DEPARTMENT OF AI, ML & DS

(AI742E05)

AI for Business

B. Tech
(Artificial Intelligence and Machine Learning)

CIA 3 Mini Project on
Title: Internship application assistant

School of Engineering and Technology,

CHRIST (Deemed to be University),

Kumbalagodu, Bengaluru-560 074

September 2025

Rutwik Kumar Mallavajjala (2263049) has successfully submitted the Mini Project for the course **AI742E05 – AI for Business** as part of **CIA 3, Component** Assessment, during the academic year 2025–2026.

FACULTY- IN CHARGE

Name :

Register No. :

Examination Center : SoET, CHRIST (Deemed to be University)

Date of Submission :

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Introduction

Internships play a critical role in bridging the gap between academic learning and professional experience. They help students apply classroom knowledge in real-world settings, gain practical exposure, and build professional networks. However, the process of finding and securing internships can be overwhelming for many students due to challenges such as identifying relevant opportunities, preparing application materials, and performing well in interviews.

The **Internship Application Assistant** chatbot was developed to address these challenges. It is an AI-powered conversational assistant that provides **real-time, personalized guidance** to students during different stages of their internship journey. Unlike static resources, the chatbot interacts dynamically with users, identifies their intent, and delivers targeted advice tailored to their academic level, skills, and chosen industry.

The **problem statement** centers around the lack of an interactive, easily accessible system that can provide continuous and personalized support for internship preparation. While many career portals and resources exist, they often deliver **generalized advice** and do not adapt to individual needs.

The **objectives** of this project are therefore defined as:

1. To design and implement an intelligent chatbot capable of handling multiple internship-related intents.
2. To integrate both **rule-based methods** and **transformer-based NLP models** for improved intent recognition.
3. To provide **personalized, context-aware responses** that evolve based on the student's academic level, skills, and stage of the application process.
4. To build a **user-friendly interface** using Streamlit, making the chatbot accessible and practical for students.

By achieving these objectives, this project contributes to building a tool that not only reduces the effort involved in internship preparation but also increases the chances of students securing quality opportunities.

Literature Review / Existing System

Career assistance systems have evolved significantly, starting from rule-based chatbots to modern AI-driven conversational agents. A review of existing solutions highlights the **strengths and limitations** of each:

1. **Rule-based Chatbots**
    - Early systems relied on hardcoded responses and keyword matching. For example, if a user typed "resume," the bot would provide a pre-defined answer about resume writing.
    - While useful for answering simple FAQs, these bots lacked the ability to understand **context, variations in phrasing, or follow-up questions**. This made them inflexible and often frustrating for users.
2. **University Career Services & Portals**
    - Many universities provide online platforms with resume templates, interview tips, and internship listings.
    - These resources are valuable but are **static and non-interactive**, requiring students to manually search and interpret content. They also do not personalize advice based on student background or application stage.
3. **AI-Powered Chatbots (e.g., ChatGPT, Google Bard)**
    - Large Language Models (LLMs) such as GPT and Bard have demonstrated powerful natural language understanding and can provide useful career guidance. However, these systems are **general-purpose models** and are not optimized for internship-specific queries. They may provide overly broad or irrelevant answers without focusing on early-career needs.
4. **Job Search Platforms (LinkedIn, Glassdoor, Indeed)**
    - These platforms offer large internship databases and allow users to apply directly. Despite their strengths in job discovery, they do not offer **step-by-step guidance** on resumes, cover letters, or interviews, leaving students with unanswered questions about preparation.

Identified Gap:
From the review, it is clear that while multiple systems exist, none effectively combine **personalized career guidance** with **internship-specific support**. Most systems either focus on **job search** (LinkedIn, Glassdoor), **static resources** (university portals), or **general-purpose advice** (ChatGPT, Bard) Thus the project aims to offer an internship focused chatbot tailored for students.

Proposed System / Methodology

The proposed chatbot follows a **hybrid methodology** that blends both rule-based and AI-driven approaches:

- **System Architecture:**
  - **Frontend:** A Streamlit-based interactive web interface that provides a clean and user-friendly chat environment.
  - **Backend:** Python-based NLP pipeline integrated with Hugging Face Transformers for advanced intent classification.
- **Intent Recognition:**
  The chatbot uses a **two-tier classification system**:
  - **Regex-based Pattern Matching** – Quickly identifies simple queries such as greetings or farewells.
  - **Zero-shot Classification (facebook/bart-large-mnli)** – Handles complex and varied student queries with higher accuracy by predicting the most relevant intent.
- **Context Management:**
  The chatbot stores session-based information such as:
  - Academic level (freshman, sophomore, junior, senior, graduate).
  - Skills mentioned (e.g., Python, Java, marketing, design).
  - Industry preferences (tech, finance, research, etc.).
  - Current stage of application (beginning, applying, interviewing, or deciding).
- **Response Generation:**
  The chatbot selects appropriate responses dynamically, avoids repetition, and personalizes suggestions based on the stored context. For example, a freshman receives skill-building advice, while a senior may be guided toward internships that transition to full-time roles.
- **Tools & Technologies Used:**
  - Python for overall development.
  - **Streamlit** for building the interface.
  - **Hugging Face Transformers** (BERT / Bart-large-mnli) for NLP tasks.
  - **PyTorch** as the deep learning backend.
  - **NumPy, Pandas, Scikit-learn** for data handling and evaluation.

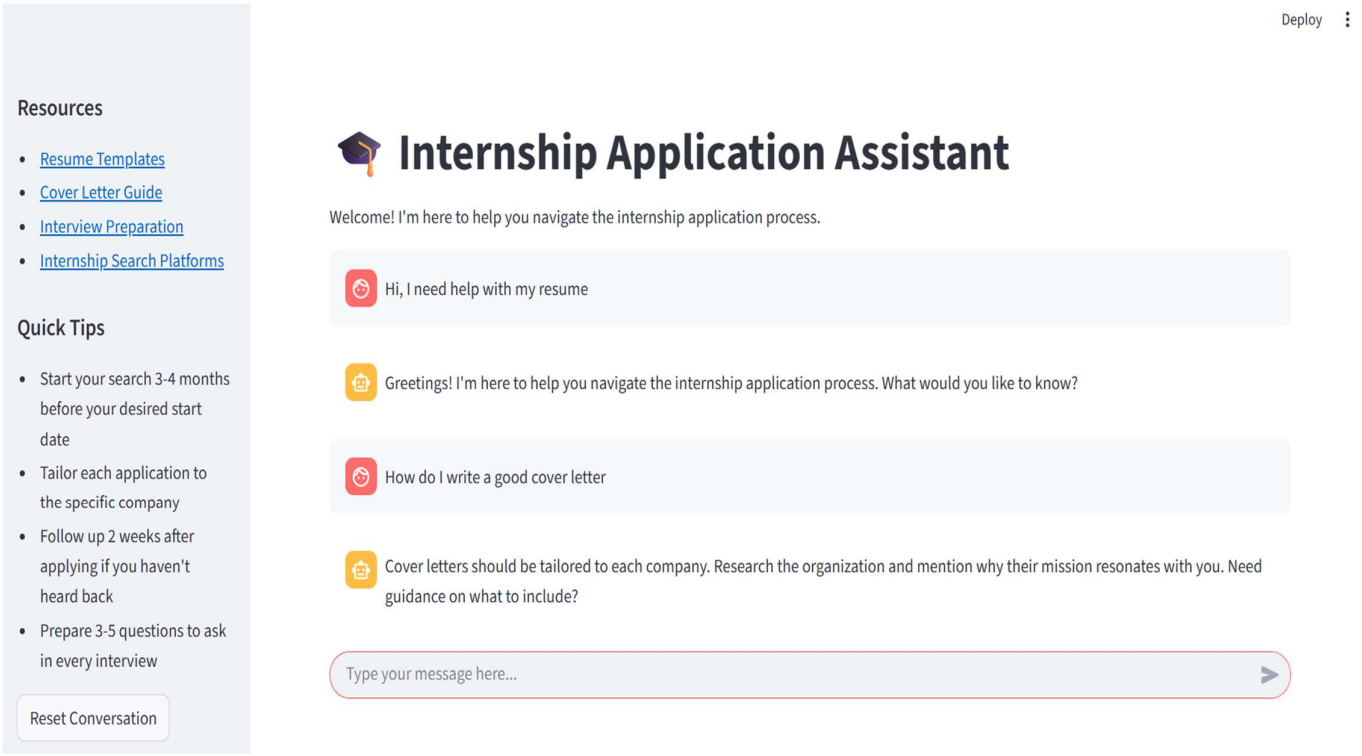
Implementation & Result

The chatbot was developed and deployed using Python and Streamlit. It features a clean, interactive chat interface where students can type queries and receive instant responses.

Implemented Features:

- Multi-intent support: greetings, resume help, cover letter advice, interview preparation, application tracking, networking, skill development, rejection handling, and more.
- Industry-specific suggestions based on fields such as technology, finance, marketing, design, and research.
- Personalized responses depending on academic level, skills, and past experiences.
- Suggested questions and quick-access resources (resume templates, interview guides, job platforms) integrated into the interface.

Sample Output



Conclusion and Future scope

The **Internship Application Assistant** chatbot successfully demonstrates the potential of combining rule-based and AI-driven NLP techniques to provide meaningful and context-aware career guidance. It offers students personalized support for resumes, cover letters, interview preparation, and application tracking.

Key Achievements:

- Designed a hybrid chatbot capable of handling both simple and complex queries.
- Implemented session-based context tracking for personalization.
- Developed a scalable system using Streamlit and Hugging Face Transformers.

Future Enhancements:

- **Resume Parsing & Automated Feedback:** Upload resumes for AI-based evaluation.
- **Voice-enabled Interaction:** Add speech-to-text and text-to-speech for accessibility.
- **Expanded Career Assistance:** Cover full-time job applications, networking analytics, and company-specific preparation.
- **Analytics & Progress Tracking:** Help users track their progress, compare applications, and receive personalized growth recommendations.

References

- Hugging Face Transformers – https://huggingface.co/transformers/
- Streamlit Documentation – https://docs.streamlit.io/
- BERT and Zero-shot Classification (facebook/bart-large-mnli) – https://huggingface.co/facebook/bart-large-mnli
- Career Guidance Resources – https://www.themuse.com/advice/
- Interview Preparation – https://www.interviewbit.com/interview-preparation/
- LinkedIn Internships – https://www.linkedin.com/internships/