

Research Document on AI models for Doctor Appointment Chatbot

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1. Abstract

Artificial Intelligence (AI) has revolutionized chatbot technology, making it more interactive and efficient for various applications, including healthcare. This research explores different AI models used in chatbots, their accuracy rates, and the advantages of adopting a hybrid approach that combines AI with a Graphical User Interface (GUI). The study compares rule-based, machine learning, natural language processing (NLP), and speech-to-text models, analysing their performance in handling doctor appointment scheduling. While AI-powered models like GPT-4 and Google Dialogflow provide high accuracy in conversational interactions (85-95%), integrating a GUI ensures a structured, user-friendly experience, reducing errors and improving accessibility. The hybrid approach enhances chatbot reliability by allowing users to switch between AI-driven conversations and manual appointment booking. Additionally, speech recognition technology is incorporated to enable voice command functionality, making the chatbot more versatile. This research concludes that a hybrid AI-GUI model offers the best balance of automation, usability, and accuracy for modern doctor appointment chatbots.

2. Introduction

Artificial Intelligence (AI) models are widely used in chatbots to provide automated, human-like interactions.

In this research, we compare various AI models, their accuracy rates, and justify why a hybrid approach (AI + GUI) is the best choice for our doctor appointment chatbot.

3. AI Models for Chatbots

➤ Rule-Based Models:

- Use predefined rules and decision trees
- Limited responses, cannot understand complex queries
- Example: Regular Expressions (Regex) and Simple FAQ bots
- **Accuracy:** 60-70%

➤ Machine Learning (ML)-Based Models

- Train on past conversations and learn patterns
- Requires labelled datasets for training

- Example: Support Vector Machines (SVM), Naïve Bayes
- **Accuracy:** 75-85%

➤ Natural Language Processing (NLP) Models

- Uses AI to process human language
- Can handle unstructured conversations
- Example: OpenAI's GPT-4, Google Dialogflow
- **Accuracy:** GPT-4 :75-85%

Dialogflow: 80-90%

Rasa NLU: 80-88%

➤ Speech-to-Text & Text-to-Speech Models

- Converts speech into text and vice versa
- Uses deep learning to improve recognition
- Example: Google Speech API, Vosk
- **Accuracy:** Google Speech-to-Text: 90-95%






Vosk: 85-90%

4. Comparison of AI Models

Model Type	Accuracy	Pros	Cons
Rule based	60-70%	Easy to implement	Limited responses
ML based	75-85%	Learns from data	Needs labelled diagram
GPT-4	85-95%	High accuracy, supports complex queries	Requires API
Dialogflow	80-90%	Google cloud integration	Limited customization
Rasa	80-88%	Open source, customizable	Requires training data
Google speech-to-text	90-95%	High accuracy for voice input	API cost for high usage
Vosk	85-90%	Works offline	Lower accuracy than Google

➤ Why Use a Hybrid Approach (AI+GUI)?

A hybrid chatbot combines AI-powered conversations with a structured GUI-based interface. Here's why it's the best approach:

-  Higher Accuracy: AI models provide smart answers, while the GUI ensures structured appointment booking.
-  User Flexibility: Users can either type, talk, or click buttons.
-  Faster Responses: AI handles queries, while GUI simplifies scheduling.
-  Improved User Experience: Users can switch between chatbot and manual form filling.
-  Better Error Handling: If AI fails to understand, the GUI provides an alternative booking method.

5. Conclusion

For our doctor appointment chatbot, we use a hybrid approach:

- GPT-4 for AI-based responses
- Google Speech-to-Text for voice commands
- A GUI for structured appointment booking

6. References

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2. Vaswani, A. et al., "Attention Is All You Need", NeurIPS, 2017.
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