

CogniAssist Smart Enterprise AI Using LLM and Langgraph

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ABSTRACT: CogniAssist Smart Enterprise AI is an intelligent system designed to automate enterprise support and improve organizational efficiency by handling user queries and service requests through artificial intelligence. It refers to the process of analyzing employee or customer queries, understanding their intent, and providing accurate responses or automated actions. In this project, the system processes user queries using Natural Language Processing and Large Language Models. The system performs category detection, sentiment analysis, and decision making to identify the nature of the request. As a result, the system can provide role-based responses and automatically raise support tickets when issues are detected. The workflow operates in two main stages. In the first stage, the system analyzes the query and classifies it into predefined enterprise categories. In the second stage, the system generates intelligent responses and performs automated ticket creation and notification to support teams.

KEYWORDS: Enterprise AI, Natural Language Processing, Sentiment Analysis, Automated Ticketing.

I. INTRODUCTION

CogniAssist Smart Enterprise AI is developed to make enterprise support systems smarter and more efficient. In many organizations, employees and customers regularly raise queries related to IT services, HR policies, and administrative activities. These requests are usually handled manually, which can be slow and sometimes difficult to manage when the number of queries increases. Because of this, organizations require a system that can understand user requests and respond quickly.

The proposed system uses artificial intelligence techniques to process and analyze user queries. By using Natural Language Processing and Large Language Models, the system is able to understand the meaning and intent behind the query. After understanding the request, it classifies the query into categories such as IT, HR, or Admin. It also performs sentiment analysis to identify whether the request indicates a normal query or a possible issue that needs attention.

When the system detects a problem or service request, it can automatically create a support ticket and send it to the responsible team. This reduces manual effort and helps organizations manage support services more effectively. Section II explains the query analysis process, Section III describes response generation and ticket creation, Section IV presents the experimental results, and Section V concludes the work.

II. LITERATURE SURVEY

The concept of intelligent enterprise support systems has evolved with the advancement of artificial intelligence and natural language processing technologies. Early research in automated support systems mainly focused on rule-based chatbots that responded to predefined queries. These systems were useful for simple and repetitive tasks but lacked the ability to understand complex user requests. With the development of machine learning and language models, modern systems can now process natural language queries and generate more accurate responses. Recent studies have explored the use of Natural Language Processing techniques for analyzing user queries and identifying their intent. These techniques allow systems to classify requests into different categories such as IT support, HR assistance, or administrative services. In addition, sentiment analysis methods are used to determine whether a query expresses a problem, complaint, or general request. Such analysis helps organizations understand user needs more effectively and prioritize important issues.

Several research works have also focused on the integration of Large Language Models to improve the performance of intelligent support systems. These models help generate meaningful responses by understanding the context of the query. Some systems combine query understanding with automated ticket management, allowing organizations to handle user issues more efficiently. This approach reduces manual workload and improves response time in enterprise environments.

The proposed system in this project is designed in two main stages: query analysis and automated support action. In the first stage, the system processes user queries using Natural Language Processing techniques and identifies the category and sentiment of the request. In the second stage, the system generates intelligent responses and automatically creates support tickets whenever a problem is detected. This approach helps improve enterprise support services and ensures faster resolution of user issues.

III. METHODOLOGY

The proposed system is designed to handle enterprise support queries in a simple and efficient manner. It processes the requests submitted by employees or users and tries to understand the purpose of the query. The system first receives the user input through the interface. After receiving the query, basic text preprocessing is performed to remove unnecessary words and clean the data. Then Natural Language Processing techniques are applied to understand the meaning and intent of the query. Based on the analysis, the system identifies the category of the request such as IT, HR, or Admin services. It also performs sentiment analysis to understand whether the query indicates a normal request or a possible issue. If a problem is detected, the system automatically creates a support ticket and stores the details for further action. This process helps organizations manage support services in a faster and more organized way.

IV. EXPERIMENTAL RESULTS

The output results of the CogniAssist Smart Enterprise AI system demonstrate how user queries are processed and how support tickets are generated and managed. The system interface is launched using the Gradio framework, which provides a user-friendly dashboard for interacting with the AI system. The dashboard contains three main sections: Login & Query, My Tickets, and Admin / Manager Tickets. These sections allow users to submit queries, view their tickets, and manage support requests.

Fig. (a) shows the Login & Query interface where the user enters the username, password, and query related to enterprise support. After clicking the Send button, the system processes the query using Natural Language Processing techniques. The system performs query preprocessing, category detection, sentiment analysis, and decision logic to determine whether the request requires an AI response or automatic ticket creation.

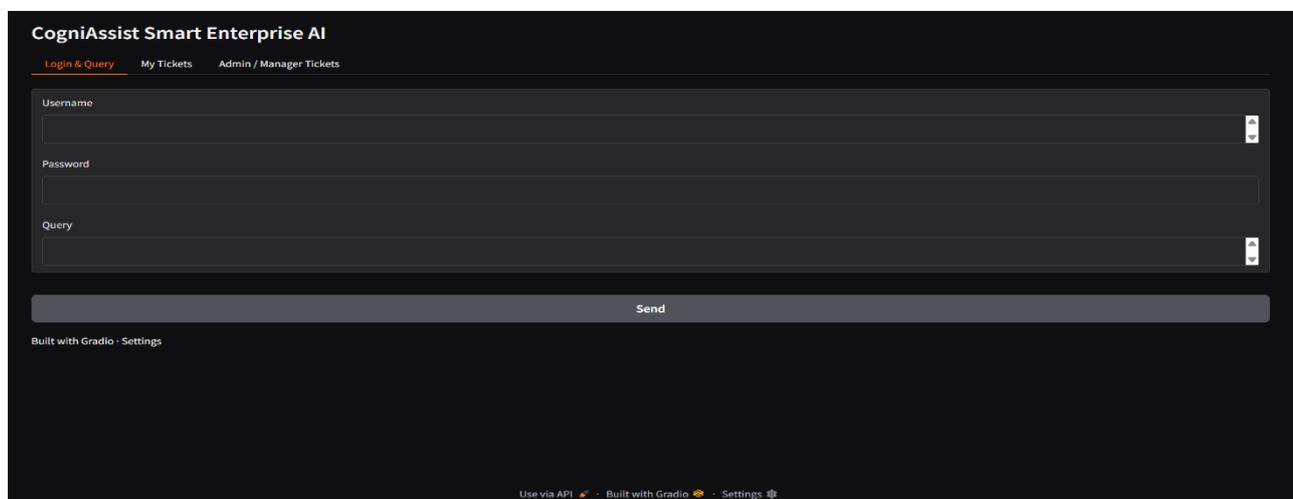


Fig. (a) Login & Query Interface

Fig. (b) and (c) show the AI responses generated by the system for different enterprise queries such as general corporate questions and role-based access control explanations. If the query is informational, the system retrieves relevant knowledge and generates a context-aware response.

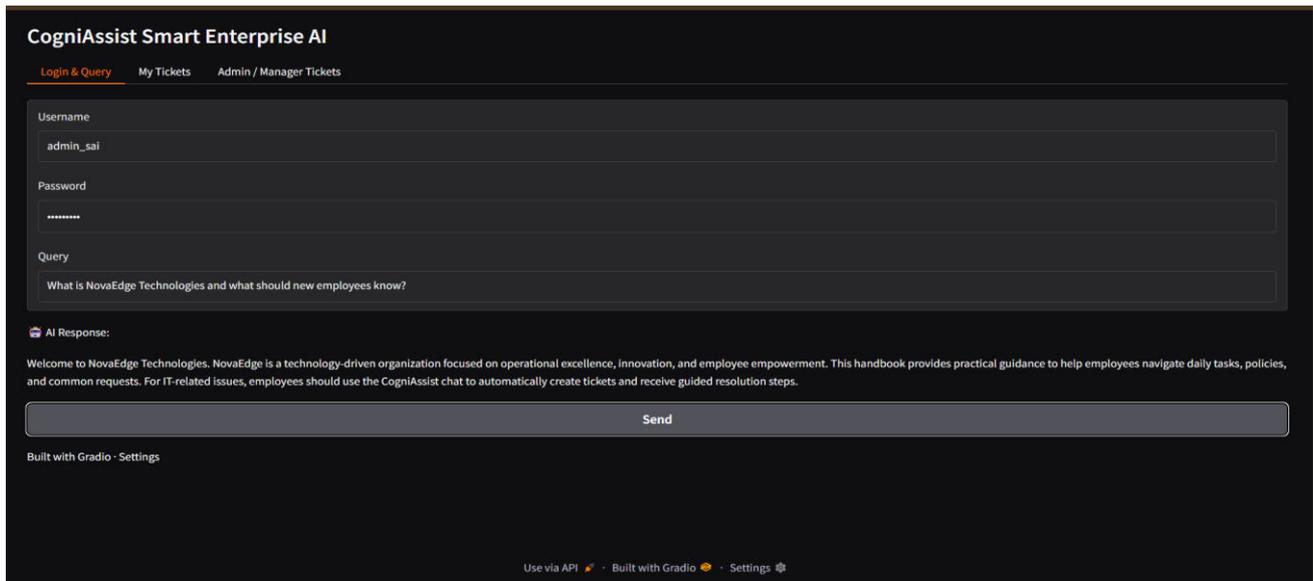


Fig. (b) AI Response for General Corporate Query

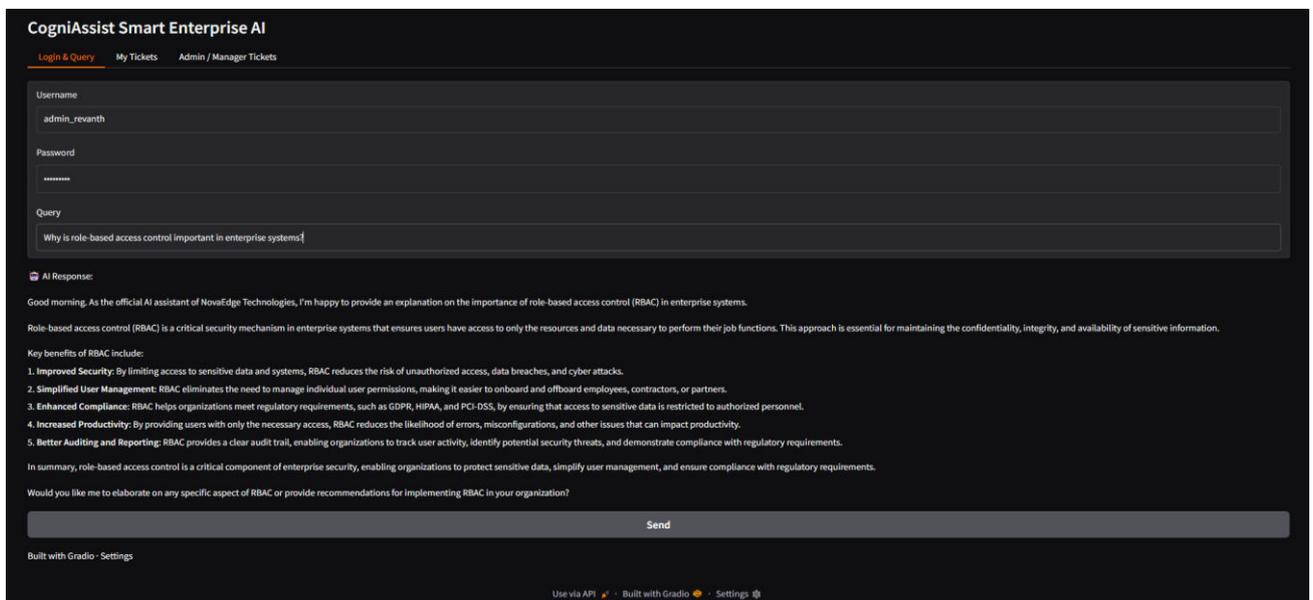


Fig. (c) AI Explanation for Role-Based Access Control

Fig. (d) shows the automatic ticket creation confirmation when the system detects an issue in the query. (e) shows the My Tickets interface where users can view the list of submitted tickets including ticket ID, issue description, category, priority, and status.

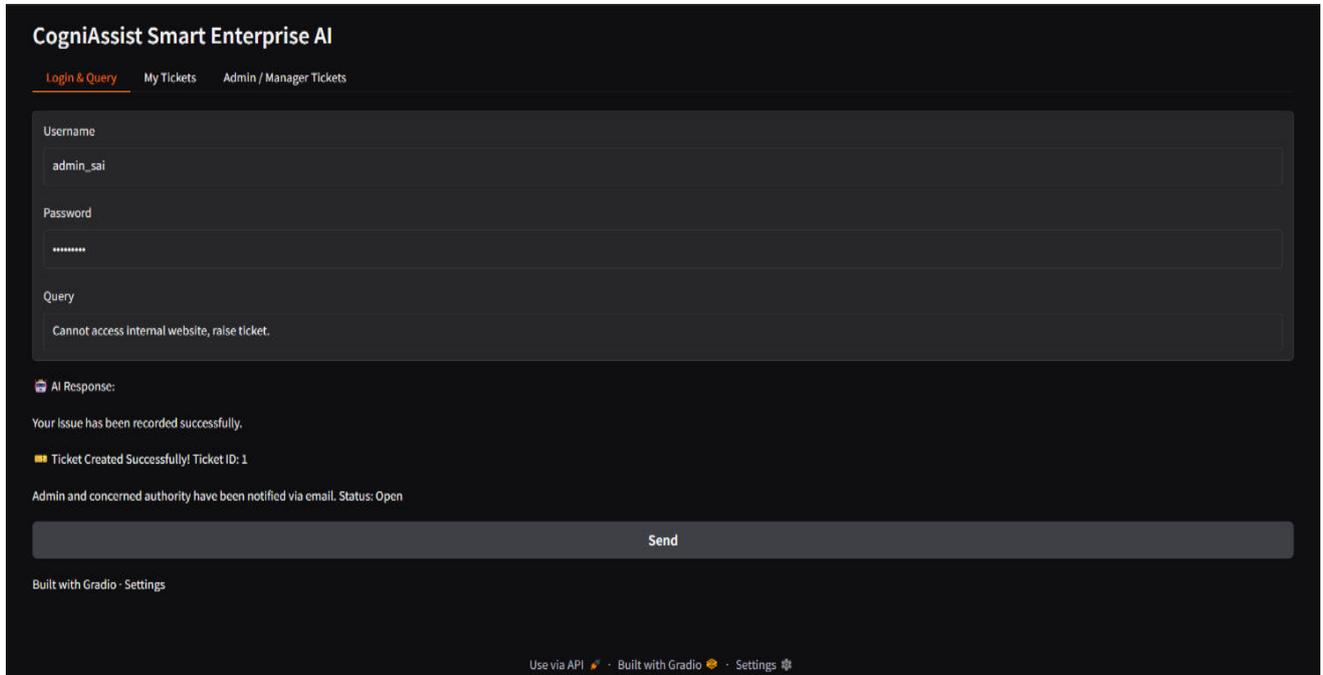


Fig (d). Automatic Ticket Creation Confirmation

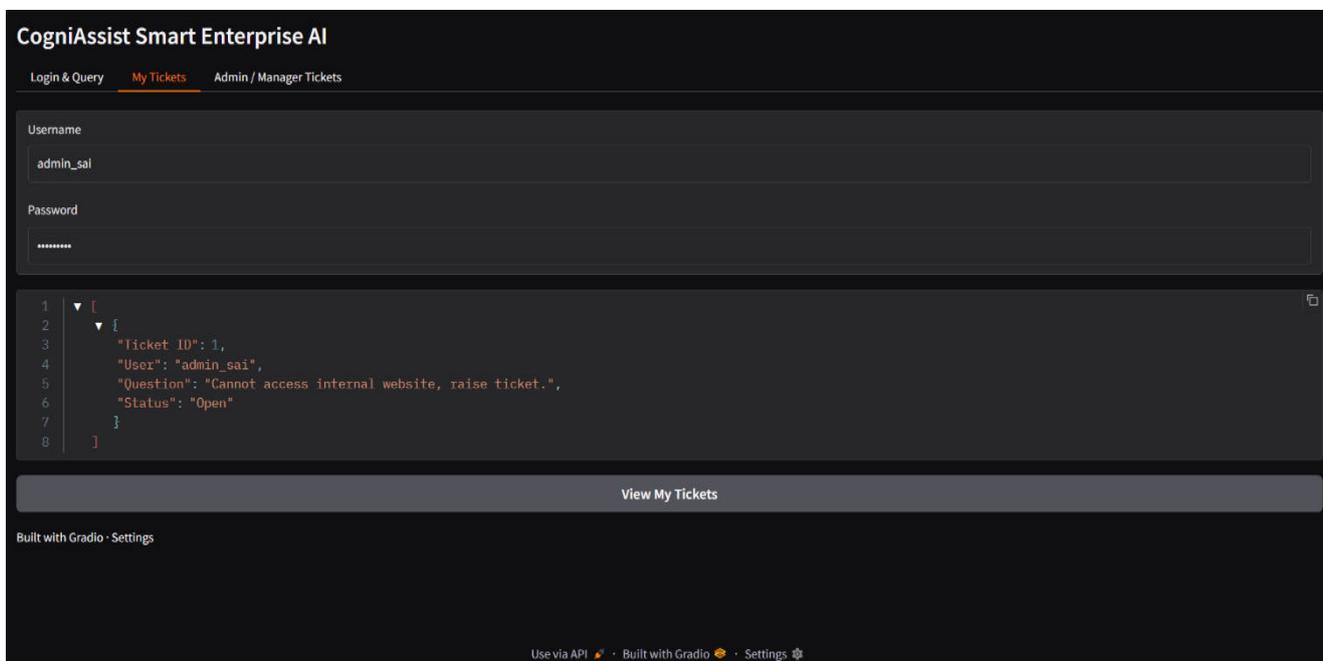


Fig (e). My Tickets – User Ticket View

Fig. (f), (g), (h), and (i) show the Admin / Manager ticket management interface where administrators can view all tickets and update their status such as Open, In Progress, or Closed. (j) shows the updated ticket status visible in the user ticket view.

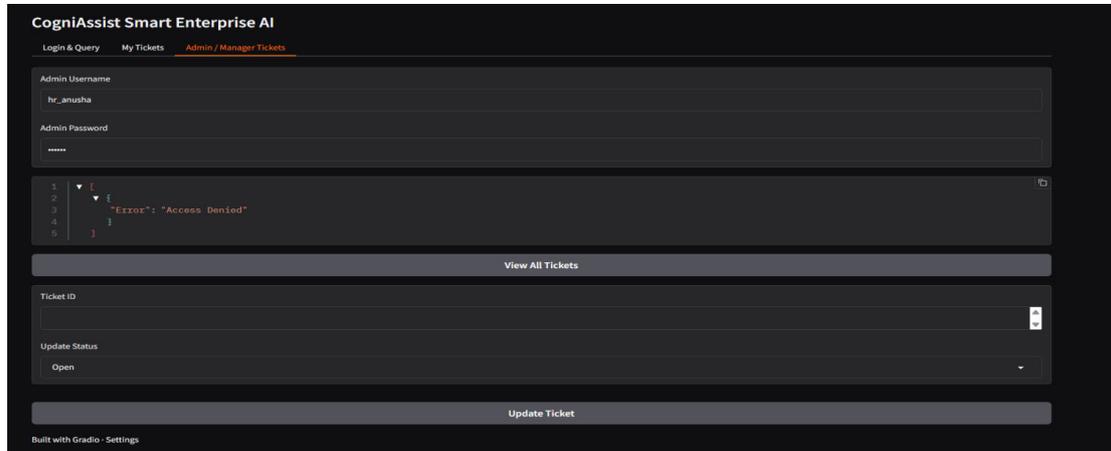


Fig (f). Admin / Manager Tickets – Access Denied Output

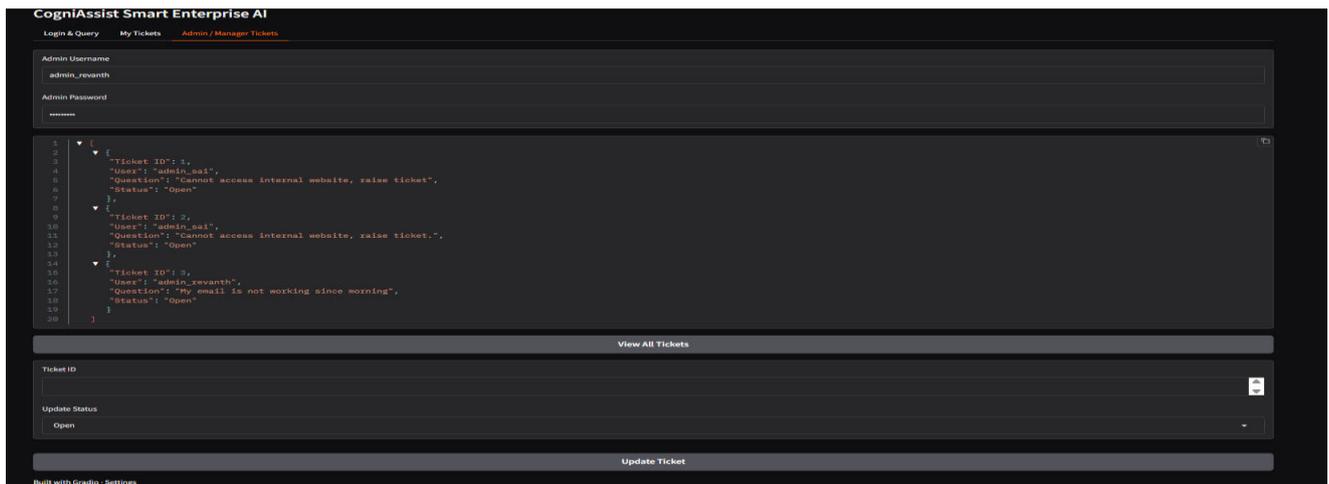


Fig. (g) Admin / Manager Tickets – View All Tickets

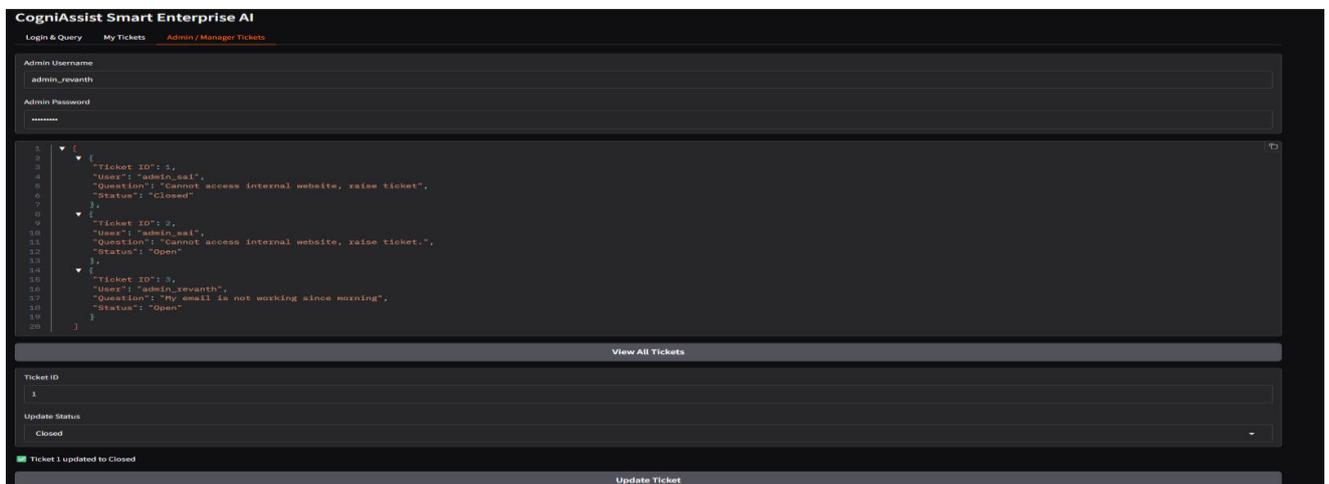


Fig. (h) Admin / Manager Tickets – Ticket Status Updated to Closed

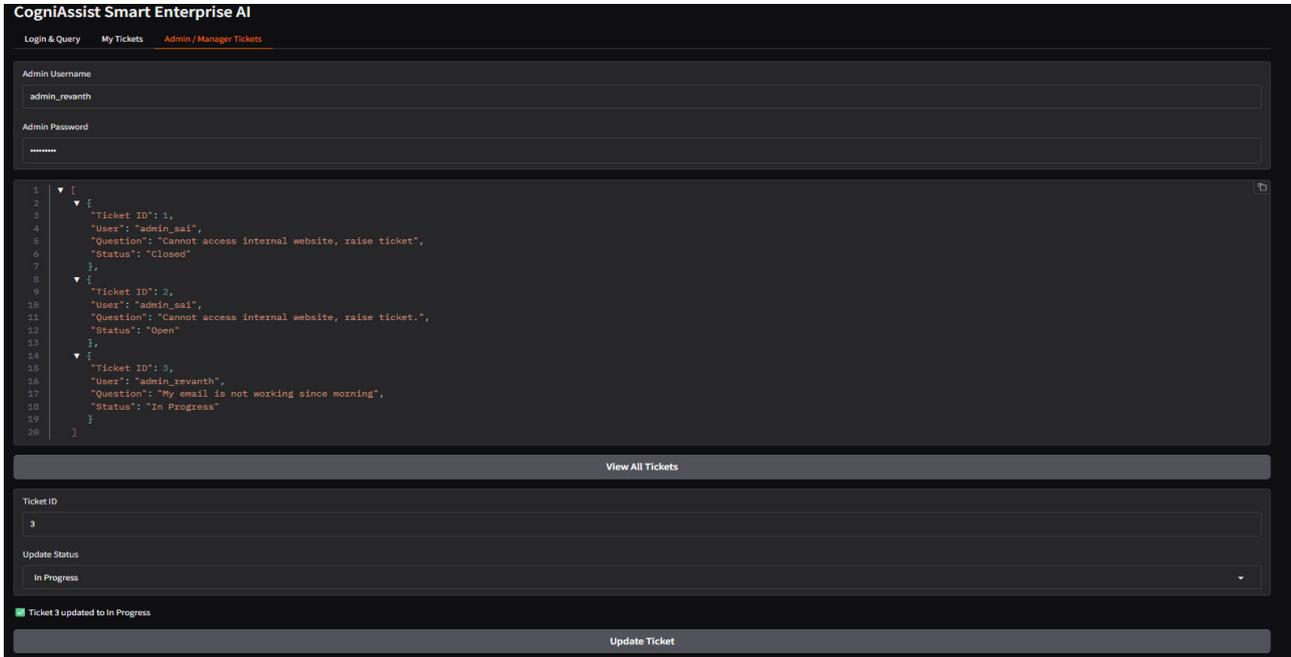


Fig. (i) Admin / Manager Tickets – Ticket Status Updated to In Progress

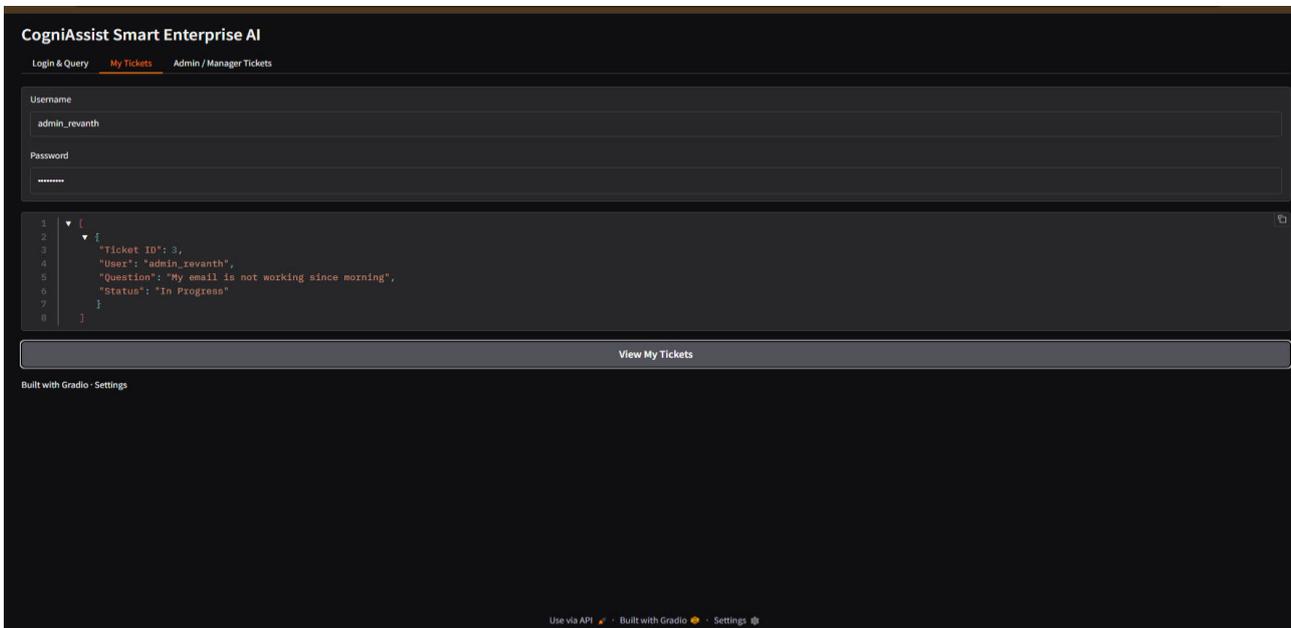


Fig. (j) My Tickets – User Ticket Status View

Fig. (k) and (l) show the email notification generated when a new ticket is created and sent to the administrator. (m) shows the fallback response generated by the system when it cannot find relevant information related to a user query.

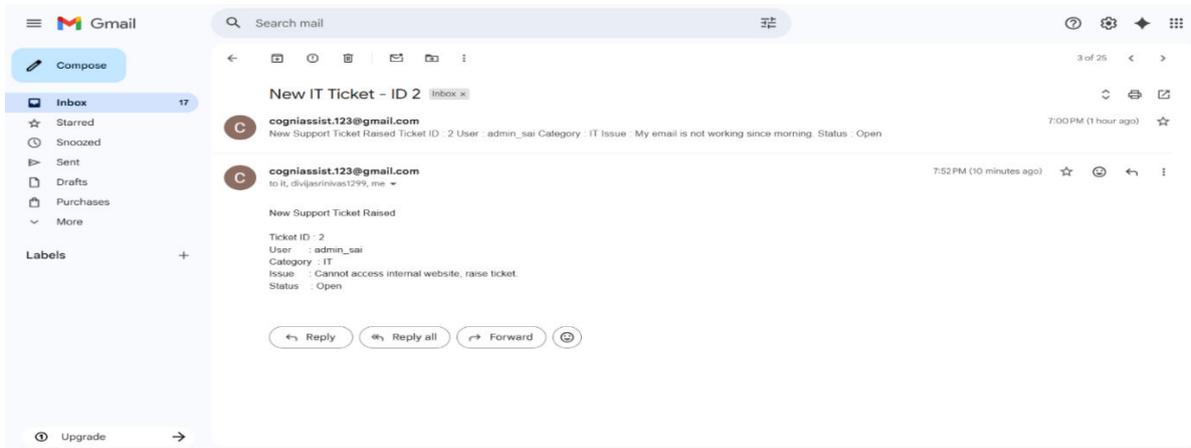


Fig. (k) Email Notification – New Ticket Alert Generated

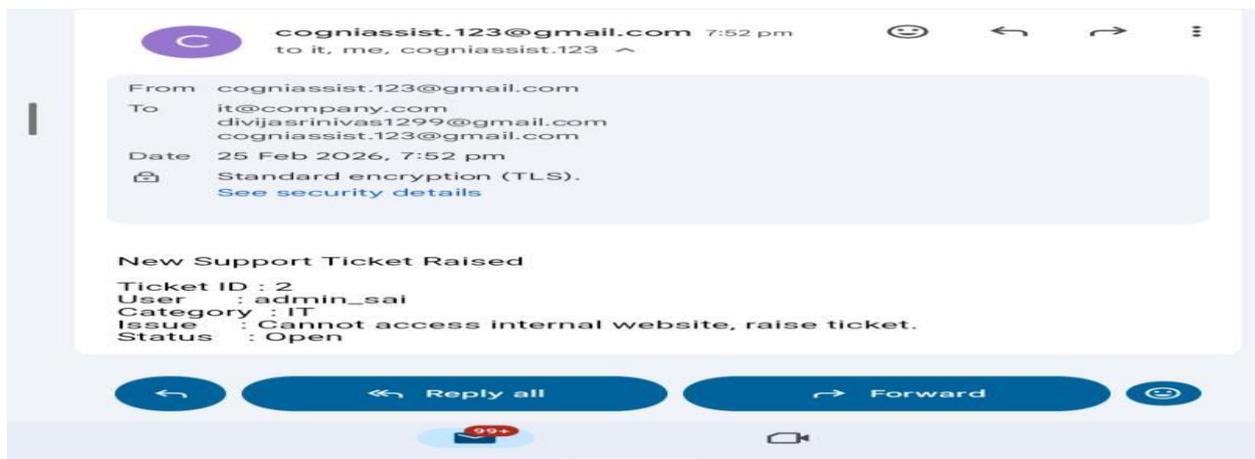


Fig. (l) Email Notification – Ticket Details Sent to Admin

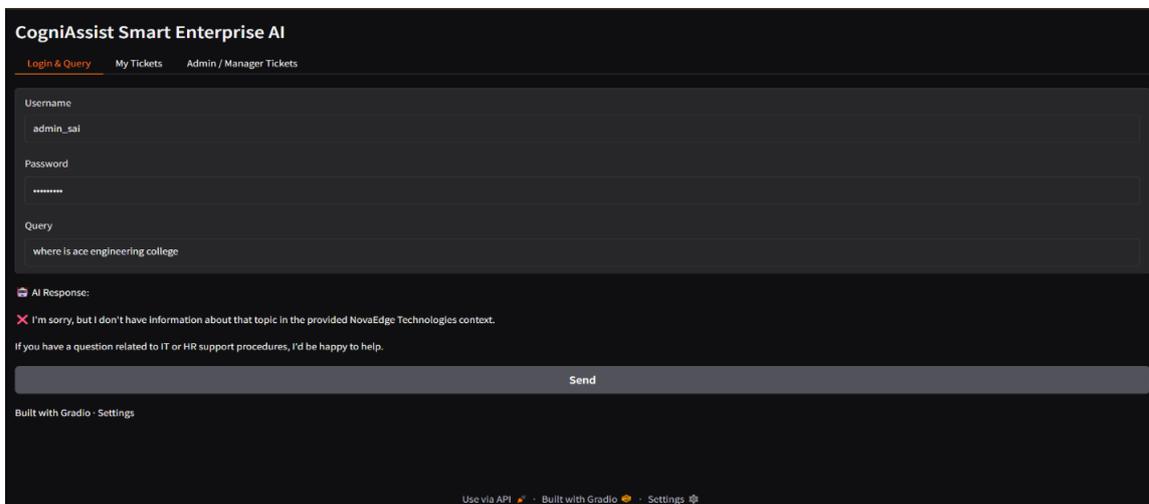


Fig. (m) Fallback Response – System Message for Unknown Query

V. CONCLUSION

In this project, a system called CogniAssist Smart Enterprise AI was developed to make enterprise support easier and faster. The system is able to process user queries and understand what the user is asking. It uses Natural Language Processing techniques to analyze the query and identify its category such as IT, HR, or Admin. During testing, different types of queries were given to the system and the results showed that it can correctly identify the request and generate a suitable response. When a query indicates a problem, the system can also create a support ticket automatically. Overall, the system helps reduce manual work and improves the way organizations handle support requests.

VI. FUTURE SCOPE

The CogniAssist – Smart Enterprise AI system has strong potential for future enhancements and large-scale deployment. The system can be expanded to support multi-department integration, cloud deployment, and advanced analytics dashboards for better decision-making. Integrating advanced Large Language Models and transformer-based reasoning can improve enterprise intelligence. Embedding-based semantic search with vector databases like FAISS could enhance knowledge retrieval accuracy. Using orchestration frameworks such as LangChain or LangGraph can enable multi-step reasoning and tool-calling. Future improvements may include automated priority prediction, SLA-based escalation, anomaly detection, and predictive analytics. Integration with platforms like ServiceNow, Microsoft Teams, or ERP systems would allow cross-platform ticket synchronization. Cloud deployment would improve scalability, security, and accessibility. Advanced security measures such as role-based encryption and audit logging could be added. These enhancements would make CogniAssist a fully autonomous enterprise AI operations platform.

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