

Virtual Support Agent

A PROJECT REPORT

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BACHELOR OF TECHNOLOGY

IN

**COMPUTER ENGINEERING [ARTIFICIAL INTELLIGENCE AND
MACHINE LEARNING]**

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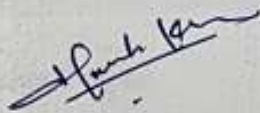
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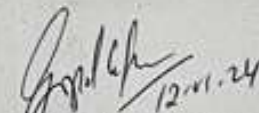
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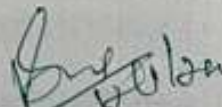
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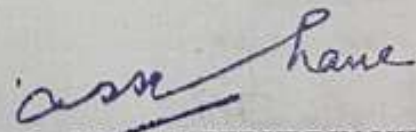
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We hereby declare that the work, which is being presented in the project report entitled **Virtual Support Agent** in partial fulfilment for the award of Degree of **Bachelor of Technology in Computer Science and Engineering [Artificial Intelligence and Machine Learning]**, is a record of our own investigations carried under the guidance of **Mr. Haseeb Khan, Asst. Prof.-SCSE, School of Computer Science Engineering & Information Science, Presidency University, Bengaluru.**

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ABSTRACT

This project centers on the creation of an innovative Virtual Support Agent enriched with Machine Learning (ML) capabilities, redefining the paradigm of customer service in the rapidly evolving digital landscape. With a foundation in natural language processing (NLP), the chatbot interprets and responds to customer queries in a contextually relevant manner, harnessing the power of ML algorithms to continuously refine its language comprehension and responsiveness. The integration of sentiment analysis ensures the chatbot's ability to discern and adapt to customer emotions, fostering a more empathetic and tailored interaction.

Additionally, user behavior prediction, driven by ML, enables the chatbot to anticipate customer needs, providing proactive and personalized support. This intelligent Customer Support Chatbot goes beyond traditional rule-based systems by evolving with each interaction, learning from user input, and adapting to dynamic customer service scenarios. By seamlessly integrating with existing support systems, it offers a unified interface for users while optimizing operational efficiency. The ML-driven analytics engine enhances the overall efficacy of the chatbot by analyzing customer interactions, feedback, and trends, ultimately contributing to improved customer satisfaction and reduced response times. This project represents a strategic fusion of ML and customer service, presenting a scalable and adaptable solution poised to elevate the customer support experience across diverse business environments.

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Vinod Kumar
Bhargava Narasimha

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CHAPTER-1

INTRODUCTION

1.1 Revolutionizing Customer Support with Intelligent Chatbots

1.1.1 Introduction to Contemporary Business Landscape:

In the dynamic landscape of contemporary business, where digital interactions with customers have become the norm, businesses face the challenge of meeting evolving customer expectations in a rapidly changing environment.

1.1.2 Cutting-Edge Solution:

This project introduces a cutting-edge solution aimed at revolutionizing customer support. At its core is an intelligent Customer Support Chatbot seamlessly infused with the capabilities of Machine Learning (ML).

1.1.3 Enhancing Customer Experience:

The primary goal of this project is to redefine the customer experience by providing a chatbot that evolves and learns over time. Sophisticated Natural Language Processing (NLP) and ML algorithms form the foundation for this evolution.

1.1.4 Integration and Operational Efficiency:

Beyond the technical intricacies, the project places a strong emphasis on integration and operational efficiency. The chatbot is meticulously designed to seamlessly integrate into existing customer support systems, providing a unified platform for users and optimizing operational processes. This comprehensive approach aims to create a dynamic and empathetic interface for users seeking support.

CHAPTER-2

LITERATURE SURVEY

Deng and Yu (2023) conducted a meta-analysis to examine the impact of chatbot technology use in sustainable education.	In their 2023 study, Deng and Yu conducted a meta-analysis and systematic review focusing on the influence of chatbot technology in sustainable education. The findings suggest a significant positive impact of chatbots on overall learning outcomes, irrespective of variables like intervention duration and learning content. Specifically, chatbots were found to notably enhance knowledge retention. However, the study highlighted a lack of significant effects on critical thinking, learning engagement, and motivation.
Interacting with educational chatbots (Kuhail et al., 2023)	<p>(a) Web platforms are the main focus of chatbot development for educational purposes, as they are useful teaching tools for a variety of subjects.</p> <p>(b) A portion of chatbots use personalised learning strategies catered to the requirements of each individual student, whereas the majority follow preset conversational trajectories. Some also use a variety of design ideas to integrate experiential and collaborative learning.</p> <p>(c) One of the biggest impediments to the development of strong and adaptable educational chatbots is the lack of comprehensive training datasets, which is one of the challenges and constraints in chatbot development for education.</p>
Chatbots applications in education (Okonkwo & Ade-Ibijola, 2021)	<p>a) Chatbots are used in education for teaching, administration, assessment, advisory, and research</p> <p>b) Chatbots have the potential to enhance learning outcomes through immediate assistance, quick access to information, and increased student motivation</p> <p>c) Implementing Chatbot technology in education faces challenges like ethics, evaluation methods, user attitudes, programming complexities, and data integration issues</p>

Artificial Intelligence in Education (Krstić et al., 2022)	<p>(a) As AI transforms the way teachers teach and students learn, the educational landscape is completely changed.</p> <p>(b) The integration of AI into educational systems drives the development of initiatives related to teaching and learning, resulting in improvements to the educational process as a whole. While conceding that it won't entirely replace conventional educational systems, AI has a significant impact on education. Rather, it brings about profound changes in the way that education is perceived and provided.</p>
Are we there yet? chatbots in education (Wollny et al., 2021)	<p>(a) Chatbots prove to be invaluable educational aids, elevating student learning outcomes in areas such as knowledge acquisition, problem-solving, self-regulation, and motivation.</p> <p>(b) Within the educational sphere, chatbots find application in disseminating information, answering queries, delivering feedback, offering tutoring assistance, gamifying learning, and fostering social interaction.</p> <p>(c) The integration of chatbots into education presents challenges, requiring attention to crafting high-quality systems, implementing effective evaluation techniques, and addressing ethical considerations surrounding their usage.</p>
AI in Education: (Tahiru, 2021)	<p>(a) Education stands at the threshold of abundant possibilities with the integration of AI, offering teachers and students the means to leverage its essential benefits.</p> <p>(b) Developed nations are actively incorporating AI not only in education but also across diverse sectors, showcasing the practical implementation of this technology.</p> <p>(c) Embracing AI in education comes with hurdles, encompassing ethical dilemmas, technological complexities regarding data usage and ownership, and organizational considerations involving the potential displacement of human roles by AI.</p>

Artificial Intelligence in Education: (Chen et al., 2020)	<p>(a) Acting as virtual assistants, AI Chatbots take on the roles and responsibilities typically handled by instructors.</p> <p>(b) Teachers benefit from increased effectiveness and efficiency, thanks to AI Chatbots, resulting in a higher caliber of instructional delivery.</p> <p>(c) Students enjoy enriched learning experiences through AI Chatbots, ultimately contributing to superior educational outcomes.</p>
Rediscovering the use of chatbots in education (Pérez et al., 2020)	<p>(a) The educational landscape witnesses a rising trend in employing chatbots for personalized tutoring, homework assistance, concept comprehension, test readiness, collaboration, and mental health support.</p> <p>(b) The integration of chatbots into education yields advantages such as heightened student engagement, improved learning outcomes, and a reduction in stress levels.</p> <p>(c) Challenges in deploying educational chatbots revolve around ensuring accuracy of information, addressing potential biases, and securing user acceptance.</p>
Artificial intelligence in higher education: the state of the field (Crompton & Burke, 2023)	<p>(a) AI holds the promise of transforming education, making it more reachable, cost-effective, and impactful.</p> <p>(b) The applications of AI in education span from personalized learning and student support to the automation of administrative functions. Additionally, AI contributes to enhanced research endeavors and the creation of novel educational prospects.</p> <p>(c) The incorporation of AI in education presents challenges, including the imperative need for data privacy and security, addressing potential biases, and providing educators with adequate training on effective AI utilization.</p>

Table 2.1

CHAPTER-3

RESEARCH GAPS OF EXISTING METHODS

Finding research gaps in the present machine learning (ML) approaches for customer service chatbots entails figuring out where the approaches may fall short or where more development and study are required. Potential research gaps in this area include the following:

3.1 Explainability and Transparency:

Gap: Poor knowledge of the decision-making processes used by ML algorithms in chatbots.

Research Question: In order to foster user trust and comprehension, how can we improve the explainability and transparency of machine learning models utilized in customer care chatbots?

3.2 Handling Ambiguity and Contextual Understanding:

Gap: Difficulties with answering unclear questions and comprehending natural language context.

Research Question: In order to provide more correct responses, how can chatbots manage ambiguous language and retain context awareness?

3.3 User Feedback Integration:

Gap: There aren't many studies on how to incorporate user feedback into chatbot performance optimisation.

Research Question: What are the best ways to integrate user feedback into customer service chatbots for iterative development and improvement?

3.4 Ethical Considerations and Bias :

Gap: The ML models employed in chatbots have not sufficiently explored potential biases and ethical issues.

Research Question: In order to ensure impartial and equitable interactions, how can we address ethical issues and reduce prejudices in customer service chatbots?

3.5 Handling Multilingual and Multicultural Interactions:

Gap: Not enough attention has been paid to creating chatbots that can manage multilingual and multicultural client interactions well.

Research Question: What tactics can be used to enhance chatbot performance in offering assistance in a variety of linguistic and cultural contexts?

3.6 Hybrid Human-Chatbot Interaction:

Gap: Insufficient investigation of the best approaches to integrating chatbot and human interactions in a smooth manner.

Research Question: In order to deliver the greatest customer support experience, how can businesses create efficient hybrid models that include interactions between chatbots and humans?

3.7 Extended Learning and Flexibility:

Gap: Inadequate investigation on chatbots' capacity for long-term learning and their capacity to adjust to changing client demands.

Research Question: In order to guarantee relevance and efficacy, how can customer service chatbots be built to continually learn and adapt over extended periods of time?

3.8 Cross-Platform Consistency:

Gap: There aren't many research on making sure users get the same experience and performance across different platforms (web, mobile, messaging apps).

Research Question: What tactics may be used to keep chatbot performance and user experience consistent across various channels of communication?

CHAPTER-4

PROPOSED METHODOLOGY

The recommended procedure for developing a chatbot for customer service that integrates machine learning follows a methodical approach, making strategic use of machine learning and natural language processing (NLP) techniques. The crucial phases of this methodology consist of:

4.1 Requirements Gathering and Definition:

Identify and define the objectives and requirements for the customer support chatbot.

Understand the specific needs and expectations of users to tailor the chatbot's capabilities accordingly.

4.2 Data Collection and Preprocessing:

Collect relevant data for training and fine-tuning the machine learning models. Preprocess the data to ensure it is clean, structured, and suitable for training the chatbot.

4.3. Intent Recognition and Entity Extraction:

Implement techniques for accurately recognizing user intents and extracting entities from their queries.

Enhance the chatbot's understanding of user input through advanced intent recognition and entity extraction.

4.4 Model Selection and Training:

Choose appropriate machine learning algorithms and models based on the nature of the customer support tasks.

Train the selected models using the preprocessed data to enable the chatbot to learn and adapt.

4.5 Dialog Flow Design:

Design a user-friendly and context-aware dialog flow for seamless interactions. Incorporate decision trees or state machines to manage the conversation flow effectively.

4.6 Backend Integration:

Integrate the chatbot with backend systems, databases, and external services to access relevant information.

Ensure smooth communication between the chatbot and other components of the support infrastructure.

4.7 Context Management:

Implement context management techniques to retain and understand the context of ongoing conversations.

Enable the chatbot to provide coherent and contextually relevant responses.

4.8 User Authentication and Authorization (if required):

Implement secure user authentication and authorization mechanisms for scenarios requiring user identification.

Ensure data privacy and security compliance.

4.9 Testing and Validation:

Conduct rigorous testing, including unit tests, integration tests, and end-to-end tests, to validate the functionality of the chatbot.

Gather feedback from users and stakeholders to identify and address any issues.

CHAPTER-5

OBJECTIVES

Main Objectives of the project are:

5.1 Improve Response Time:

Reduce the time it takes to respond to customer queries. Enhances customer satisfaction by providing quick and efficient support.

5.2 Increase First-Contact Resolution:

Aim to resolve customer issues during the first interaction. Improves customer experience by minimizing the need for multiple interactions and reducing resolution time.

5.3 Enhance Personalization:

Tailor responses and recommendations based on individual customer preferences and history. Creates a more personalized and engaging customer experience, fostering a sense of connection.

5.4 Boost Customer Satisfaction (CSAT):

Measure and enhance overall customer satisfaction with the support provided.

Higher CSAT scores indicate improved customer perception and loyalty.

5.5 Reduce Customer Churn:

Minimize the number of customers leaving the service or product.

Retaining customers is crucial for business success and growth.

5.6 Increase Customer Engagement:

Encourage active participation and interaction with customers. Engaged customers are more likely to be satisfied, loyal, and contribute positively to the brand.

5.7 Improve Accuracy of Responses:

Enhance the precision and correctness of the chatbot's answers. Builds trust among users and reduces the likelihood of misinformation.

5.8 Handle Increased Volume of Queries:

Scale the chatbot's capabilities to manage a higher volume of customer queries. Ensures that the chatbot remains effective even during peak periods, improving overall efficiency.

5.9 Automate Routine Tasks:

Automate repetitive and mundane tasks that don't require human intervention. Frees up human agents to focus on more complex issues, speeding up the support process.

5.10 Provide Multilingual Support:

Enable the chatbot to understand and respond to queries in multiple languages. Expands the chatbot's reach to a diverse user base, improving inclusivity and accessibility.

CHAPTER-6

SYSTEM DESIGN & IMPLEMENTATION

Architectural Design:

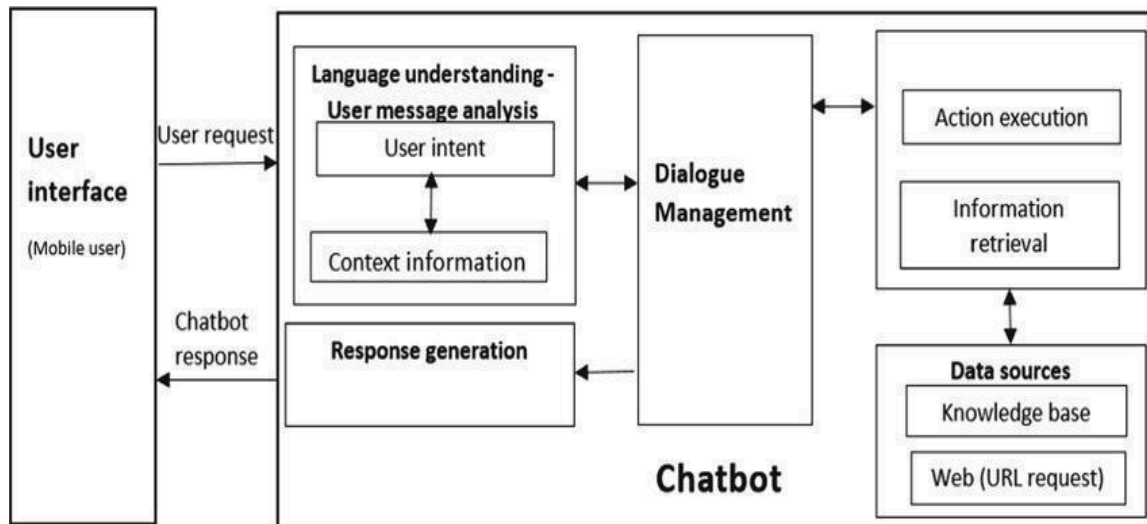


Figure 6.13

6.1 User Interface:

Description: The user interface serves as the entry point for users to interact with the chatbot. It can be a web-based chat window mobile app, or other communication channels.

Components:

Chat Window

Input Text Box

Multimodal Input Support (Text, Voice, Images)

6.2 User Intent Recognition (NLP Module):

Description: The NLP module processes user input to understand the intent and extract relevant entities.

Components:

Intent Recognition Model

Entity Extraction Model

Natural Language Processing Algorithms

6.3 Context Information:

Description: Context information management ensures that the chatbot understands the ongoing conversation and maintains relevant context.

Components:

Context Preservation Mechanism

User Session Management

Contextual Information Storage

6.4 Response Generation:

Description: The response generation component creates appropriate responses based on user intent, entities, and historical context.

Components:

Dynamic Response Generator

Personalization Engine

Sentiment-Aware Response Generator

6.5 Dialogue Management:

Description: Dialogue management oversees the flow of conversation, handling user queries and responses.

Components:

Dialogue Manager

Fallback Strategies

Contextual Understanding

6.6 Action Execution Information Retrieval:

Description: Retrieves information related to executing specific actions or tasks initiated by user queries.

Components:

Action Execution Handler

External System Integration

Backend API Calls

6.7 Data Sources and Knowledge Base:

Description: The knowledge base stores information, responses, and historical interactions, supporting continuous learning.

Components:

Customer Database Integration

Backend Systems Integration

Knowledge Base Management

6.8 Web URL Request Handling:

Description: Handles requests for web URL information retrieval, allowing the chatbot to fetch relevant data from external sources.

Components:

Web URL Request Processor

Data Extraction Mechanism

Integration with Web APIs

6.9 Security and Compliance:

Description: Ensures secure communication channels, data encryption, and compliance with privacy regulations.

Components:

Secure Communication Channels

Data Encryption Mechanisms

Compliance Measures

6.10 Analytics and Monitoring:

Description: Monitors user interactions, analyzes user behavior, and logs errors for optimization.

Components:

User Interaction Analytics

Error Handling and Logging

Performance Monitoring

6.11 Deployment and Scalability:

Description: Deploys the chatbot on scalable cloud infrastructure and utilizes containerization for efficient management. **Components:**

Cloud Deployment Architecture

Containerization Technologies

6.12 User Authentication (if applicable):

Description: Implements secure authentication mechanisms for verifying user identities, especially if dealing with sensitive information. **Components:**

User Authentication Module

Identity Verification Processes

CHAPTER-7

TIMELINE FOR EXECUTION OF PROJECT

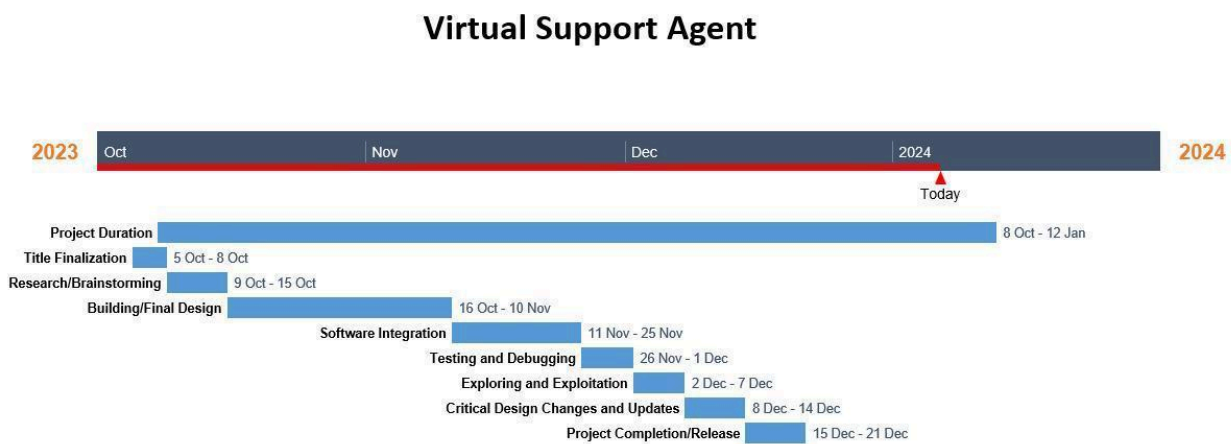


Figure 7.1

CHAPTER-8

OUTCOMES

8.1 Improved Response Times:

Chatbots equipped with ML can analyze and respond to user queries in real-time, significantly reducing response times. Enhances customer satisfaction by providing quick and efficient support.

8.2 24/7 Availability:

ML-driven chatbots can operate round-the-clock, providing continuous support. Ensures customers have access to assistance at any time, improving overall accessibility and user experience.

8.3 Increased First-Contact Resolution:

ML enables chatbots to better understand and resolve customer issues during the initial interaction.

Minimizes the need for multiple interactions, leading to faster issue resolution and improved customer satisfaction.

8.4 Enhanced Personalization:

ML allows chatbots to analyze user preferences and behavior, enabling personalized interactions. Creates a more tailored and engaging customer experience, fostering a sense of connection.

8.5 Reduced Customer Churn:

ML-driven chatbots can address customer issues promptly, reducing the likelihood of customers switching to competitors.

Retaining customers is crucial for business success and growth.

8.6 Cost Savings:

Automation of routine tasks through chatbots leads to operational efficiency and cost savings.

Reduces the workload on human agents, allowing them to focus on more complex issues.

8.7 Improved Customer Satisfaction Scores:

Quick responses, personalized interactions, and issue resolution contribute to higher customer satisfaction scores. Positive customer feedback and increased loyalty.

8.8 Proactive Customer Engagement:

ML enables chatbots to initiate conversations, providing proactive assistance and relevant information.

Enhances customer engagement and contributes to a more proactive support approach.

8.9 Positive Brand Image and Reputation:

Efficient and personalized support through chatbots contributes to a positive brand image.

Builds trust and credibility among customers, influencing brand reputation positively.

8.10 Data-Driven Insights:

ML algorithms can analyze user interactions, providing valuable insights into customer behavior and preferences.

Informed decision-making, allowing businesses to optimize services based on data-driven insights.

CHAPTER-9

RESULTS AND DISCUSSIONS

Input	Actual output	Expected output	Result
Greeting message	Bot greets user	Bot greets user	Accepted
Ask for movies	Gives results based on place	Gives results based place	onAccepted
User willing to watch movie	Bot asks to enter place	Get answer to that query as to enter place	Accepted
Enters irrelevant query	Displays error message	Expects answer for the entered query	Rejected
User enters the location	Bot asks for movie name	Asks to enter the movie name	Accepted

Table 9.1

CHAPTER-10

CONCLUSION

The integration of machine learning (ML) into customer support chatbots signifies a significant leap forward in the realm of customer service capabilities. This transformative advancement is achieved through the incorporation of key technologies such as natural language processing (NLP), sentiment analysis, and personalized recommendation systems. These ML-driven chatbots showcase remarkable potential in reshaping the entire landscape of customer support.

The utilization of NLP allows these chatbots to comprehend and respond to user queries with a level of sophistication that mirrors human interaction. Sentiment analysis empowers them to gauge the emotional tone of customer inquiries, leading to more empathetic and tailored responses. Additionally, personalized recommendation systems enhance the chatbots' ability to provide individualized suggestions, thereby augmenting the overall customer experience.

In conclusion, the integration of ML into customer support chatbots represents a pivotal advancement in customer service technology. These chatbots stand out for their capacity to offer personalized, round-the-clock support, setting them apart as indispensable tools in the contemporary customer-centric business landscape. Their unique ability to continuously learn and adapt ensures that they stay relevant and effective over time. For businesses, strategic implementation and the right approach enable the harnessing of the full potential of ML-driven chatbots, ultimately leading to elevated customer experiences and driving overall business success.

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APPENDIX-A

PSEUDOCODE

Main.py

```
# Import necessary
libraries import json
from difflib import get_close_matches
from flask import Flask, render_template, request, session, redirect, url_for
import firebase_admin
from firebase_admin import credentials, firestore
from datetime import datetime
import random

# Initialize Flask app
cred = credentials.Certificate("key.json")
firebase_admin.initialize_app(cred)
app = Flask(__name__)

# Define routes and functions...

# Load knowledge base from a
JSON file brain =
json.load(open('knowledge.json'))
#
# User Chatbot Route
@app.route('/userchatboot', methods=['POST', 'GET'])
def userchatboot():
    try:
        # Initialize answer
        variable answer = ""

        # Check if the request method is
        POST if request.method == 'POST':
            # Get user input from the form
            usertext = request.form['usertext'].lower()
            message = 'You: ' + usertext + '\n' answer
            = ""
            # Find close matches in the knowledge base
            close_match = get_close_matches(message, brain.keys())
            flag = False
```

```

#      Check if there is a close
match if close_match:
    reply = 'Chat Bot: ' + brain[close_match[0]][0] + '\n'
    answer = brain[close_match[0]][0]
    flag = True
else:
    reply = 'Chat Bot: ' + 'Can\'t find it in my knowledge base\n'
    answer = 'Can\'t find it in my knowledge base'

# Get user ID from the session
userid = session['userid']

#      Get current date and
time now = datetime.now()
date_time = now.strftime("%d/%m/%Y %H:%M:%S")

# Generate a random ID for the chat entry
id = str(random.randint(1000, 9999))

#      Create a JSON object for the chat
entry json_data = {
    'id': id,
    'UserId': userid,
    'Question': usertext,
    'Answer': answer,
    'DateTime': date_time,
    'Flag': flag
}
#      Concatenate user's message and chat bot's reply for
display answer = message + reply

# Connect to Firestore and add the chat entry
db = firestore.client()
db_ref = db.collection('newchat')
id = json_data['id']
db_ref.document(id).set(json_data)

# Render the template with the chat bot's response
return render_template("userchatboot.html", answer=answer)
except Exception as e:
    #      Handle
    exceptions return
    str(e)

```

```
# Start the Flask app if executed as the main
script if __name__ == '__main__':
    # Set the Flask app's secret key
    app.secret_key = "CustomerSupport@1234"

    # Enable debug mode for
    development app.debug = True

    # Run the Flask app
    app.run()
```

Training Data Sets :

```
# Import necessary
libraries import re
import torch
from transformers import BertTokenizer, BertForSequenceClassification,
Trainer, TrainingArguments
import pandas as
pd import nltk
from nltk.corpus import stopwords
from nltk.tokenize import word_tokenize

# Load the dataset from a CSV file
data = pd.read_csv('customer_support_messages.csv')

# Clean the text data
data['clean_text'] = data['text'].apply(lambda x: re.sub(r'^\w\s|$', '', x)) #
Remove special characters
data['clean_text'] = data['clean_text'].apply(lambda x: x.lower()) # Convert
text to lowercase
data['clean_text'] = data['clean_text'].apply(lambda x: ' '.join([word for word in
x.split() if word not in (stopwords.words('english'))])) # Remove stopwords

# Tokenize the cleaned text
data['tokenized_text'] = data['clean_text'].apply(lambda x: word_tokenize(x))

# Load the pre-trained BERT model and tokenizer
tokenizer = BertTokenizer.from_pretrained('bert-base-uncased') # Load BERT
tokenizer
# Create a BERT-based classification model
model = BertForSequenceClassification.from_pretrained('bert-base-uncased',
```

```
num_labels=len(data.category.unique()))

# Define the data (X) and labels (y)
X = data.tokenized_text.values # Features - tokenized text
y = data.category.values # Labels

# Define training arguments
training_args = TrainingArguments(
    output_dir='./results',
    num_train_epochs=5,
    per_device_train_batch_size=16,
    per_device_eval_batch_size=64,
    warmup_steps=500,
    weight_decay=0.01,
    logging_dir='./logs',
    logging_steps=10
)

# Define the Trainer and train the
model_trainer = Trainer(
    model=model,
    args=training_args,
    train_dataset=X, # Training dataset (features)
    eval_dataset=y # Evaluation dataset (labels)
)

trainer.train() # Train the model
```

Back End:

```
# Import necessary
libraries from chatterbot import
ChatBot
from chatterbot.trainers import ChatterBotCorpusTrainer

# Create a new ChatBot instance
chatbot = ChatBot('MyChatBot')

# Initialize a trainer to train the chatbot on English corpus
data bot_trainer = ChatterBotCorpusTrainer(chatbot)

# Train the chatbot using English corpus data
bot_trainer.train("chatterbot.corpus.english")
```

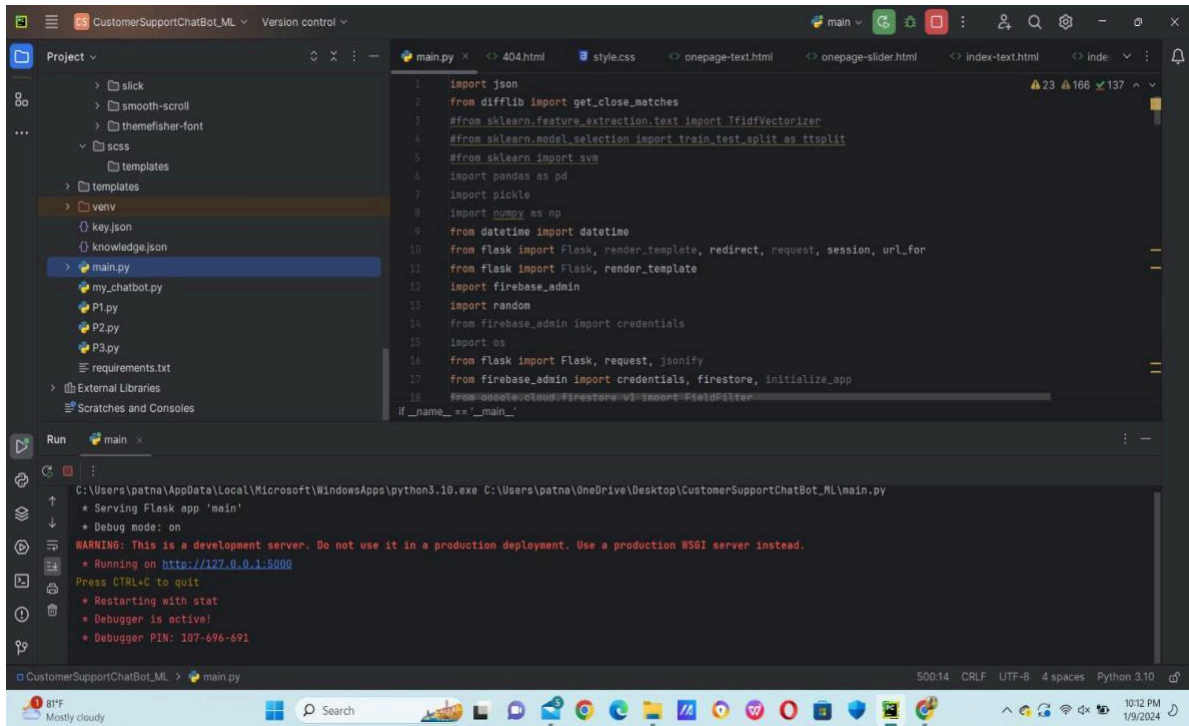
```
# Get a response from the chatbot
response = chatbot.get_response("Hello, how are you?")
print(response)

# Interact with the chatbot until the user types
'quit' print("enter 'quit' to stop")
while True:
    user_input = input("You: ")
    if user_input == 'quit':
        break
    bot_response = chatbot.get_response(user_input)
    print("Bot:", bot_response)
```

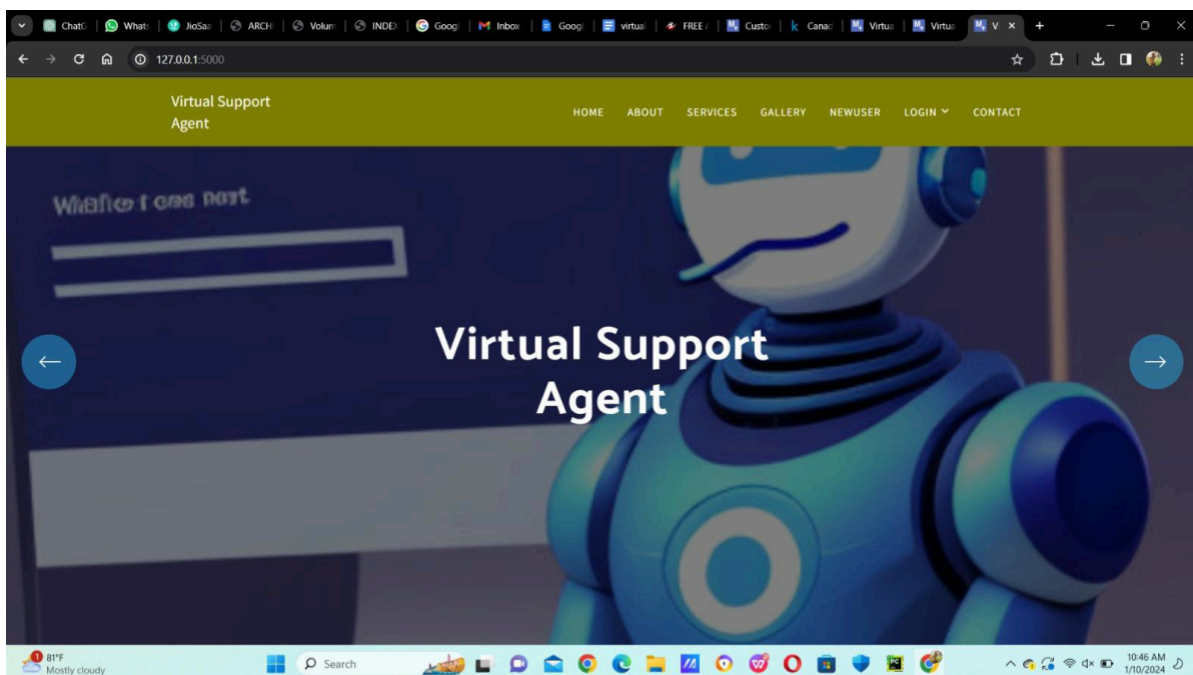
APPENDIX-B

SCREENSHOTS

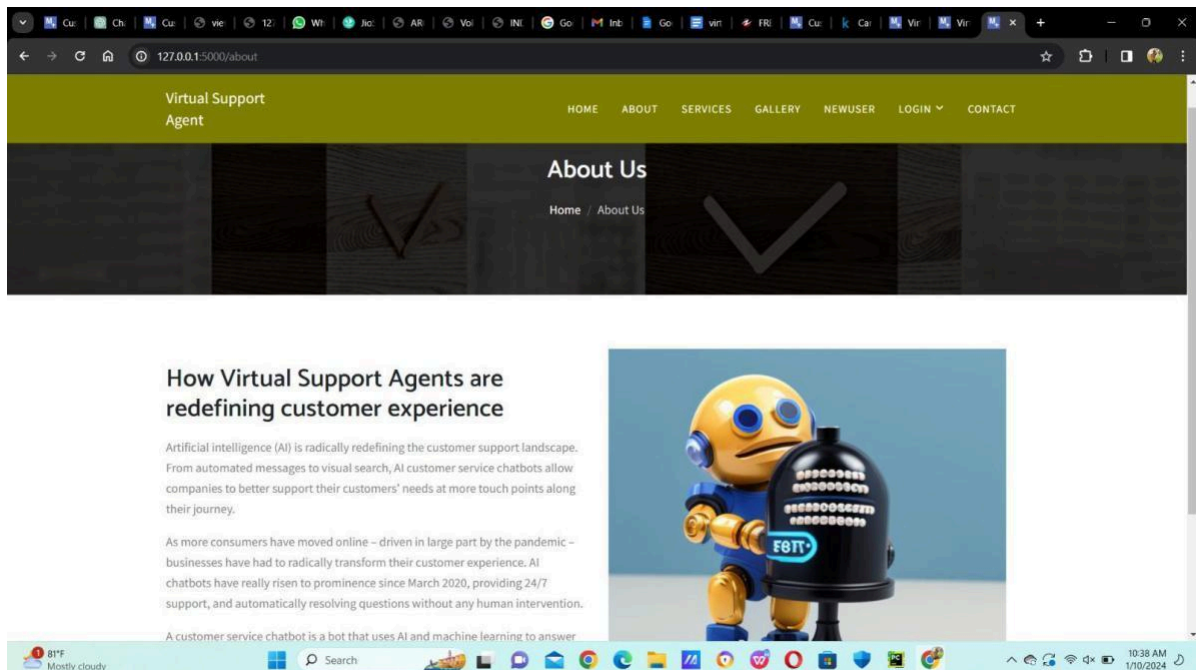
B.1 Compile code



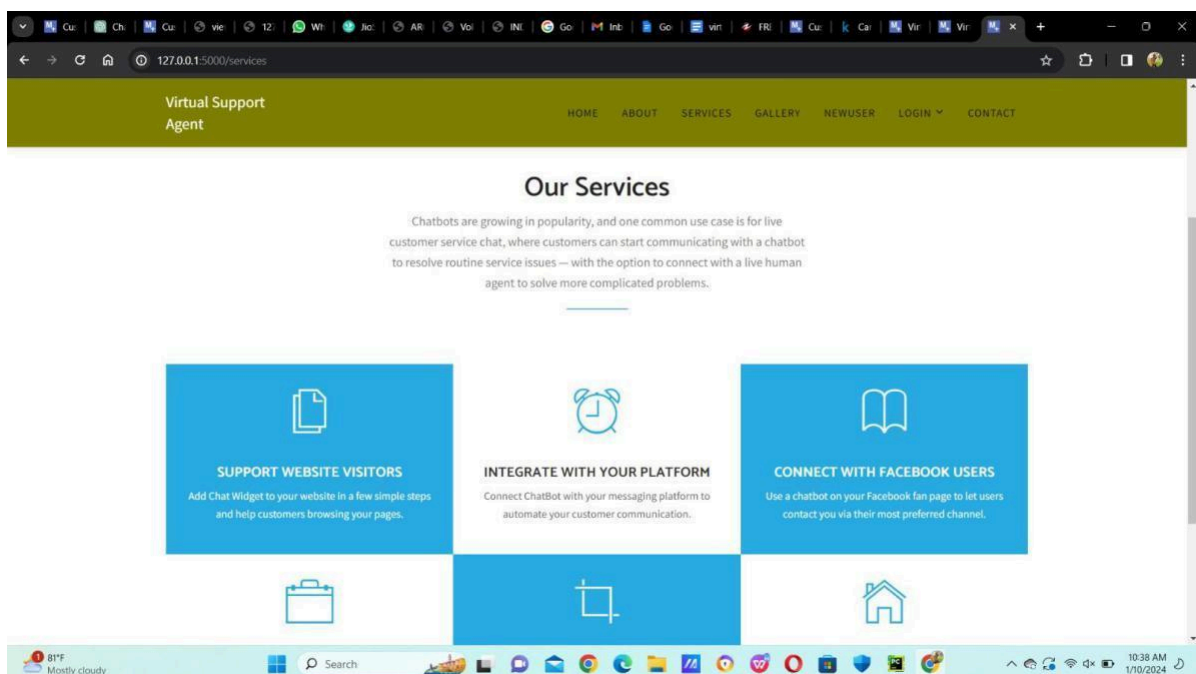
B.2 Home Page:



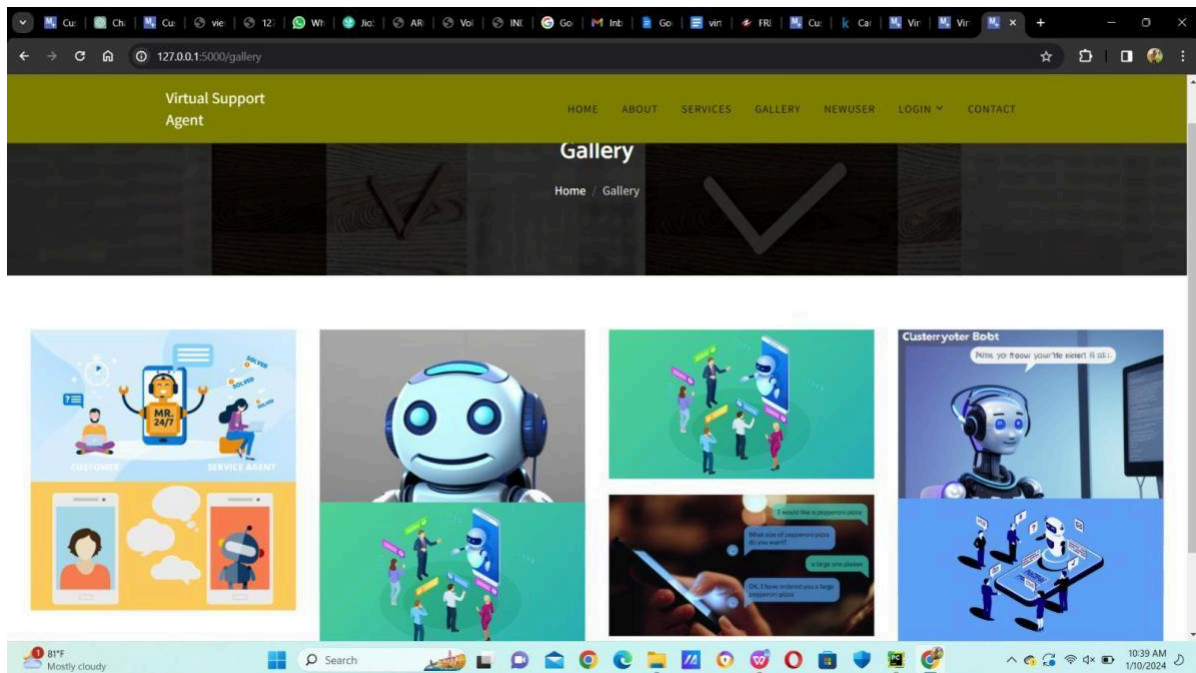
B.3 About Us:



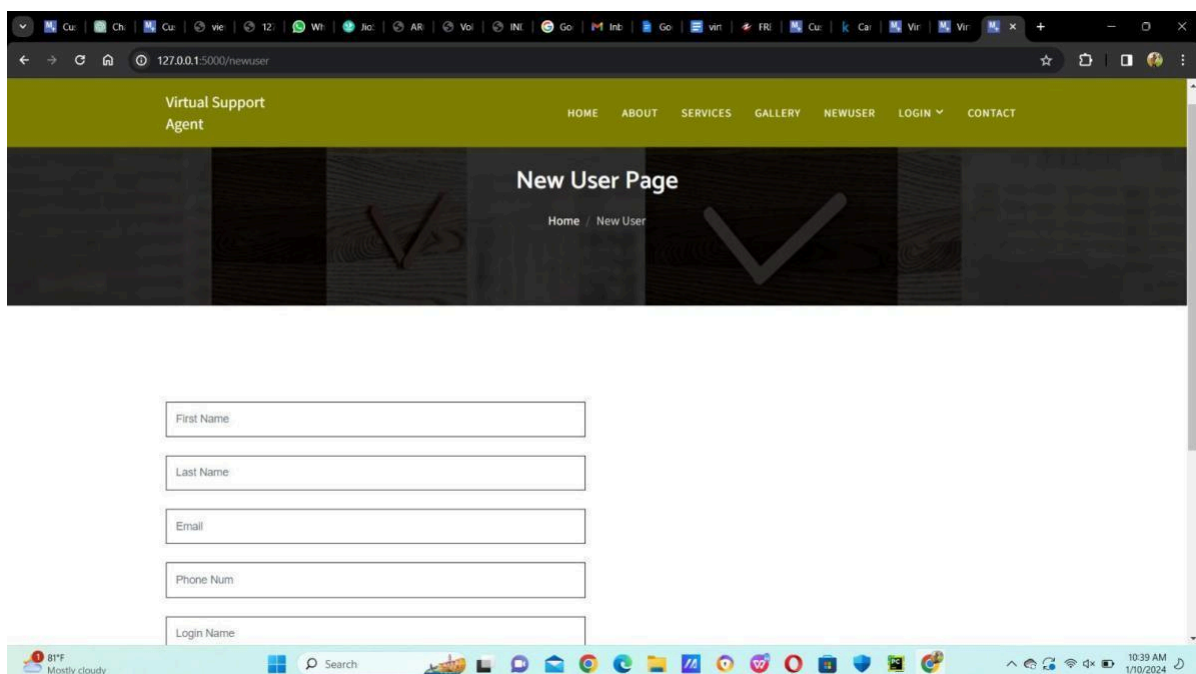
B.4 Our Services:



B.5 Gallery:



B.6 New User Page:



B.7 Admin Login Page:

The screenshot shows a web browser window with the address bar displaying "127.0.0.1:5000/adminlogin". The page has a green header with the text "Virtual Support Agent" and a navigation menu with links: HOME, ABOUT, SERVICES, GALLERY, NEWUSER, LOGIN, and CONTACT. The main content area has a dark background with the title "Admin Login Page" and a breadcrumb "Home / Admin Login". Below the title, there are two input fields: "Login Name" and "Your Password". A blue button labeled "ADMIN LOGIN" is positioned below the password field. The Windows taskbar at the bottom shows the date and time as 10:39 AM on 1/10/2024.

B.8 Staff Login Page:

The screenshot shows a web browser window with the address bar displaying "127.0.0.1:5000/stafflogin". The page has a green header with the text "Virtual Support Agent" and a navigation menu with links: HOME, ABOUT, SERVICES, GALLERY, NEWUSER, LOGIN, and CONTACT. The main content area has a dark background with the title "Staff Login Page" and a breadcrumb "Home / Staff Login". Below the title, there are two input fields: "Login Name" and "Your Password". A blue button labeled "STAFF LOGIN" is positioned below the password field. The Windows taskbar at the bottom shows the date and time as 10:39 AM on 1/10/2024.

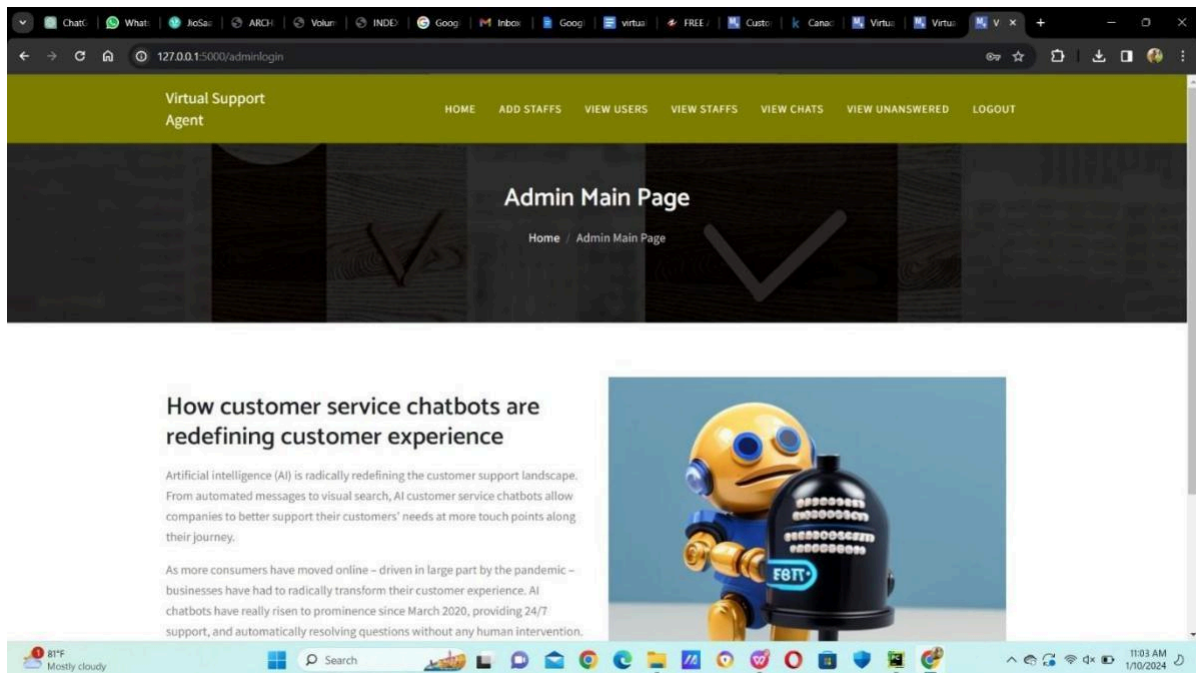
B.9 User Login Page:

The screenshot shows a web browser window with the address bar displaying `127.0.0.1:5000/userlogin`. The website has a green header with the text "Virtual Support Agent" on the left and navigation links (HOME, ABOUT, SERVICES, GALLERY, NEWUSER, LOGIN, CONTACT) on the right. The main content area has a dark background with the title "User Login Page" and a breadcrumb "Home / User Login". Below the title, there are two input fields: "Login Name" and "Your Password". A blue button labeled "USER LOGIN" is positioned below the password field. The Windows taskbar at the bottom shows the date and time as 10:39 AM on 1/10/2024.

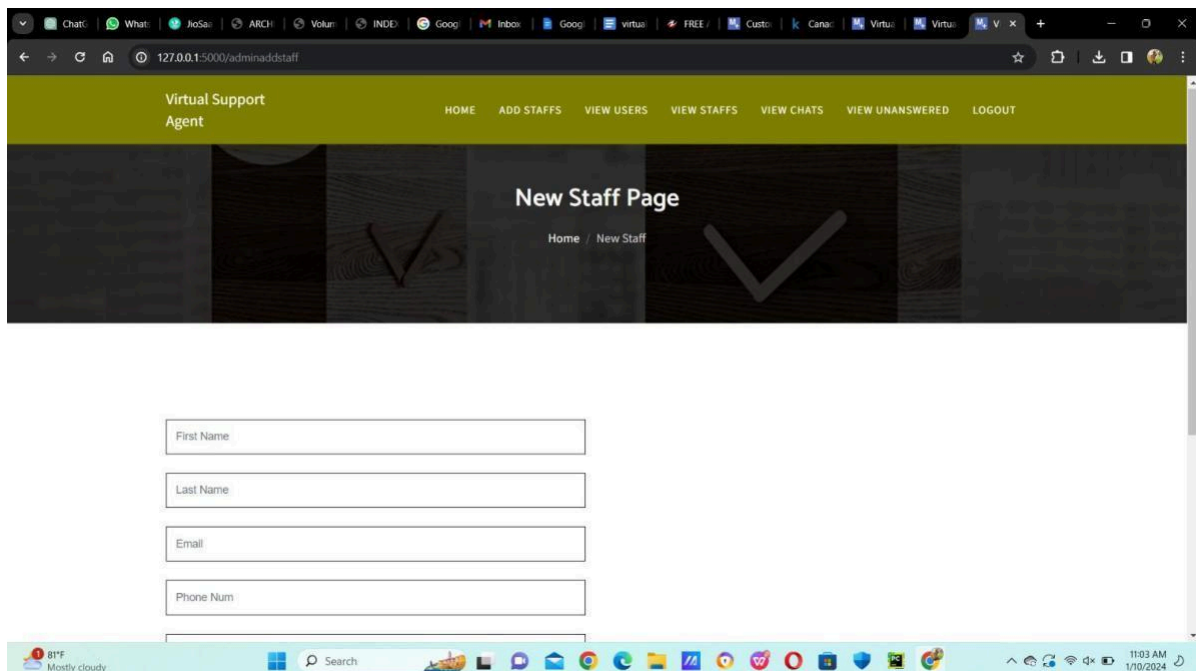
B.10 Contact Us:

The screenshot shows a web browser window with the address bar displaying `127.0.0.1:5000/contact`. The website has a green header with the text "Virtual Support Agent" on the left and navigation links (HOME, ABOUT, SERVICES, GALLERY, NEWUSER, LOGIN, CONTACT) on the right. The main content area has a dark background with the title "Contact Us" and a breadcrumb "Home / Contact Us". Below the title, there is a "Contact Details" section on the left and a contact form on the right. The contact details include the address "Bharhav, presidency College, Bangalore", phone number "91 63058 870835", fax number "91 63058 870835", and email "hello@customer.com". The contact form has four input fields: "Your Name", "Your Email", "Subject", and "Message". The Windows taskbar at the bottom shows the date and time as 10:39 AM on 1/10/2024.

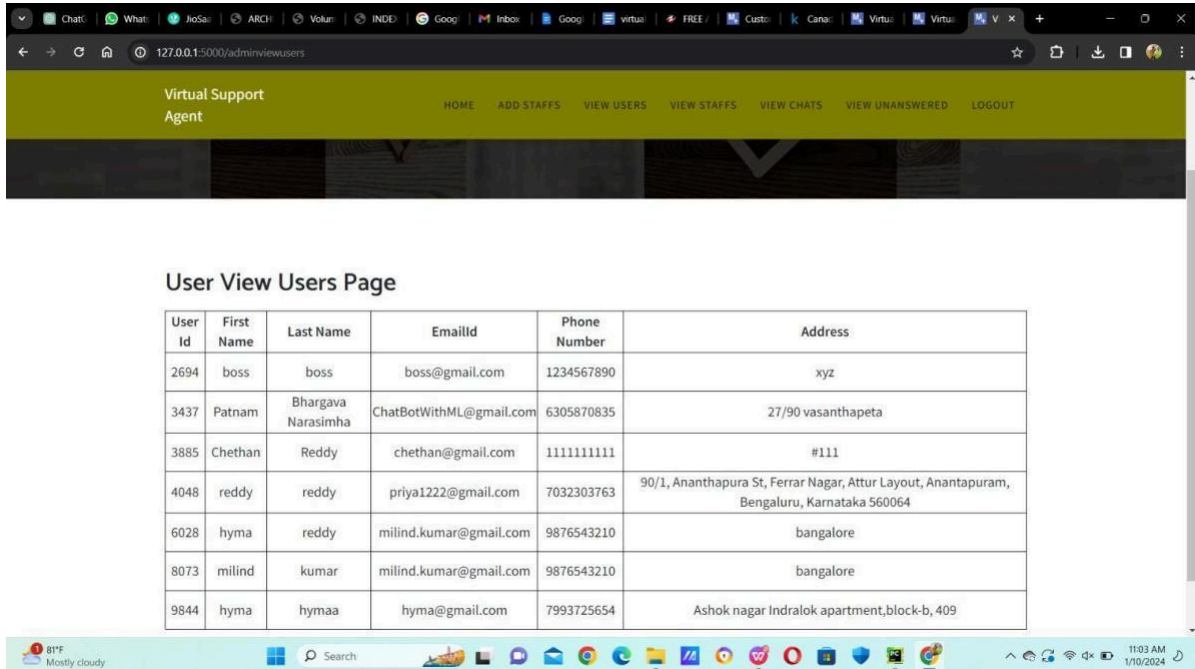
B.11 Admin Main Page:



B.12 New Staff Page:



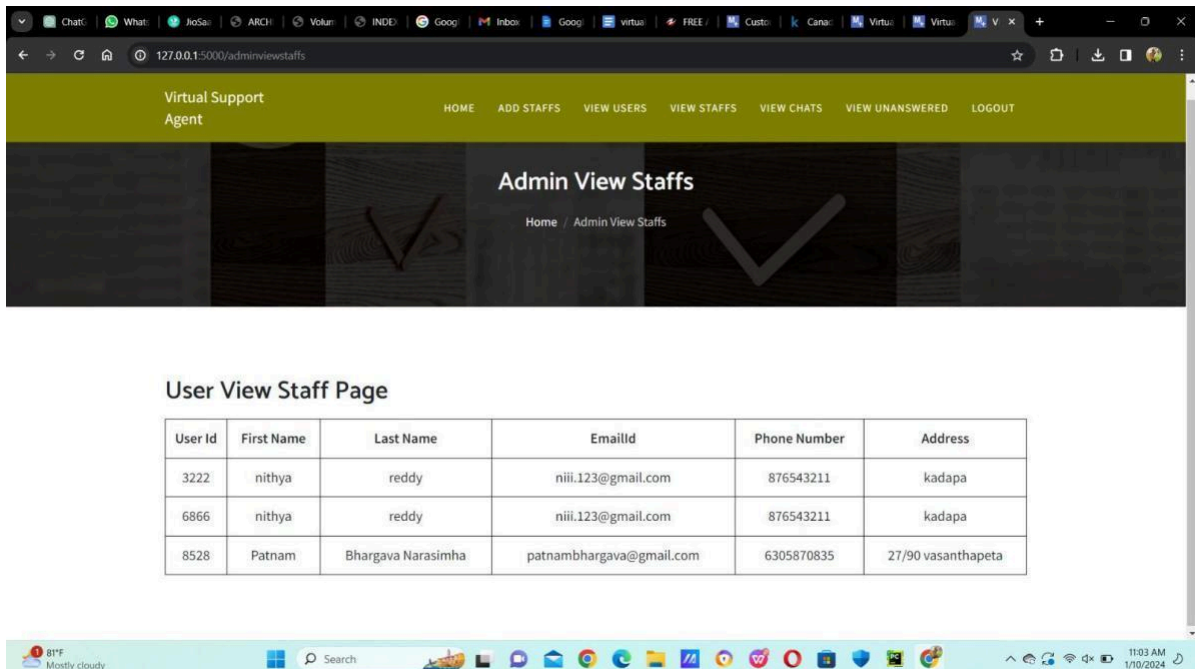
B.13 User view Users Page:



User View Users Page

User Id	First Name	Last Name	EmailId	Phone Number	Address
2694	boss	boss	boss@gmail.com	1234567890	xyz
3437	Patnam	Bhargava Narasimha	ChatBotWithML@gmail.com	6305870835	27/90 vasanthapeta
3885	Chethan	Reddy	chethan@gmail.com	1111111111	#111
4048	reddy	reddy	priya1222@gmail.com	7032303763	90/1, Ananthapura St, Ferrar Nagar, Attur Layout, Anantapuram, Bengaluru, Karnataka 560064
6028	hyma	reddy	milind.kumar@gmail.com	9876543210	bangalore
8073	milind	kumar	milind.kumar@gmail.com	9876543210	bangalore
9844	hyma	hymaa	hyma@gmail.com	7993725654	Ashok nagar Indralok apartment, block-b, 409

B.15 Admin View Staffs:



Admin View Staffs

Home / Admin View Staffs

User View Staff Page

User Id	First Name	Last Name	EmailId	Phone Number	Address
3222	nithya	reddy	niii.123@gmail.com	876543211	kadapa
6866	nithya	reddy	niii.123@gmail.com	876543211	kadapa
8528	Patnam	Bhargava Narasimha	patnambhargava@gmail.com	6305870835	27/90 vasanthapeta

B.16 Admin View Chats Page:

Admin View Chats Page

Chat It	User Id	Question	Answer	DateTime
1201	3437	return policy	A course of action adopted and pursued by government or some other organization, which seeks to preserve or protect an extensive area of woodland, often to produce products and benefits such as timber, wildlife habitat, clean water, biodiversity and recreation.	07/01/2024 15:30:47
1309	9844	agricultural biotechnology	An advanced technology that allows plant breeders to make precise genetic changes to impart beneficial traits to crop plants.	20/12/2023 11:30:09
1471	3437	where is my order	plese provide your order id.	09/01/2024 15:22:35
1593	3437	bhargav	is a person	07/01/2024 15:28:13
1610	3437	hi	A language of the USA.	09/01/2024 13:14:07
1813	3437	hi	A language of the USA.	09/01/2024 13:14:08
1916	3437	how are you	I am fine how about you.	08/01/2024 14:55:37
1947	3437	how are you doing	A form of greetings where one asks about the other's health without expecting an answer.	08/01/2024 14:39:28
2023	3437	how do i reset my	To reset your password, go to the login page and click on the 'Forgot Password' link.	09/01/2024

Admin View Chats Page

Chat It	User Id	Question	DateTime	Answer Question
1369	2694	namaste	31/12/2023 23:17:36	Answer Question
1397	4048	who is millind	05/01/2024 20:41:04	Answer Question
2471	3437	1234	09/01/2024 12:47:09	Answer Question
2495	3437	what	08/01/2024 13:06:21	Answer Question
2513	2694	i am getting fever	31/12/2023 23:16:37	Answer Question
2738	3437	where is my order	07/01/2024 15:38:10	Answer Question
2961	3437	hii	08/01/2024 12:37:49	Answer Question
3488	3437	hai	08/01/2024 14:56:02	Answer Question
3713	3437	1234	09/01/2024 14:30:48	Answer Question

B.17 User Data:


Virtual Support Agent

HOME VIEW PROFILE CHATBOOT VIEW CHATS LOGOUT

Home / View Profile

User Data

User Id	3437
First Name	Patnam
Last Name	Bhargava Narasimha
User Name	bhargav
Email Id	ChatBotWithML@gmail.com
Phone Number	6305870835



81°F Mostly cloudy 11:04 AM 1/10/2024

APPENDIX-C

ENCLOSURES

MuktShabd Journal

ISSN NO: 2347-3150
Scientific Journal Impact Factor – 4.6

ACCEPTANCE LETTER TO AUTHOR



Dear Author,

With reference to your paper submitted “VIRTUAL SUPPORT AGENT” we are pleased to accept the same for publication in **MSJ Volume XIII, Issue 1, JANUARY 2024.**

Manuscript ID: MSJ8659

Please send the scanned Copyright form and Registration form along with bank receipt of an online maintenance/processing fee of **2000 + 18% GST= 2360/-** Per paper. Please note that the amount we are charging is very nominal & only an online maintenance and processing fee.

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 *Fee Paid for the Publication of the paper does not refund under any circumstances
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DATE
11-JANUARY-2024

Sincerely,
 Best regards,
M. ASHITOSH MEHATA
<http://shabdbooks.com/>

Sumit Ganguly
 Editor-In-Chief
 MSJ
www.shabdbooks.com







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ORIGINALITY REPORT			
9%	7%	0%	7%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS
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4	Submitted to Zambia Centre for Accountancy Studies Student Paper	1	1%
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7	www.grazitti.com Internet Source	1	1%

8	Submitted to CSU, San Jose State University	1 %
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	Internet Source	

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	Internet Source	

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★ Submitted to Morgan Park High School

Student Paper

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The Project work carried out here is mapped to SDG-3 Virtual Support Agent

The Virtual Support Agent is a machine learning-driven chatbot created to effectively handle customer enquiries. With the use of sophisticated natural language processing, it delivers precise and customized responses. This virtual agent is available around-the-clock to improve client interactions. It works around the clock. With the ability to learn continuously, it changes and grows over time to provide help that is progressively more useful.