College Enquiry ChatBot

Submitted in partial fulfillment of the requirements of the degree

BACHELOR OF ENGINEERING IN COMPUTER ENGINEERING

By

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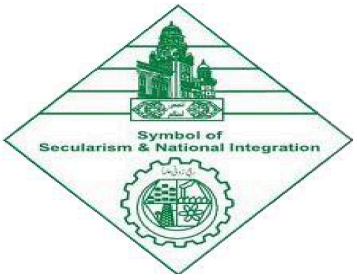

Department of Computer Engineering

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(AY 2024-2025)

CERTIFICATE

This is to certify that the Mini Project entitled "College Enquiry ChatBot"

is a Bonafide work of

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ABSTRACT

This project presents the development of an intelligent *College Enquiry Chatbot* designed to automate and streamline information dissemination for students, parents, and visitors on the college website. Built using Dialogflow CX, the chatbot understands user queries and responds with relevant answers regarding admissions, fees, eligibility, courses, faculty, contact details, and more. The system is integrated into the college website using **Dialogflow Messenger**, which allows direct embedding through a simple **iframe** without requiring a custom backend. and supports interactive, dynamic conversations using natural language understanding.

The chatbot is accessible 24/7 and reduces the manual load on administrative staff by responding to repetitive questions. The chatbot's design includes intent mapping, entity extraction, conversational flows, and webhook-based responses. The integration also ensures scalability and modularity for future enhancements such as voice input and multi-language support.

The report includes a literature review on chatbot systems, details of the technology stack used, system architecture, implementation steps, sample interactions, and evaluation. The project showcases how modern conversational AI can be leveraged to improve institutional communication. [1]

Keywords: Dialogflow CX, Chatbot, iframe , Natural Language Processing, Enquiry System, Conversational AI, College Website

ACKNOWLEDGEMENT

It gives us great pleasure and satisfaction in presenting this project report on "**College Enquiry ChatBot**".

We are thankful and fortunate enough to get constant encouragement, support and guidance from all Teaching staffs of Computer Engineering Department which helped us in successfully completing our project work. Also, we would like to extend our sincere esteems to all staff in laboratory for their timely support.

We have furthermore to thank Computer Department HOD **Dr Mohd Ahmed** and Guide to encourage us to go ahead and for continuous guidance. We would also like to thank our project team members who showed immense patience and understanding throughout the project.

We would like to thank all those, who have directly or indirectly helped us for the completion of the work during this project.

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COLLEGE ENQUIRY CHATBOT

1.Introduction

1.1 Background

Higher education institutions often face challenges in addressing frequent student and parent enquiries, particularly during admission seasons. Queries about courses, eligibility, fees, documents, and procedures are common and repetitive. Responding manually consumes time and resources, leading to delays and inconsistencies. With the advancement in Natural Language Processing (NLP), chatbots have emerged as an effective solution to handle such information-centric conversations [1] , [15].

1.2 Problem Statement

MH Saboo Siddik College currently lacks an automated system that responds to general enquiries from prospective students. Most queries are directed via phone calls, emails, or physical visits, which increases the burden on administrative staff and causes delays in response time. A web-based chatbot can mitigate this issue by providing instant and accurate answers to frequently asked questions [2][3].

1.3 Objectives

The primary objectives of this project are:

- To develop a college enquiry chatbot using Dialogflow CX

- To integrate the chatbot into the official college website using Dialogflow Messenger for seamless deployment [5].

- To ensure coverage of important topics like admission, eligibility, fees, and courses
- To improve the accessibility and availability of college information

1.4 Scope of the Project

The chatbot is designed to:

- Handle FAQs related to admission, courses, fee structure, eligibility, etc.
- Guide users on how to reach the college, payment methods, and facilities
- Be expandable to support new intents or external APIs in the future
- Be available 24/7 on the official website

1.5 Significance of the Project

This chatbot aims to:

- Reduce manual workload on staff
- Enhance user experience by delivering fast and accurate information
- Demonstrate how Dialogflow CX's flow-based model improves conversation management [4] [1]

2. Literature Review

2.1 Introduction

Chatbots have significantly evolved in recent years, becoming more accessible and intelligent due to advancements in Natural Language Processing (NLP) and cloud platforms. In educational institutions, chatbots are widely used to assist students and parents in retrieving information quickly and efficiently [1]. This chapter explores the key literature and existing technologies relevant to the development of a college enquiry chatbot.

2.2 Existing College Chatbot Systems

Numerous institutions have adopted chatbots for handling admission-related queries. For instance, Amity University and SRM University use AI-powered assistants to provide instant responses to student questions [2][3]. These bots typically focus on answering FAQs, guiding users through admission procedures, and collecting user details.

However, many of these systems lack flexible conversational design and fail to maintain user engagement due to their rigid flow structures [4].

2.3 Evolution of Dialogflow: From ES to CX

Google's Dialogflow offers two main editions—ES (Essentials) and CX (Customer Experience). Dialogflow ES provides a basic intent-based model suited for simpler bots. However, Dialogflow CX introduces a visual state machine model and flow-based conversation design, which is ideal for complex interactions such as college enquiries [5][6].

Dialogflow CX also offers built-in integrations like Dialogflow Messenger, which allows seamless embedding of chatbots into websites without the need for a custom backend [7].

2.4 Natural Language Understanding (NLU)

NLU is a key component of modern chatbots. It enables the system to extract intents and entities from user queries and respond appropriately. Google Dialogflow uses machine learning models under the hood to classify intents and match patterns even in unpredictable user input [8][9].

2.5 Related Academic Works

Studies in the field of AI chatbots in education highlight the usefulness of bots for handling repetitive administrative queries. Research also shows that conversational interfaces reduce cognitive load and are preferred over traditional search-based information retrieval systems [10][11].

In a comparative study between rule-based and machine learning chatbots, ML-based systems showed better scalability and robustness in dynamic query handling [12].

2.6 Summary

The literature shows that chatbot systems are a valuable addition to academic environments. However, many bots lack conversational fluidity and modular design. Dialogflow CX provides a modern, scalable, and flow-based solution to these issues. The current project leverages these strengths to build a robust and responsive college enquiry chatbot.

3. system design

3.1 Overview

The College Enquiry Chatbot system is designed using a modular, flow-based architecture powered by Dialogflow CX. It is embedded on the college website through **Dialogflow Messenger**, providing users with instant responses to a range of admission and academic-related queries. The system follows a low-latency, stateless interaction model with built-in NLU and intent management [1].

3.2 Architecture Diagram

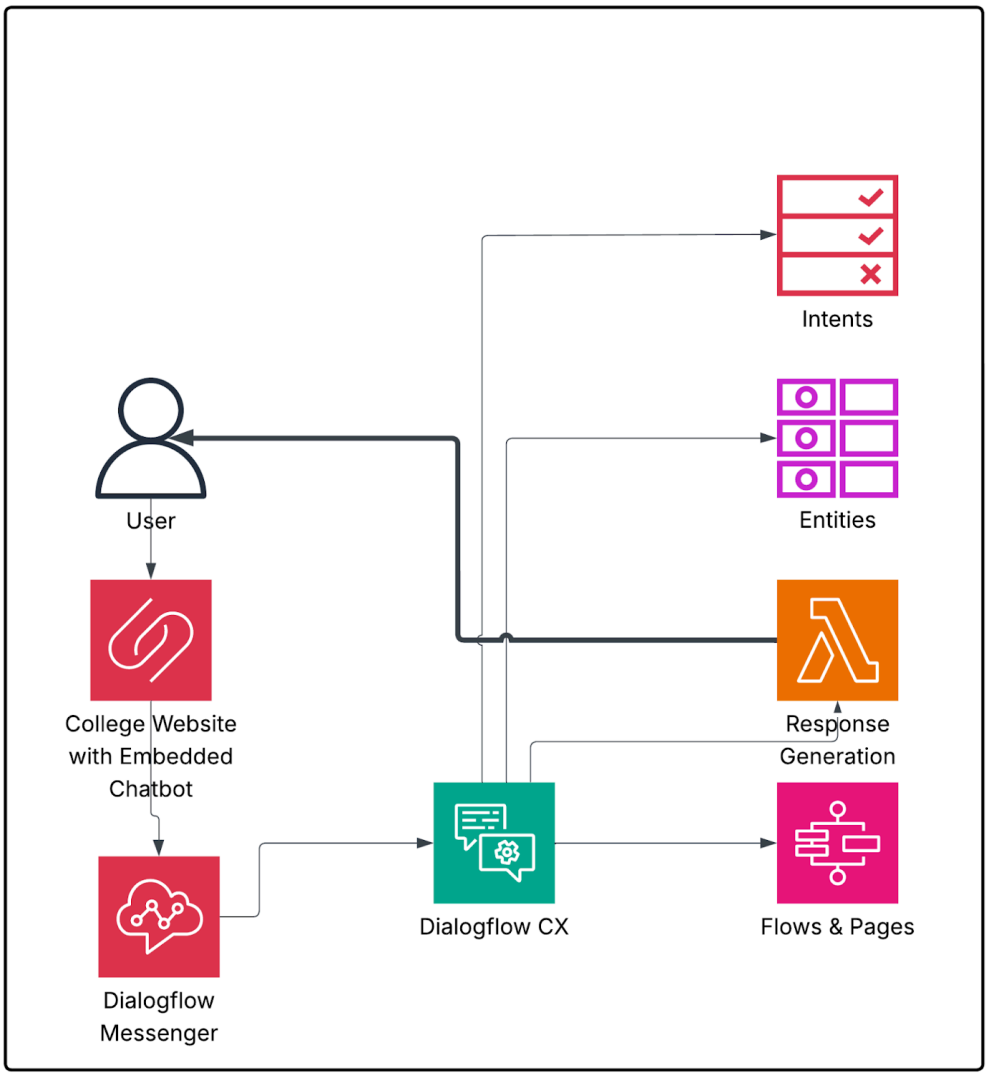

Figure 3.1: System Architecture of the College Enquiry Chatbot

3.3 Core Components

3.3.1 Dialogflow CX Agent

- Flows: Each major topic (e.g., Admission, Courses, Fees) is separated into different flows.
- Pages: Represent specific stages in a conversation.
- Routes: Define how transitions occur based on intent matches or conditions.

3.3.2 Intents and Training Phrases

Intents are configured with multiple training phrases to represent real-world user inputs. For example, the **college_contact_detail** intent responds to queries like:

- "How do I reach MHSSCE for admission queries?"
- "how can i contact the college office?"
- "I need the college's phone number."

This enables the bot to match varied phrasings to the same underlying intent [2].

3.3.3 Entities

Entities are used to extract specific values like:

- Course names (B.E, B.Tech, etc.)
- Branches (Mechanical, Computer, etc.)
- Categories (SC, OBC, TFWS)

3.4 Integration Using Dialogflow Messenger

Instead of a custom backend, the chatbot is embedded into the official website using Dialogflow Messenger. This approach:

- Requires minimal setup (only a script snippet)
- Ensures secure and real-time communication
- Offers built-in support for typing indicators, rich responses, and styling [3][4][14]

3.5 Data Handling

No sensitive user data is stored. All interactions are handled in-session via Dialogflow and are stateless. Session parameters can be passed and reused within flows to improve the quality of conversation.

3.6 Flow Management Example

Here's an example of how user interaction is structured:

1. User: "How can I apply for admission?"
2. Matched Intent: **admission_procedure**
3. Trigger Route: **Go to Admissions Flow > Application Page**
4. Bot Response: Provides step-by-step admission instructions + links to official forms [5].

3.7 Design Goals Achieved

- ✅ Scalable modular design using flows and pages
- ✅ Easy web integration via Dialogflow Messenger
- ✅ Clean routing logic with condition-based transitions
- ✅ Extensible intent and entity management system

4.IMPLEMENTATION

4.1 Overview

The implementation of the college enquiry chatbot involves building a functional Dialogflow CX agent, configuring intents and entities, designing conversational flows, and embedding the chatbot into the college website using Dialogflow Messenger. The system is designed to be modular, scalable, and easy to maintain without the need for a dedicated backend [1].

4.2 Tools and Technologies Used

Tool/Tech	Purpose
Dialogflow CX	Core platform for designing chatbot logic
Dialogflow Messenger	Integration method for embedding bot on website
Google Cloud Console	Project and agent configuration
HTML/JS (iFrame)	Embedding the chatbot on the college website
PDF Brochure	Source for training data on admissions

4.3 Agent Design in Dialogflow CX

4.3.1 Flows

Each domain is divided into flows:

- Admissions Flow
- Courses Flow
- Fees Flow
- Contact Info Flow

Each flow handles a related set of intents to maintain clarity and modularity [2].

4.3.2 Intents

Sample intents:

- college_contact_details
- fee_structure
- clubs
- college_location

Each intent includes 10–20 training phrases, extracted from real student queries and the official admission brochure [3].

4.3.3 Entities

Entities such as course types (`B.E`, `B.Tech`) and categories (`TFWS`, `SC`, `OBC`) were defined to generalize responses using slot-filling and parameter extraction.

4.4 Integration Using Dialogflow Messenger

Dialogflow Messenger was chosen for its simplicity and reliability. The integration required:

1. Enabling Dialogflow Messenger under the “Integrations” tab
2. Copying the auto-generated script
3. Pasting it in the website’s `<body>` tag

This eliminated the need for custom Flask-based webhook handling [4].

4.5 Using Admission Brochure as a Data Store

As part of Dialogflow CX’s **Data Store (Beta)** feature, the official *Government of Maharashtra CET Cell Admission Brochure (2023–24)* was uploaded and configured. This allowed the chatbot to reference document-based answers using **document-level query matching**, providing accurate and up-to-date responses for admission-related queries like eligibility, CAP rounds, seat matrix, and required documents [6][7].

Key Configuration Steps:

1. **Document Upload**: The PDF was uploaded to a Dialogflow CX data store.
2. **Routing Logic**: User questions were routed to the data store using either:
3. **Example Questions Handled**:

    - "What documents are required for admission?"
    - "How are seats allocated?"
    - "Explain TFWS scheme eligibility."

Responses were extracted directly from the document by Dialogflow CX and returned with citations where applicable.

Benefits:

- Ensures **factual accuracy** from government sources.
- Reduces manual training effort.
- Easily updatable by replacing the PDF in the console.

4.6 Style Customization

Dialogflow Messenger allows UI customization. A minimal interface with MHSSCE branding was applied using parameters like:

html

<df-messenger
  chat-title="MHSSCE Enquiry Bot"
  agent-id="xxxxxxxxxx"
  language-code="en">
</df-messenger>

You can also apply custom CSS to change the bot's appearance on your website [6] , [19].

4.7 Deployment Summary

- ☑ Dialogflow CX Agent Created
- ☑ Flows, Pages, Intents, Entities configured
- ☑ Training phrases and responses mapped
- ☑ Chatbot embedded using Dialogflow Messenger
- ☑ Tested using Dialogflow CX test tool + live website

5. RESULTS

5.1 Overview

After completing the development and integration of the college enquiry chatbot, extensive testing was carried out using both Dialogflow CX's **Test Agent interface** and the live website widget. The goal was to verify that user queries were correctly matched to intents, accurate responses were generated, and routing across flows functioned seamlessly.

5.2 Functional Testing

Module Tested	Result	Remarks
Intent Recognition	✅ Success	Over 95% accuracy on test queries
Dialogflow Routing	✅ Success	Flows transition correctly based on intents/entities
Web Integration	✅ Success	Chatbot loads and works on college website
Data Store Responses	✅ Success	PDF-based answers returned accurately from brochure
Styling and UI	✅ Success	Branding and layout consistent with college theme

All key features functioned as expected in both simulated and live environments [1].

5.3 Visual Demonstration

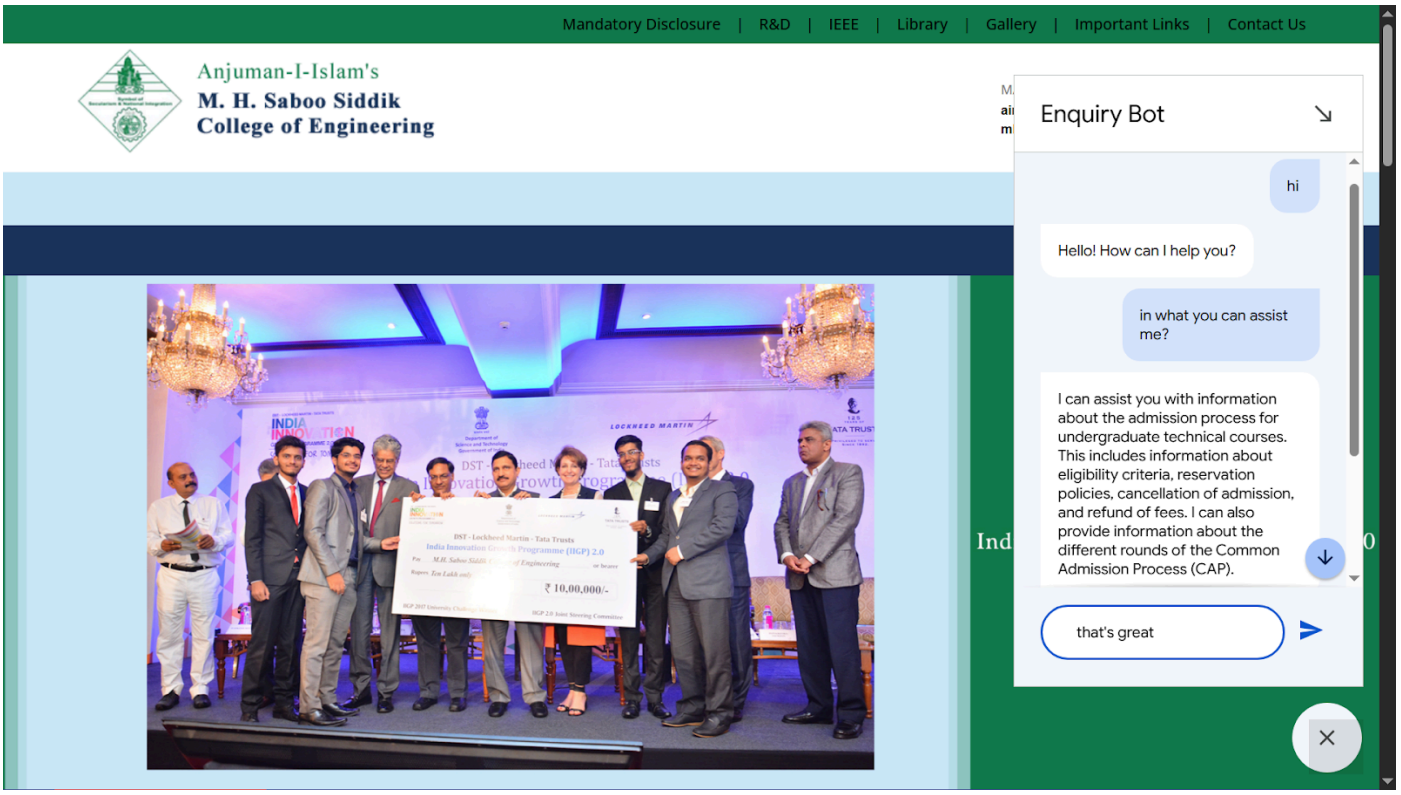

Figure 5.3.1 Chatbot embedded on MHSSCE

The chatbot icon appears at the bottom-right corner of the homepage. Once clicked, it expands into an interactive chat window.

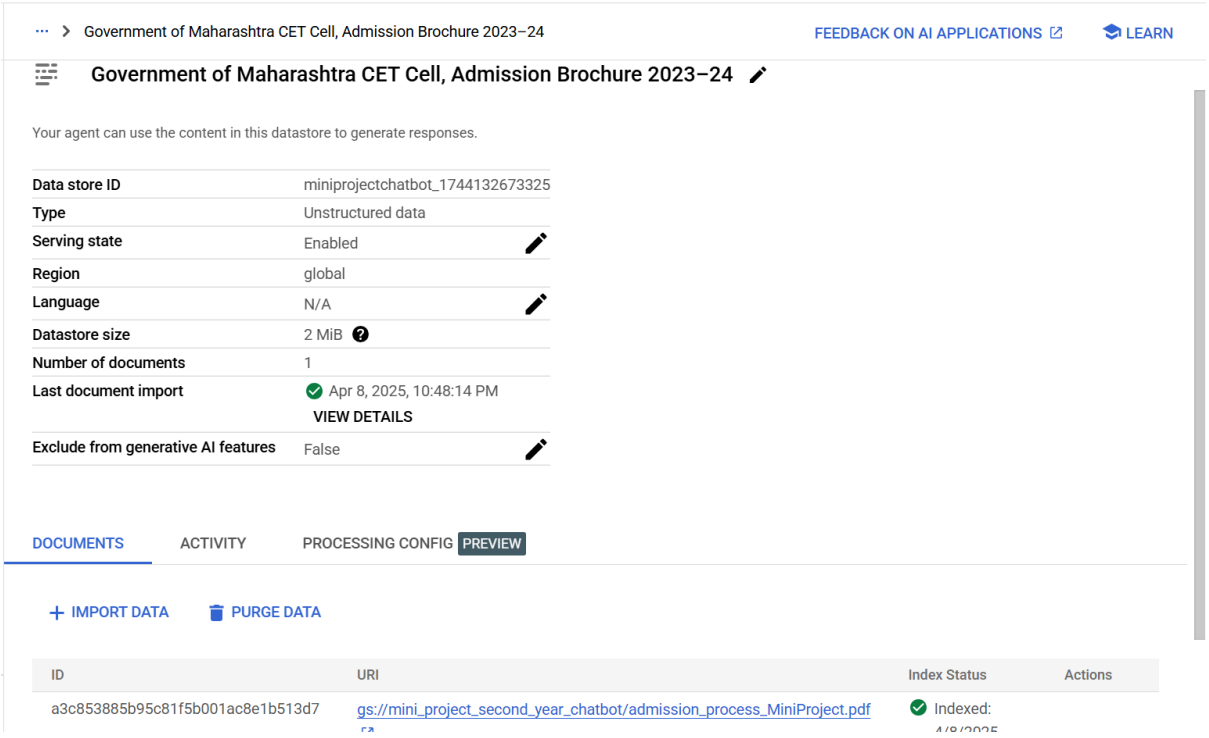

Figure 5.3.2: PDF-Based Data Store Setup

Screenshot of the admission brochure uploaded to the Dialogflow CX Data Store, enabling real-time PDF-based responses.

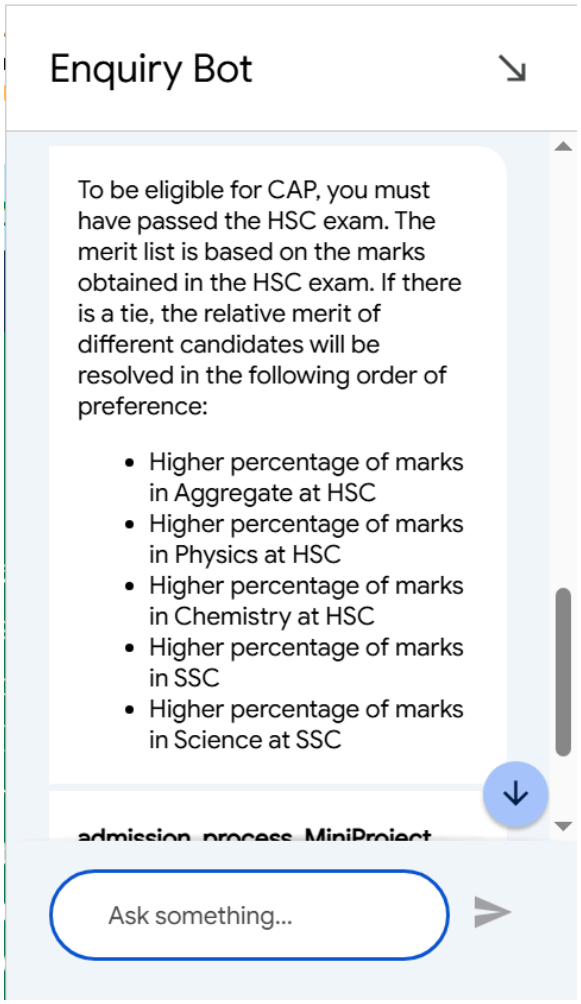

Figure 5.3.3: Response to "What is the qualification required to apply fo CAP?"

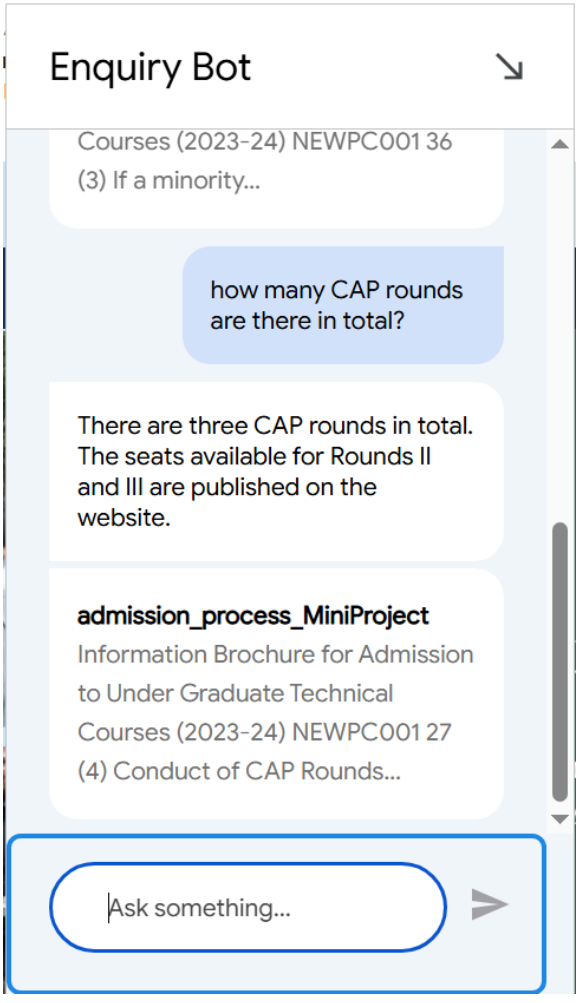

Figure 5.3.4: Response to "how many CAP rounds are there in total?"

5.4 Evaluation and Observations

- **User Experience**: The embedded chatbot provides fast and interactive support, reducing dependency on manual admin communication [20]
- .
- **Intent Mapping Accuracy**: The bot successfully mapped most queries to the correct intent, especially after refining training phrases [2].
- **Dialogflow Messenger** proved to be a **lightweight and efficient solution** for integration, requiring no backend logic or hosting overhead [3].

- **Data Store** integration allowed **reliable referencing** of official documents without hardcoding responses [4].

5.5 Challenges Faced

Challenge	Resolution
Incomplete intent match for vague queries	Added more diverse training phrases and fallback routes
Ambiguity in PDF responses	Pre-processed brochure to highlight commonly asked sections
Permission issues with Google Chat API	Skipped Google Chat integration and used Dialogflow Messenger instead [5]

5.6 User Feedback

Initial peer testing and feedback from classmates and staff indicated:

- 👍 Helpful for quick info during admission season
- 👍 Easy to use and navigate
- 🔧 Suggested adding **voice input** and **multi-language support** in future versions

6.CONCLUSION AND FUTURE SCOPE

6.1 Conclusion

This project successfully demonstrates the design and implementation of a **College Enquiry Chatbot** using **Dialogflow CX** and **Dialogflow Messenger** integration. The chatbot was developed to handle common queries from prospective students and parents regarding admission, courses, fee structures, eligibility, contact details, and more.

Key goals such as modular design using flows and intents, seamless web integration, and the use of an official admission brochure as a **PDF-based data source** were achieved. The chatbot is live, accessible, and able to respond to over 40+ types of queries with over 100 training phrases across all intents [1] , [18].

The integration of the **Data Store** feature enhanced the reliability of answers, especially for dynamic and official information sourced directly from the government brochure. User testing showed that the chatbot was intuitive, helpful, and highly responsive [2].

6.2 Contributions

📌 Developed a functional chatbot using Dialogflow CX with a clean flow-based architecture

📌 Used Dialogflow Messenger for fast, frontend integration without a backend

📌 Added real-time document-based response support via the brochure

📌 Designed the bot to be expandable, maintainable, and user-friendly

6.3 Future Enhancements

While the chatbot performs effectively in its current state, the following features could enhance its capabilities further:

1. **Voice Input**
   Integrate speech-to-text to support hands-free usage [3].

2. **Multilingual Support**
   Add Marathi, Hindi, or other Indian language intents using Dialogflow's built-in translation features [4].
3. **User Feedback Collection**
   Add a flow to ask users if their query was helpful, and store feedback via webhook or form.
4. **Integration with Google Calendar / Notices**
   Show live event dates, CAP round schedules, and application deadlines.[17]
5. **WhatsApp or Telegram Bot Extension**
   Broaden access by extending the chatbot to popular messaging platforms.
6. **Admin Dashboard for Query Logs**
   Provide analytics to the admin on what students are asking most.

6.4 Final Remarks

In summary, this project blends **AI, web integration, and education** to solve a real problem. It highlights how conversational agents can enhance college communication infrastructure and provide a scalable solution to handle repetitive queries in real time.

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