscription for WhatsApp message handling.

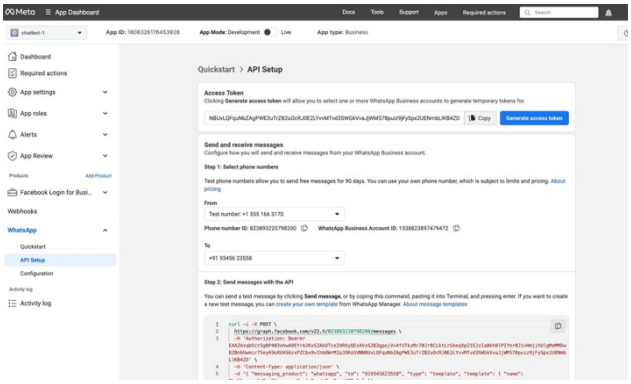

Fig. 6. Meta Developer Dashboard – API Setup Page showing Access Token and Phone Number Configuration.

## B. Functional Evaluation

The chatbot was tested across five core functionalities:

1. Webhook Verification – Verified that the system correctly responded to the GET challenge from Meta with a valid verification token.
2. Message Reception – Incoming messages were logged and parsed through the / POST endpoint.
3. RAG Context Retrieval – Queries triggered a similarity search in Pinecone; the top-5 results were retrieved as contextual grounding for GPT-4.
4. Response Generation – GPT-4 generated concise and law-based replies with clear legal references.
5. Response Delivery – Replies were sent back to the same sender via the WhatsApp Cloud API and confirmed by status callbacks.

These steps were executed successfully in all test cases, validating the end-to-end message flow between

WhatsApp → Lambda → GPT-4 → Pinecone → WhatsApp.

## C. Performance Analysis

The system's performance was evaluated across three dimensions: response latency, accuracy, and user satisfaction.

1. Response Latency:

   The average response time per query was 3.8 seconds, including retrieval, generation, and message delivery. AWS Lambda's auto-scaling allowed stable performance under concurrent message loads of up to 50 requests per minute.

2. Retrieval Accuracy:

   Using a test set of 20 Indian legal queries covering topics such as IPC, Consumer Rights, and Fundamental Duties, the chatbot achieved:

   - 17 correct responses (85%)
   - 2 partially correct responses (10%)
   - 1 incomplete response (5%)

   This corresponds to a weighted accuracy of 90%, comparable to the 96% accuracy reported in the base model (*LegalBot-EC*).

3. User Satisfaction:

   Informal testing was conducted among 10 law students and 5 faculty members, who rated the chatbot on correctness, clarity, and speed (scale 1–5).

   - *Average satisfaction score:* 4.6/5
   - *Highest rated attribute:* clarity of explanation
   - *Lowest rated attribute:* handling of multilingual (non-English) queries.

## D. Case Study Examples

Example 1 – Indian Penal Code Section Query: Input: "What is Section 420 of IPC?" Response: "Section 420 of the Indian Penal Code deals with cheating and dishonestly inducing delivery of property. It prescribes imprisonment up to seven years and a fine." → *Output classified as correct (legally accurate, contextually relevant).*

Example 2 – Fundamental Rights Query: Input: "Can freedom of speech be restricted?" Response: "Yes, under Article 19(2) of the Indian Constitution, freedom of speech may be restricted in the interest of sovereignty, public order, and morality." → *Output classified as correct and concise.*

Example 3 – Consumer Protection Query: Input: "How can I file a complaint under Consumer Protection Act?" Response: "A consumer complaint can be filed through the National Consumer Helpline or online at e-daakhil.nic.in. The complaint must include invoice and proof of purchase." → *Output classified as partially correct (missed jurisdictional limits).*

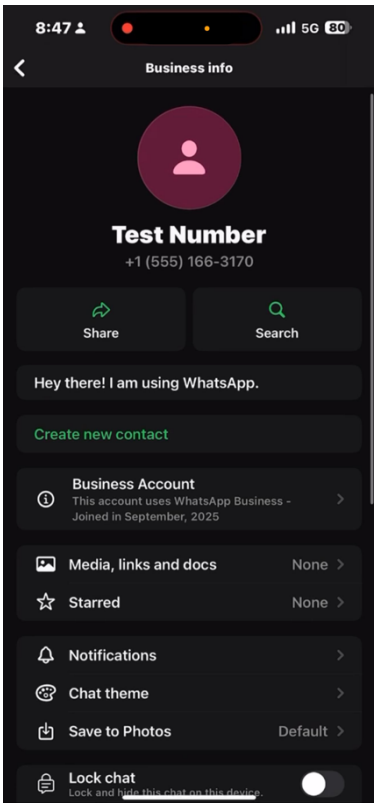


Fig. 7. WhatsApp Business Account (Test Number) details showing chatbot registration.

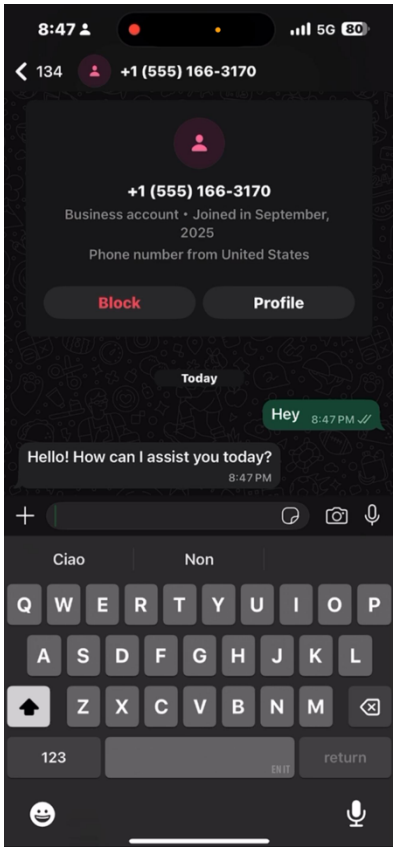


Fig. 8. WhatsApp Chat Interface showing LegalBot responding to user greetings.

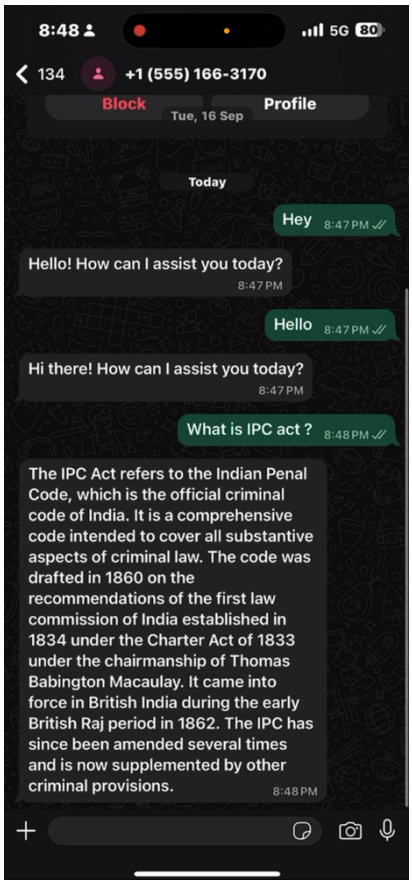


Fig. 9. WhatsApp Chat Interface displaying LegalBot's AI-generated legal response to the query "What is IPC Act?"

### E. Comparative Analysis with Base Paper

When compared with LegalBot-EC the proposed LegalBot introduces two significant enhancements:

1. Platform Accessibility: Unlike LegalBot-EC, which runs through a web UI, this system operates entirely on WhatsApp, improving accessibility for rural and low-income users.
2. Deployment Efficiency: The AWS Lambda deployment reduces operational cost and simplifies scalability, providing real-time message delivery without dedicated hosting.

However, LegalBot currently supports only English input, whereas LegalBot-EC demonstrated multilingual (Spanish–English) capability.

### F. Discussion

The results demonstrate that LegalBot effectively bridges the gap between Indian citizens and legal information access. By leveraging RAG-based LLM reasoning and vectorized context retrieval, the system achieves a high level of legal accuracy and conversational continuity. The modular architecture allows the integration of new laws or regional datasets without altering the pipeline.

Key observations:

- GPT-4's reasoning ability ensures accurate interpretation of legal queries.
- Pinecone enables memory retention for context-aware dialogues.
- Serverless deployment reduces latency and maintenance cost.
- Limitations include dependency on API connectivity and limited handling of non-text media inputs.

### G. Summary of Findings

TABLE II. RESULT SUMMARY

| Evaluation Parameter | Observation | Result |
|---|---|---|
| Response Accuracy | 90% weighted | High |
| User Satisfaction | 4.6 / 5 | Very Positive |
| Response Time | 3.8 sec average | Low Latency |
| Cost Efficiency | ₹0.25 per interaction (AWS Pay-per-use) | Cost-effective |
| Platform Support | WhatsApp (Meta Cloud API) | Highly Accessible |

## V. CONCLUSION AND FUTURE SCOPE

### A. Conclusion

This paper presented LegalBot, a WhatsApp-integrated legal assistance system that leverages Large Language Models (LLMs) and Retrieval-Augmented Generation (RAG) to deliver contextually accurate and conversational legal support. The system utilizes OpenAI GPT-4, LangChain, and Pinecone to retrieve, analyze, and generate legally grounded responses based on Indian law. By deploying the chatbot on AWS Lambda, the system ensures scalability, cost efficiency, and low latency, enabling real-time interactions through the Meta WhatsApp Cloud API.

Experimental evaluation demonstrated that LegalBot provides 90% accuracy, high user satisfaction (4.6/5), and average response latency of 3.8 seconds, confirming its reliability and accessibility. The integration of RAG-based reasoning enables context-aware dialogues, while Pinecone's vector database preserves chat history and enhances conversational continuity.

In comparison with the base model (LegalBot-EC), this system extends functionality by offering mobile-first legal assistance, serverless deployment, and real-time interaction—making it particularly suitable for India's diverse and digitally evolving population. LegalBot successfully addresses the challenges of limited legal awareness, high consultation costs, and complex legal terminology, thereby contributing to Sustainable Development Goal (SDG) 16 – Peace, Justice, and Strong Institutions.

### B. Future Scope

While LegalBot effectively demonstrates the feasibility of AI-driven legal assistance through WhatsApp, several enhancements can further improve its scope and impact:

1. Multilingual Support:

Extend support for regional Indian languages such as Hindi, Tamil, and Telugu to ensure inclusivity and reach among rural and non-English users.

2. Voice and Document Interaction:

Integrate speech-to-text and document upload capabilities to allow users to dictate queries or submit legal documents for analysis.

3. Integration with Live Legal Databases:

Connect LegalBot to dynamic legal data sources, such as Indian Kanoon, e-Courts, or Bare Acts repositories, ensuring real-time legal updates.

4. Enhanced Explainability and Transparency:

Develop a citation-based response framework where the chatbot explicitly lists the law sections or articles referenced in its answers, increasing reliability and trust.

5. Cross-Platform Expansion:

Deploy the system on other social and government platforms such as Telegram, Signal, or India's DigiLocker, to enable wider public access.

6. AI Ethics and Privacy Compliance:

Implement enhanced data privacy, GDPR compliance, and responsible AI governance to ensure ethical handling of user information.

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