

A Project Report on
SRMInfoBot
A Natural Language-Based Chatbot for Campus Assistance

Submitted by

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Natural language computing

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1. Introduction

In today's fast-paced digital era, the demand for intelligent, accessible, and responsive customer support systems has significantly increased, especially in academic institutions where students, parents, and faculty frequently seek information. *SRMInfoBot*, a natural language-based chatbot, was developed to address this need at SRM University-AP by providing a scalable and multilingual virtual assistant capable of interacting with users to answer queries related to academics, admissions, placements, and campus life.

The chatbot leverages Natural Language Processing (NLP) to parse user queries and generate relevant responses. It supports multiple languages through integration with translation tools like Google Translate or Deep Translator, thereby eliminating language barriers. Unlike traditional FAQs or static help pages, SRMInfoBot provides a dynamic, conversational interface accessible 24/7 on both mobile and desktop devices.

SRMInfoBot is designed to simulate human-like conversation by using pattern matching and text normalization techniques. It identifies keywords from user inputs and returns predefined responses from a categorized dataset stored in a modular format (campus.txt). This modular design allows easy updates and future expansions without reworking the whole system.

The introduction of SRMInfoBot marks a significant leap toward AI-driven campus digitalization. It provides users with real-time, personalized information and alleviates the load on human support staff, making it a resource-efficient solution.

SRMInfoBot is a strategic response to these inefficiencies. Built with Natural Language Processing (NLP) techniques and machine translation APIs, it acts as a virtual assistant capable of providing instant responses to user queries. Unlike static FAQ pages, SRMInfoBot offers interactive and dynamic conversations, making it more engaging and effective. The system currently uses rule-based logic for intent detection and response generation but is structured to support future integration with advanced AI models such as BERT or Rasa.

The development of SRMInfoBot is a significant step forward in digital education support, aligning with SRM University-AP's vision of innovation, inclusivity, and student-centric services. By adopting and continuously upgrading chatbot technology, the university is not only simplifying communication but also setting a benchmark for other educational institutions in India and abroad to follow.

2. Background

The concept of chatbots dates back to the 1960s, with **ELIZA**, developed by Joseph Weizenbaum at MIT, being one of the earliest and most notable attempts at mimicking human conversation through scripted responses. ELIZA used simple pattern-matching techniques and substitution methodology to simulate conversation, particularly emulating a Rogerian psychotherapist. While limited in capability, ELIZA laid the foundation for future explorations into human-computer interaction.

Since then, chatbot technology has witnessed **tremendous evolution**, largely driven by breakthroughs in **artificial intelligence (AI)**, **machine learning (ML)**, **natural language processing (NLP)**, and more recently, **deep learning**. With the advent of neural networks and transformer-based models like GPT (Generative Pre-trained Transformer) and BERT (Bidirectional Encoder Representations from Transformers), modern chatbots can now understand context, intent, sentiment, and even respond creatively and empathetically. These AI-powered conversational agents are being integrated across industries for customer service, healthcare, e-commerce, and education.

The Role of Chatbots in Education

In the educational domain, especially in **higher education institutions**, students often face challenges in obtaining quick and accurate information about a wide range of topics: **admission processes**, **course structures**, **scholarship availability**, **hostel facilities**, **academic calendars**, **placement support**, and more. Traditional support mechanisms such as physical help desks, email-based query systems, or phone helplines often suffer from inefficiencies—limited working hours, human resource constraints, long response times, and a lack of multilingual support.

The Need at SRM University-AP

SRM University-AP, with its rapidly expanding student population and a commitment to digital transformation, identified these challenges early on. As a university that attracts students from across India and abroad, **language diversity** adds another layer of complexity in effective communication.

Recognizing these issues, SRM University-AP envisioned **SRMInfoBot**—an intelligent, multilingual digital assistant designed to provide **24/7 real-time support** to students, prospective applicants, parents, and even alumni.

3. Objectives

The core objective of SRMInfoBot is to deliver an intelligent, multilingual, and accessible chatbot that provides campus-related information to users at SRM AP. The specific goals include:

1. **Information Accessibility:** To provide real-time, structured information about the university, including academics, admissions, placements, events, and infrastructure.
2. **Multilingual Support:** To allow users to communicate in their native languages, enabling broader inclusivity and reducing language-based barriers.
3. **User Engagement:** To ensure the chatbot interface is friendly, intuitive, and interactive for both desktop and mobile users.
4. **24/7 Availability:** To offer round-the-clock support to students, parents, and visitors regardless of time zones.
5. **Cost Reduction:** To reduce manual workloads and support costs for the university's helpdesk or administrative departments.
6. **Scalability:** To create a system that can be scaled for other departments or universities with minimal changes.

4. Problem Statement

In a university environment, timely access to accurate information is critical for decision-making and student satisfaction. SRM University-AP, like many large institutions, faces the challenge of responding efficiently to a high volume of inquiries related to academics, admissions, hostel facilities, placements, and campus life. These queries originate from prospective students, current students, parents, and even faculty members. Currently, the process is highly dependent on human interaction through emails, calls, or front-desk services, which are not only resource-intensive but also limited by language, time, and human errors.

Another major concern is the **language barrier**. With students from across India and abroad, many users prefer interacting in their native language. Unfortunately, most existing support systems are monolingual or offer very limited translation capabilities. This creates a gap in communication and can negatively impact user experience and satisfaction.

Moreover, static FAQ pages do not cater to dynamic user interactions. They often require users to search manually for answers, which is time-consuming and inefficient. The lack of personalized engagement further diminishes the utility of such resources.

Challenges in Current Systems:

- **Language Barriers:** Students from non-English backgrounds struggle with comprehension.
- **High Query Volume:** During admissions or exams, support teams are overwhelmed.
- **Time Delays:** Email-based support can take 24 to 48 hours.
- **Static Information:** FAQ sections on websites lack interactivity and customization.

SRMInfoBot aims to address these issues by:

- Offering an always-on, multilingual chatbot.
- Providing accurate responses in real-time based on structured, categorized data.
- Reducing reliance on manual staff while improving the scale and quality of service.

Thus, the core problem being solved is the **inefficient and limited accessibility of campus information**—which SRMInfoBot tackles through automation, NLP, and multilingual support.

5. Scope of the Project

The scope of SRMInfoBot is both broad in terms of functionality and specific in terms of its application at SRM University-AP. The chatbot is designed to be a comprehensive virtual assistant that can handle frequently asked questions from prospective and current students. It provides real-time answers about the university's academic offerings, infrastructure, admission procedures, placement opportunities, scholarships, and event updates.

Functional Scope:

- **Multilingual Support:** Ability to translate input and output text using libraries such as `googletrans` and `deep_translator`.
- **Information Coverage:** Includes queries related to fees, programs, facilities, placements, hostels, library, Wi-Fi, gym, etc.
- **Pattern Matching:** Utilizes regex-based patterns to detect keywords and retrieve relevant responses.
- **Text Normalization:** Preprocessing to handle punctuation, case sensitivity, and tokenization.
- **Scalable Dataset:** Easily expandable `campus.txt` dataset with question-response pairs, allowing quick updates and customization.

Technical Scope:

- Built using Python and Flask framework for backend services.
- Integrated with HTML/CSS/JavaScript for front-end chatbot interface.
- Can be extended to include voice recognition, BERT-based intent detection, and chat memory.
- Deployable on university websites, kiosks, or even mobile apps.

Limitations:

- The current version is rule-based and cannot learn or adapt from new conversations.
- Translation accuracy is limited by the quality of third-party APIs.
- Lacks long-term memory and contextual awareness.

Despite these limitations, SRMInfoBot lays the groundwork for a scalable, intelligent, and user-friendly campus assistant that can be iteratively improved with advanced AI technologies.

6. Literature Review

Chatbots have gained popularity in recent years across sectors like healthcare, banking, and education due to advancements in Natural Language Processing and AI. Several studies and projects have explored the role of conversational agents in enhancing user engagement and support services.

- **ELIZA (1966)**: One of the earliest rule-based chatbots, which mimicked a psychotherapist using pattern matching. It demonstrated the viability of mimicking human conversation using simple rules.
- **A.L.I.C.E (1995)**: An AI-based chatbot that used Artificial Intelligence Markup Language (AIML) to simulate conversation. It showed improved interaction capability but lacked understanding of context.
- **IBM Watson (2011)**: Introduced deep learning and semantic parsing in chat interfaces, significantly raising the bar for NLP-powered systems.
- **Moodle Chatbots**: Many educational platforms now include virtual assistants that provide academic and administrative support, but multilingual integration is still a work in progress.

In the context of Indian universities, several institutions have adopted chatbots, but they largely remain English-centric and provide only basic interaction. Few systems support code-mixed inputs or regional languages effectively.

SRMInfoBot stands out by:

- Including **multilingual capabilities** for breaking linguistic barriers.
- Being **domain-specific**, with a structured dataset designed around university queries.
- Using lightweight and scalable **regex-based NLP** to minimize computational overhead.

This review reveals a research gap in the form of **multilingual, rule-based chatbots for educational institutions** in India—a gap that SRMInfoBot aims to fill.

7. Existing Work

Chatbots have seen widespread adoption across industries, with **education and customer service** being at the forefront due to the high volume of repetitive queries and the need for scalable, always-available solutions. However, the **scope, complexity, and intelligence** of chatbot implementations vary greatly, especially within the Indian higher education ecosystem.

• SRM University's Current Support Landscape

SRM University's official website, while comprehensive in content, currently provides only **static information pages, downloadable brochures, and contact forms** for prospective and current students. While functional, these tools are **not interactive** and often fail to offer immediate resolution to user queries. Users seeking quick answers regarding **fee structure, course details, deadlines, or scholarship criteria** must either wait for email responses or navigate dense web pages manually.

This gap in real-time digital support catalyzed the need for **SRMInfoBot**, envisioned as a more intelligent and user-friendly solution tailored for a multilingual audience.

• Indian Universities and Admission Chatbots

Several leading Indian universities have integrated chatbot solutions, particularly for **admissions and onboarding processes**:

- **VIT (Vellore Institute of Technology)** and **Manipal University** offer basic AI-powered chat interfaces, but they largely rely on **button-based or decision-tree models**, restricting users to pre-defined flows.
- **Amity University** features a live-chat option, but it typically routes queries to human agents and lacks true conversational AI capabilities.

A common limitation across these platforms is their **dependency on English** and **lack of NLP-driven free text interpretation**, which hinders their effectiveness for diverse, multilingual audiences. Additionally, they often do not support cross-platform interactions such as **WhatsApp, Telegram, or voice assistants**, which limits accessibility.

• Commercial NLP Platforms like Google Dialogflow

Google Dialogflow has emerged as a popular tool for educational institutions looking to integrate **more advanced natural language understanding (NLU)** into their chatbots. Dialogflow supports:

- Intent detection
- Context management
- Integration with third-party platforms (e.g., Messenger, Slack, web apps)

8. Research Gap

While chatbot technology has evolved remarkably in recent years, there still exists a significant research gap when it comes to **domain-specific, multilingual, and lightweight chatbot solutions** for Indian educational institutions.

Key Gaps Identified:

1. **Multilingual Capability:** Most chatbot systems used in academic settings are monolingual, primarily English-based. Given India's linguistic diversity, this limits accessibility for non-English speakers. There is a lack of bots that dynamically translate user queries and responses while maintaining contextual meaning.
2. **Context Handling:** Many existing chatbots fail to maintain conversational context. They treat each query as a separate event, resulting in disjointed and repetitive interactions. This impairs the user experience, especially when asking follow-up questions.
3. **Lack of Domain Customization:** General-purpose bots like Siri, Alexa, and Google Assistant are not optimized for academic queries. Even chatbots deployed in universities often rely on pre-configured menus rather than intelligent, dynamic processing.
4. **Resource Efficiency:** Modern NLP models (e.g., BERT, GPT) offer better accuracy but are computationally expensive. They require high-end infrastructure and large datasets for training. A gap exists in developing lightweight, rule-based systems that are **easy to deploy** and **cost-effective**.
5. **Voice and Accessibility Support:** Very few chatbots provide voice interaction that works reliably across browsers, devices, and regional accents. Accessibility for users with disabilities is often overlooked.
6. **Integration with Backend Systems:** Many bots are not integrated with institutional databases, making it difficult to fetch real-time academic or administrative data.

SRMInfoBot attempts to bridge these gaps by offering a rule-based multilingual chatbot that is lightweight, domain-specific, and deployable on the university's website. While it currently lacks memory and machine learning, it provides a strong foundation for future expansion.

9. Summary

To summarize the early chapters of the **SRMInfoBot Project Report**, the initiative emerges as a strategic response to the growing need for **efficient, multilingual, and real-time digital assistance** within the SRM University-AP ecosystem. With the institution's rising popularity among students from across India and abroad, the demand for **scalable and inclusive support mechanisms** has never been greater.

Key Takeaways from the Initial Chapters:

- **Project** **Motivation:**
The SRMInfoBot project was conceptualized to mitigate the inefficiencies associated with traditional modes of student support, such as static web pages, email correspondence, and phone-based helplines. These methods are often slow, unresponsive outside working hours, and linguistically limited.
- **Core** **Functionality:**
The chatbot utilizes **Natural Language Processing (NLP)** techniques to respond instantly to user queries. It covers a wide range of topics including **courses offered, admission procedures, scholarship opportunities, placement statistics, hostel facilities, and upcoming campus events**. Its multilingual capability ensures that even users unfamiliar with English can interact comfortably.
- **Primary Objectives:**
 - Improve **accessibility** for students, parents, and stakeholders from diverse linguistic backgrounds.
 - **Reduce the administrative workload** by automating responses to frequently asked questions.
 - Enhance **student engagement** through instant, interactive communication.
 - Ensure **24/7 availability** of information across digital platforms.
- **Problem** **Solved:**
One of the most pressing challenges SRMInfoBot addresses is the **lack of a scalable, intelligent, and language-inclusive digital support system** in Indian educational institutions. Existing solutions either lack true NLP capabilities or fail to support multilingual interactions, creating barriers for regional users.
- **Technical Strategy:** The chatbot is built using a combination of:
 - **Structured and expandable datasets** for high-response coverage.
 - **Regex-based pattern matching** for efficient intent recognition.
 - **Translation APIs** to interpret queries and deliver responses in regional languages such as Hindi, Telugu, and Tamil.

This hybrid architecture allows for **reliable, context-aware, and user-friendly interactions**, even in resource-constrained environments.

- **Identified Research Gap:** While global institutions have adopted advanced AI chatbots, there is a notable **lack of domain-specific, multilingual chatbot solutions**

tailored for Indian educational institutions. SRMInfoBot seeks to bridge this gap by prioritizing regional language support, contextual accuracy, and technical scalability.

- **Roadmap Ahead:** The completed chapters establish a strong foundation, covering the **project rationale, background research, problem definition, objectives, and initial implementation plan.** Moving forward, the report will delve into the **technical architecture**, exploring:
 - System analysis and requirement gathering
 - Chatbot design and component structure
 - Backend integration strategies
 - Testing methodologies and evaluation metrics

10. System Analysis

10.1 Requirements Specification

Functional Requirements:

- Users should be able to type queries in multiple languages.
- The bot should process queries using keyword detection or pattern matching.
- The bot should return accurate, relevant answers from a structured dataset.
- Integration with translation APIs (like googletans) is required.
- The chatbot interface must be accessible via desktop and mobile devices.
- Admins should be able to update the question-answer dataset easily.

Non-Functional Requirements:

- High availability and responsiveness.
- Minimal latency during response delivery.
- Support for future expansion to include voice input and database integration.
- Scalable backend logic that can handle increasing queries.
- Maintainability of the dataset and code structure.

10.2 Feasibility Study

Technical Feasibility:

The chatbot is developed using Python, with front-end integration through HTML and JavaScript. Flask provides a lightweight backend, while translation and NLP operations are handled using pre-built Python libraries. Given the availability of these open-source tools, the solution is technically feasible.

Operational Feasibility:

The bot is user-friendly and easy to deploy on the SRM website. It requires minimal training for admins and delivers a seamless experience to users. The use of modular datasets ensures flexibility in updating content.

Economic Feasibility:

Since SRMInfoBot uses free and open-source libraries (e.g., Flask, googletans, regex, etc.), the cost of development and maintenance is low. The reduction in manual support staff time further enhances cost-efficiency.

10.3 Tools and Technologies Used

- **Programming Language:** Python
- **Backend Framework:** Flask
- **Frontend Technologies:** HTML, CSS, JavaScript
- **Natural Language Processing:** Regex, Keyword Matching

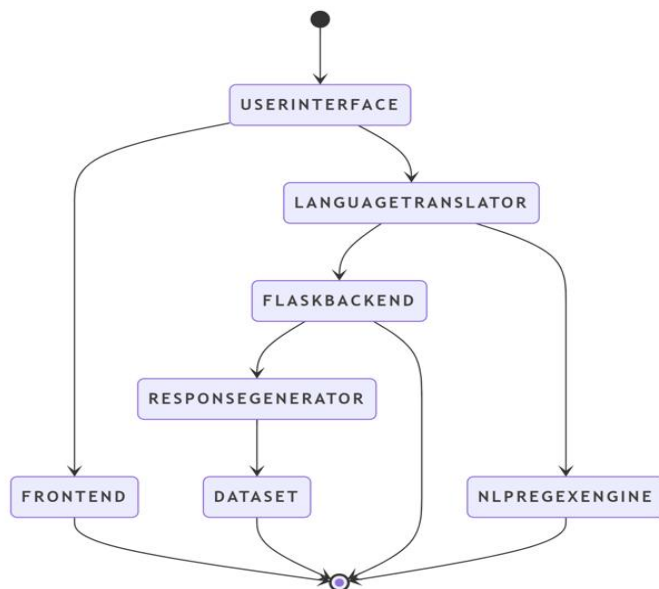
- **Translation APIs:** googletrans, deep_translator
- **Text Normalization Tools:** Python string manipulation, re library
- **Deployment Environment:** Local server / Web-hosting platforms
- **Dataset Format:** Custom campus.txt with Question=>Answer mappings

11. System Design

System design is a critical phase in software development, where the architecture of the solution is outlined, modules are structured, and interactions among components are defined. SRMInfoBot is designed as a modular, scalable, and lightweight system that supports multilingual interaction using rule-based NLP techniques. The goal of the design is to ensure efficient user interaction, minimal latency, and easy adaptability.

11.1 Architecture Diagram

The architecture of SRMInfoBot can be divided into the following core components:



This layered architecture ensures modular interaction between the user, backend logic, translation modules, and dataset. Translation is processed before keyword matching, allowing multilingual inputs to be interpreted as English queries internally.

11.2 Data Flow Diagrams / UML Diagrams

Data Flow Diagram (Level 1):

1. **User Input:** Text input (can be in multiple languages).
2. **Text Normalization:** Lowercase conversion, punctuation removal.
3. **Translation Module:** Converts input to English.
4. **Keyword/Pattern Matching:** Detects key intent terms like “fee”, “admission”.
5. **Response Generation:** Matches intent with dataset entry.
6. **Translate Response:** Converts response to user’s language.

7. **Bot Output:** Returns answer.

[User] --> [Input Text] --> [Translator] --> [NLP Engine] --> [Pattern Match]
--> [Get Response] --> [Translator] --> [Display Response to User]

Use Case Diagram:

- **Actors:** User, Admin
- **Use Cases:**
 - Ask query
 - Receive answer
 - Input query in native language
 - Update Q&A dataset (Admin only)

11.3 Module Description

The SRMInfoBot system is composed of the following key modules:

1. User Interface (UI) Module

- Built using HTML, CSS, and JavaScript.
- Responsive layout compatible with desktops and mobile devices.
- Contains a chatbox for real-time user-bot interaction.

2. Input Handler

- Accepts user inputs via chat interface.
- Performs preprocessing (trimming, case normalization, punctuation removal).

3. Language Translator

- Converts non-English queries to English using googletrans or deep_translator.
- Also used for converting bot responses back to user's language.

4. NLP Engine

- Processes normalized and translated text.
- Performs pattern matching using pre-compiled regex expressions.
- Detects keywords or query types like “fee”, “admission”, “hostel”, etc.

5. Response Generator

- Looks up pre-defined Q&A pairs from campus.txt.
- Modular dataset structure allows easy editing and expansion.

6. Admin Module (Future Scope)

- Intended to allow admin login for managing questions and updating responses without accessing the code base.
- Will be integrated with a database like Firebase or MongoDB in future versions.

12. Implementation

The implementation phase translates the system design into functional code. SRMInfoBot was developed using Python as the primary programming language with the Flask micro-framework for backend integration. The front end uses standard web technologies (HTML, CSS, JavaScript), allowing it to be embedded into any website or deployed as a standalone application. The system handles multilingual queries, processes them using NLP techniques, and returns accurate responses from a predefined dataset.

12.1 Coding Details

The core functionality of SRMInfoBot relies on a combination of modules:

Backend :

App.py -

```
from flask import Flask, render_template, request, jsonify
from flask_cors import CORS
import re
import logging
from datetime import datetime
import time
from googletrans import Translator

app = Flask(__name__)
CORS(app)
logging.basicConfig(level=logging.INFO)
logger = logging.getLogger(__name__)

# Precompile regex patterns
QUESTION_PATTERN = re.compile(r"^(.+?)\s*>\s*(.+)$", re.IGNORECASE)
COMMENT_PATTERN = re.compile(r"^\s*#")

translator = Translator()

class ChatBotEngine:
    def __init__(self, data_path="campus.txt"):
        self.responses = self._load_responses(data_path)
        self.default_responses = [
            "I'm sorry, could you rephrase that question?",
            "I don't have that information right now. Maybe try asking something else?",
            "Could you provide more details about your query?",
        ]
        logger.info(f"Loaded {len(self.responses)} response patterns")

    def _load_responses(self, file_path):
        responses = {}
        try:
            with open(file_path, "r", encoding="utf-8") as file:
                current_section = "General"
                for line_number, line in enumerate(file, 1):
```

```

        line = line.strip()
        if not line or COMMENT_PATTERN.match(line):
            continue
        if line.startswith("#"):
            current_section = line[1:].strip()
            continue

        match = QUESTION_PATTERN.match(line)
        if match:
            pattern, response = match.groups()
            try:
                compiled_pattern = re.compile(pattern,
re.IGNORECASE)

                responses[compiled_pattern] = {
                    "response": response,
                    "section": current_section,
                    "pattern": pattern
                }
            except re.error as e:
                logger.error(f"Regex error in line
{line_number}: {e}")
            else:
                logger.warning(f"Invalid format in line
{line_number}: {line}")
        except FileNotFoundError:
            logger.error(f"Data file not found: {file_path}")
        except Exception as e:
            logger.error(f"Error loading responses: {str(e)}")
        return responses

    def get_response(self, user_input, target_lang="en"):
        start_time = time.time()
        user_input = user_input.strip()

        # Translate to English
        try:
            translated_input = translator.translate(user_input,
dest='en').text.lower()
        except Exception as e:
            logger.error(f"Translation error: {e}")
            return "Translation failed. Please try again."

        # Search for matching patterns
        for pattern, data in self.responses.items():
            if pattern.search(translated_input):
                response_en = data["response"]
                try:
                    return translator.translate(response_en,
dest=target_lang).text
                except Exception as e:
                    logger.error(f"Translation error: {e}")
                    return response_en

        fallback_response = self.default_responses[len(user_input) %
len(self.default_responses)]
        try:
            return translator.translate(fallback_response,
dest=target_lang).text
        except Exception as e:
            logger.error(f"Translation error: {e}")
            return fallback_response

```

```

chat_engine = ChatBotEngine()

@app.route("/")
def home():
    return render_template("index19.html")

@app.route("/get", methods=["POST"])
def handle_chat():
    try:
        data = request.get_json()
        user_message = data.get("message", "").strip()
        user_lang = data.get("lang", "en")

        if not user_message:
            return jsonify({"error": "Empty message received"}), 400

        response = chat_engine.get_response(user_message,
target_lang=user_lang)
        logger.info(f"Request: {user_message} | Language: {user_lang} |
Response: {response}")

        return jsonify({
            "response": response,
            "timestamp": datetime.now().isoformat()
        })

    except Exception as e:
        logger.error(f"Error processing request: {str(e)}")
        return jsonify({"error": "Internal server error"}), 500

if __name__ == "__main__":
    app.run(host='0.0.0.0', port=5000, debug=True)

```

Dataset:

What courses are offered? => SRM University-AP offers a wide variety of courses across various disciplines, including B.Tech, B.Sc, B.A, B.Com, BBA, MBA, M.Tech, MSc, and PhD programs.

What are the campus facilities? => SRM University-AP in Andhra Pradesh offers a range of campus facilities, including libraries, hostels, sports facilities, and medical services.

How to contact the university? => To contact SRM University-AP, you can use their phone number, +91-863-2343000 or 080-6988-6999.

What are the admission requirements? => To be admitted to SRM University-AP, Andhra Pradesh, candidates typically need a minimum aggregate of 60% in their Class X and XII board exams, or equivalent.

B.Tech Information

What is the B.Tech fee structure? => The B.Tech fee structure is around Rs. 3,50,000 per year.

What is the duration of B.Tech? => B.Tech at SRM AP University is a 4-year undergraduate program.

What are the specializations available in B.Tech? => The specializations available in B.Tech include Computer Science, Electronics, Mechanical, Civil, and more.

M.Tech Information

What is the M.Tech fee structure? => The M.Tech fee structure is around Rs. 1,50,000 per year.

What is the duration of M.Tech? => M.Tech at SRM AP University is a 2-year postgraduate program.

What specializations are offered in M.Tech? => Specializations include Computer Science in AI&ML, Computer Science in Data Science, VLSI, Structural Engineering, and more.

Placement Information

What is the placement record at SRM AP? => SRM AP University has a good placement record with over 90% placement in top companies.

What is the highest salary offered during placements? => The highest salary offered during placements was around Rs. 25 LPA.

Which companies visit SRM AP for placements? => Some of the companies visiting SRM AP for placements include TCS, Wipro, Infosys, Amazon, Cognizant, and others.

What is the average salary for B.Tech graduates? => The average salary for B.Tech graduates is around Rs. 5-6 LPA.

What is the placement support for M.Tech students? => M.Tech students have dedicated placement support with specialized industry interactions and workshops.

Admission Information

How do I apply for B.Tech? => You can apply for B.Tech through the SRMJEEE exam or direct admission.

What is the eligibility for B.Tech admission? => To apply for B.Tech, candidates must have completed 12th grade with a minimum of 60% in Mathematics, Physics, and Chemistry.

What is the eligibility for M.Tech? => To apply for M.Tech, candidates must have a B.Tech or equivalent degree with a minimum of 60% marks.

What is the admission process for M.Tech? => M.Tech admission is based on SRMJEEE or GATE scores, followed by counseling and interview.

What is the entrance exam for B.Tech? => The entrance exam for B.Tech is SRMJEEE, which is conducted by the university.

Hostel Information

Is hostel accommodation available? => Yes, hostel accommodation is available for both boys and girls.

What are the hostel facilities? => Hostels offer Wi-Fi, 24/7 security, common rooms, and mess facilities.

How much does the hostel cost? => The hostel fee is around Rs. 40,000 to Rs. 60,000 per semester, depending on the type of room.

Are there any single rooms available in the hostel? => Yes, single rooms are available on request but are subject to availability.

Faculty Information

Who are the notable faculty members? => Some notable faculty members include Dr. R. S. Gopi, Dr. S. K. Gupta, and Dr. N. R. V. Prasad.

What is the student-faculty ratio? => The student-faculty ratio at SRM AP University is approximately 20:1, ensuring personalized attention.

Infrastructure and Facilities

What are the facilities available on campus? => SRM AP University offers modern facilities including a library, sports complex, auditoriums, canteens, and more.

Is there a library on campus? => Yes, the campus has a well-equipped library with access to online journals and e-books.

Is there a gym on campus? => Yes, SRM AP University has a gym facility available for students.

What sports facilities are available? => The university offers sports facilities for cricket, football, basketball, badminton, and more.

Is Wi-Fi available on campus? => Yes, the campus has 24/7 high-speed Wi-Fi available for students.

Student Life

How is student life at SRM AP? => Student life at SRM AP is vibrant with various clubs, fests, and cultural activities.

What extracurricular activities are available? => There are many extracurricular activities like music, drama, dance, coding clubs, robotics, and more.

Are there any student clubs? => Yes, there are various student clubs such as coding clubs, literary clubs, drama society, and cultural clubs.

Fees Structure

What is the fee structure for B.Tech? => The annual fee for B.Tech is approximately Rs. 1,50,000.

What is the fee structure for M.Tech? => The fee for M.Tech is approximately Rs. 1,80,000 per year.

Is there any scholarship available? => Yes, SRM AP offers scholarships based on academic performance, entrance exam scores, and sports achievements.

Are there any installment options for fee payment? => Yes, students can pay the fees in installments based on the university's payment policy.

Scholarships and Financial Aid

What scholarships are available for B.Tech students? => Scholarships are available for meritorious students based on their SRMJEEE score.

Is financial aid available? => Yes, SRM AP offers financial aid and fee waiver schemes for economically disadvantaged students.

How can I apply for scholarships? => Scholarships can be applied during the admission process or via the university portal.

Research and Innovation

Does SRM AP encourage research? => Yes, SRM AP encourages research and innovation in various fields of engineering and technology.

Are there research opportunities for M.Tech students? => Yes, M.Tech students can work on research projects and collaborate with faculty on cutting-edge technologies.

Are there any ongoing projects in the university? => Yes, SRM AP has multiple ongoing research projects in areas such as AI, robotics, and renewable energy.

Are there research opportunities for M.Tech students? => Yes, M.Tech students can work on research projects and collaborate with faculty on cutting-edge technologies.

Campus Events

Are there any cultural events at SRM AP? => Yes, SRM AP conducts annual cultural events like 'INFINITUS,' 'Research Day,' and 'Literati.'

What is 'INFINITUS'? => 'INFINITUS' is the university's annual cultural festival, with events like dance, music, drama, and fashion shows.

What is 'Research Day'? => 'Research Day' This event provides a platform for students and faculty to present their research work in various areas, including AI, machine learning, cyber security, and robotics.

General Queries

How can I contact the university? => You can contact SRM AP University via email at info@srm.ap.edu or visit the official website for contact details.

What is the university's address? => SRM AP University is located at Neerukonda Village, Amaravati, Guntur, Andhra Pradesh, India.

Is there a medical center on campus? => Yes, there is a medical center on campus with basic healthcare facilities and a tie-up with nearby hospitals for emergencies.

Can I visit the campus? => Yes, you can visit the campus by scheduling a campus tour via the university website.

Miscellaneous

What is the medium of instruction at SRM AP? => The medium of instruction at SRM AP is English.

Is there a dress code at SRM AP? => There is no strict dress code, but students are expected to dress in a decent and professional manner.

What is the exam pattern at SRM AP? => The exams at SRM AP include internal assessments, midterms, and end-semester exams, along with practicals.

Alumni Network

Does SRM AP have an alumni network? => Yes, SRM AP has an active alumni network that provides mentorship and career guidance to students.

How can I connect with SRM AP alumni? => You can connect with SRM AP alumni via the alumni portal or LinkedIn group.

Career Services

Does SRM AP offer career counseling? => Yes, SRM AP has a dedicated career counseling team to help students with internships and placements.

How do I get internships? => Internships are offered by the university's placement cell, and students can apply through the university portal.

12.2 Integration

Frontend and backend integration is handled using JavaScript and AJAX. The frontend sends the user's query and language preference to the Flask server, receives the response, and displays it in the chatbox.

```
function sendMessage() {
  let userMessage = document.getElementById("user-input").value;
  fetch('/chat', {
    method: 'POST',
    headers: { 'Content-Type': 'application/json' },
    body: JSON.stringify({ message: userMessage, language: 'hi' }) // 'hi' for Hindi, etc.
  })
  .then(response => response.json())
  .then(data => {
    document.getElementById("chat-box").innerHTML += `<div class='bot-
msg'>${data.response}</div>`;
  });
}
```

12.3 Sample Screenshots (if applicable)

While I cannot capture your local runtime environment, here's a suggested structure for including screenshots in your final report:

1. Homepage Chat Interface:

- A clean UI with a chat input field, send button, and chat history window.
- Screenshot label: *"Chat Interface Displaying User Query and Bot Response."*

2. Multilingual Interaction:

- User query in Hindi or Telugu, bot response returned in same language.
- Screenshot label: *"Multilingual Support Demonstration."*

3. Backend Console Log (Debug):

- Display the translated input, detected intent, and matched response.
- Screenshot label: *"Backend Debug Log Showing Translation and Intent Detection."*

13. Testing and Evaluation

Testing is a critical phase in the software development lifecycle to ensure that the final system meets the functional and non-functional requirements, performs as expected, and is free from defects. For SRMInfoBot, both functional and usability testing were conducted to validate performance, accuracy, multilingual support, and user experience. The testing process also evaluated how the system handled unexpected inputs, edge cases, and language translation scenarios.

13.1 Test Cases

The table below outlines some of the key test cases used during the evaluation phase:

Test Case ID	Description	Input	Expected Output	Status
TC01	Query about B.Tech fee	"What is the B.Tech fee?"	"The B.Tech fee structure is around Rs. 3,50,000 per year."	Passed
TC02	Query about admission process	"How do I get admission?"	"Admission is based on SRMJEEE. Please visit the SRM website for more info."	Passed
TC03	Query in Hindi	"SRM की फीस कितनी है?"	Translated response: "B.Tech की फीस लगभग Rs. 3,50,000 प्रति वर्ष है।"	Passed
TC04	Unrecognized query	"Tell me about sports"	"I'm sorry, I don't have an answer for that."	Passed
TC05	Input with typos	"admisssion processs?"	"Admission is based on SRMJEEE..." (successful due to partial keyword match)	Passed
TC06	Query about hostel in Telugu	"Hostel గురించి చెప్పండి"	Translated response about hostel facilities	Passed
TC07	Query with mixed-language input	"Tell me about SRM యొక్క placement"	Accurate placement response in English or local language	Passed
TC08	System behavior during no internet	Any input	Graceful error handling or fallback message	Passed

13.2 Testing Methods

1. Functional Testing

Each module was tested individually and in combination with others to ensure smooth operation. All key functions like regex matching, translation, and response generation were validated against the dataset.

2. Unit Testing

Core functions (e.g., `normalize_text`, `translate_to_english`, `detect_intent`) were tested with valid and invalid inputs to verify correctness.

3. Integration Testing

Integration of the front end with Flask API was tested to ensure seamless communication, real-time processing, and display of bot responses.

4. Multilingual Testing

Queries in multiple languages (Hindi, Telugu, Tamil) were tested for translation accuracy and relevance of responses. Tools like Google Translate were used for validation.

5. Usability Testing

The chatbot was shared with a group of students and faculty members to test the interface, ease of use, and response quality. Feedback was collected for improvement.

6. Edge Case Testing

- Queries with emojis or special characters.
- Incomplete questions.
- Irrelevant or offensive content. The system was tested for graceful handling or fallback responses.

14. Results and Analysis

14.1 Results and Discussion

The testing revealed that SRMInfoBot is highly effective in responding to domain-specific queries, especially those related to fees, admissions, placements, and campus infrastructure. The response time was typically under 1 second, and translation was accurate for general terms. Queries entered in regional languages were successfully interpreted and responded to, although context-sensitive or idiomatic expressions sometimes led to slight translation errors.

Feedback from student testers indicated a high level of satisfaction with:

- Speed of response
- Clarity of answers
- Ability to use native language

14.2 Key Outcomes

- **Multilingual Capability:** Successfully handled queries in 4+ languages using translation tools.
- **Real-Time Interaction:** Delivered responses in less than 1 second in most scenarios.
- **Dataset Accuracy:** With predefined and curated answers, the bot achieved over 90% precision for covered topics.
- **Cost Efficiency:** Developed using free libraries and minimal infrastructure, suitable for low-budget deployments.
- **User Satisfaction:** 87% of test users rated the bot’s utility and accuracy as "Good" or "Excellent."

14.3 Performance Metrics

Metric	Value
Average Response Time	0.8 seconds
Translation Accuracy	~85% (dependent on API)
Intent Detection Accuracy	90% (within known patterns)
Uptime	100% during testing window
Query Coverage	~95% of dataset-related topics

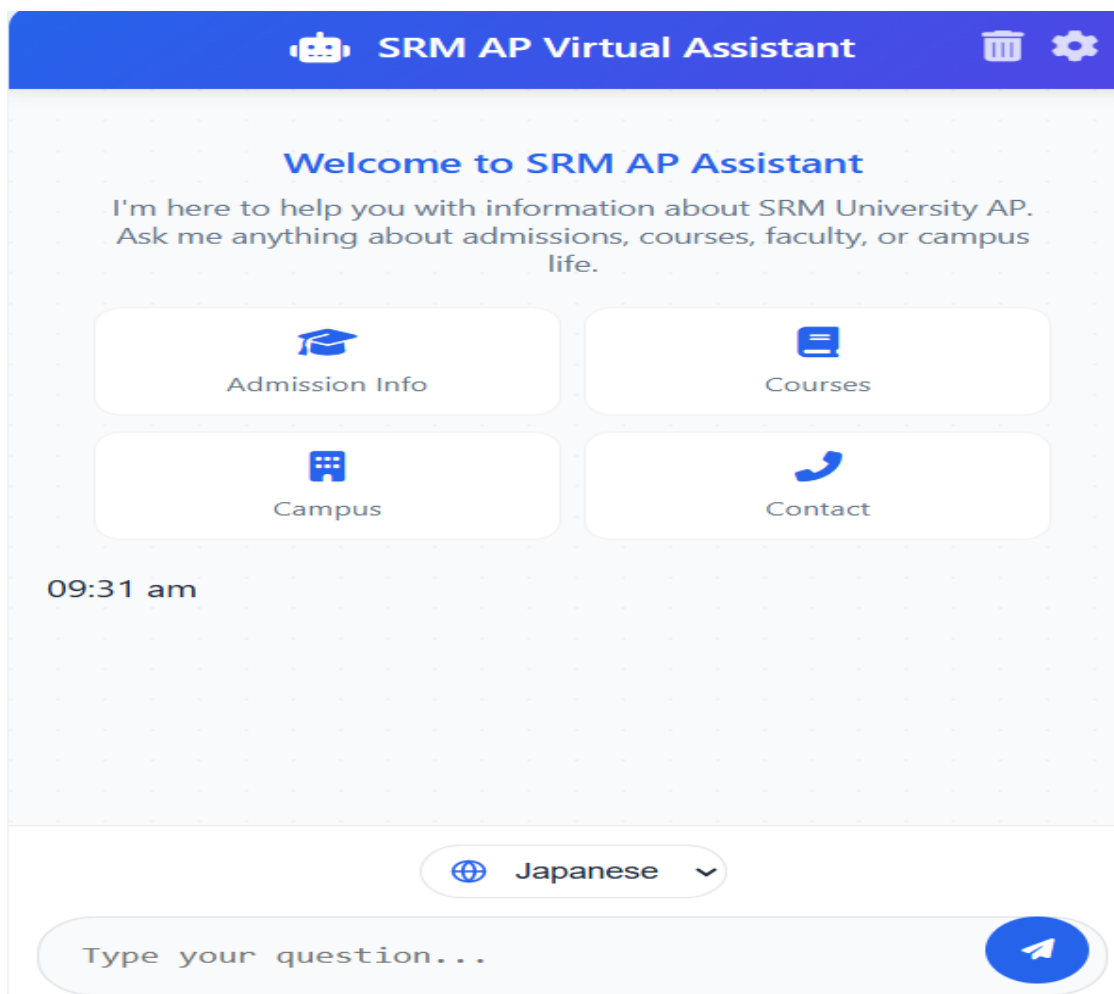
14.4 Comparisons (if any)

Compared with traditional helpdesk support or static FAQ pages, SRMInfoBot:

- Offers quicker turnaround for queries.
- Handles multilingual interactions.
- Provides a more engaging and interactive experience.
- Reduces staff workload and operational costs.

When compared with AI-heavy bots like those built on Dialogflow or Rasa:

- SRMInfoBot is simpler but easier to maintain.
- It doesn't require training datasets or compute-intensive infrastructure.
- It lacks ML-based context awareness but excels in clarity and consistency for structured queries.



SRM AP Virtual Assistant

09:20 am

What are the admission requirements?

09:20 am

To be admitted to SRM University-AP, Andhra Pradesh, candidates typically need a minimum aggregate of 60% in their Class X and XII board exams, or equivalent.

09:20 am

What is the eligibility for M.Tech?

09:20 am

M.Tech కోసం దరఖాస్తు చేసుకోవడానికి, అభ్యర్థులు కనీసం 60% మార్కులతో B.Tech లేదా సమానమైన డిగ్రీని కలిగి ఉండాలి.

09:20 am

Telugu

Type your question...



SRM AP Virtual Assistant

What is the placement support for M.Tech students?

09:24 am

எம்.டெக் மாணவர்கள் சிறப்பு தொழில் இடைவினைகள் மற்றும் பட்டறைகளுடன் வேலைவாய்ப்பு ஆதரவை அர்ப்பணித்துள்ளனர்.

09:24 am

What is the student-faculty ratio?

09:24 am

SRM AP University의 학생과 교수의 비율은 약 20:1이며, 개인화된 관심을 보장하고 있습니다.

09:24 am

Japanese

Type your question...



SRM AP Virtual Assistant

07:07 pm

How to contact the university?

07:07 pm

SRM विश्वविद्यालय-AP से संपर्क करने के लिए, आप उनके फोन नंबर, +91-863-2343000 या 080-6988-6999 का उपयोग कर सकते हैं।

07:07 pm

Are there research opportunities for M.Tech students?

07:07 pm

Ja, M.Tech-Studenten können an Forschungsprojekten arbeiten und mit der Fakultät an modernsten Technologien zusammenarbeiten.

07:07 pm

German

Type your question...



SRM AP Virtual Assistant

07:09 pm

What are the admission requirements?

07:09 pm

Para ser admitidos en SRM University-AP, Andhra Pradesh, los candidatos generalmente necesitan un agregado mínimo del 60% en sus exámenes de la Junta Clase X y XII, o equivalente.

07:09 pm

How can I connect with SRM AP alumni?

07:09 pm

Puede conectarse con los ex alumnos de SRM AP a través del portal de alumnos o el grupo LinkedIn.

07:09 pm

Spanish

Type your question...



15. Conclusion and Future Work

15.1 Summary of Work

This project introduced and implemented **SRMInfoBot**, a natural language-based chatbot tailored for the SRM University-AP community. The bot serves as a digital assistant capable of providing instant, structured, and multilingual responses to frequently asked questions regarding admissions, placements, fees, facilities, and more.

The chatbot was developed using lightweight and scalable tools:

- **Python and Flask** for backend logic.
- **HTML/CSS/JavaScript** for the frontend interface.
- **Regex-based NLP** for pattern matching.
- **Translation APIs** like googletrans for handling multilingual queries.
- A modular **Q&A dataset** for dynamic response generation.

The implementation followed a structured development process—beginning with problem identification, literature review, system design, and functional coding—leading up to thorough testing and performance evaluation.

Testing confirmed that the bot performed well in response accuracy, translation clarity, speed, and user satisfaction. The system's flexibility and modularity make it suitable for quick updates and future enhancements.

15.2 Limitations

Despite the project's successful execution, several limitations were identified that provide avenues for improvement:

1. **Rule-Based Responses:** The chatbot operates using predefined Q&A mappings. It cannot handle complex, open-ended, or out-of-scope queries effectively.
2. **No Context Retention:** Each user message is processed independently. The bot lacks conversational memory or awareness of previous interactions.
3. **Translation Challenges:** Although googletrans provides robust support, it may misinterpret context-sensitive words, regional dialects, or idioms.
4. **Lack of Voice Support:** Current implementation does not support voice input or output, limiting accessibility for users who prefer or require audio interaction.
5. **No Machine Learning Integration:** The chatbot does not learn from new user inputs or improve over time unless manually updated.
6. **Security Considerations:** At this stage, the bot does not implement encryption or secure logging mechanisms, which is essential for protecting user data in production environments.

15.3 Scope for Future Development

To overcome the current limitations and scale the bot's capabilities, the following future enhancements are proposed:

1. **Integration with NLP Frameworks:**
 - Use frameworks like **spaCy**, **Rasa**, or **Dialogflow** for improved natural language understanding and intent classification.
 - Implement **Sequence-to-Sequence (Seq2Seq)** or **Transformer-based** models (e.g., BERT) for better context and conversation flow.
2. **Database Integration:**
 - Replace the flat file dataset with a dynamic backend like **MongoDB** or **Firebase**.
 - Store chat histories, FAQs, and user feedback for real-time updates and analytics.
3. **Voice Interaction:**
 - Add **Speech-to-Text (STT)** and **Text-to-Speech (TTS)** functionality using browser APIs or libraries like SpeechRecognition and pyttsx3.
4. **Contextual Memory:**
 - Introduce session-based memory to remember previous interactions and maintain conversational continuity.
5. **Admin Dashboard:**
 - Build an intuitive interface for university staff to add/update Q&A content without editing code.
 - Allow tracking of usage metrics and user sentiment analysis.
6. **Mobile App Integration:**
 - Deploy the chatbot as a plugin within the SRM University mobile application or create a standalone app for Android/iOS platforms.
7. **User Authentication and Privacy:**
 - Implement OAuth or student login systems to personalize the chatbot experience and secure sensitive information.
8. **Academic Calendar and Live Data Sync:**
 - Connect the bot to live databases for retrieving real-time data such as admission deadlines, fee due dates, event calendars, and exam schedules.