



# PRESIDENCY UNIVERSITY

Private University Estd. in Karnataka State by Act No. 41 of 2013

## BANGALORE



A Project Report  
On  
**“Customer Support Chat bot with ML”**

Batch Details Batch

Number: CEI-24

Sl. No.	Roll Number	Student Name
1	ASHUTOSH KUMAR	20211CEI0062
2	PIYUSH KUMAR	20211CEI0013
3	ABHILASH NEELI	20211CEI0081
4	MOHAMMED SHAZIN	20211CEI0070

**School of Computer Science,**  
**Presidency University, Bengaluru.**

Under the guidance of,

Dr. Debasmita Mishra

Under the reviewer of,

Dr. Smitha Patil

School of Computer Science,  
Presidency University, Bengaluru

# **CONTENTS**

1. Introduction
2. Literature Review
3. Objectives
4. Proposed Method
5. Methodology
6. Timeline of the Project
7. Expected Outcomes
8. Conclusion
9. References

## **1. INTRODUCTION**

The "Customer Support Chatbot Using ML" project leverages AI to automate real-time customer service, providing instant responses and handling common inquiries efficiently. It analyzes interactions to improve personalization and relevance, enhancing customer satisfaction while reducing manual effort in business operations

## **2. LITERATURE REVIEW**

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- Abouelyazid, M. (2022). Natural Language Processing for Automated Customer Support in E-Commerce: Advanced Techniques for Intent Recognition and Response Generation. *Journal of AI-Assisted Scientific Discovery*, 2(1), 195-232.
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- Kulkarni, C. S., Bhavsar, A. U., Pingale, S. R., & Kumbhar, S. S. (2017). BANK CHAT BOT—an intelligent assistant system using NLP and machine learning. *International Research Journal of Engineering and Technology*, 4(5), 2374-2377.
- KATRAGADDA, V. (2023). Automating Customer Support: A Study on The Efficacy of Machine Learning-Driven Chatbots and Virtual Assistants. *IRE Journals*, 7(1), 600-601.
- Gayam, S. R. (2020). AI-Driven Customer Support in E-Commerce: Advanced Techniques for Chatbots, Virtual Assistants, and Sentiment Analysis. *Distributed Learning and Broad Applications in Scientific Research*, 6, 92-123.
- Potla, R. T. (2023). Enhancing Customer Relationship Management (CRM) through AI-Powered Chatbots and Machine Learning. *Distributed Learning and Broad Applications in Scientific Research*, 9, 364-383.

### **3. OBJECTIVES**

- **Automated Customer Support** –  
Automate common queries and routine support tasks.
- **Enhanced Customer Experience** –  
Improve customer satisfaction with quick and accurate responses.
- **Reduce Operational Cost** –  
Lower costs by reducing the need for human agents for repetitive tasks.
- **Reduce Response Time** –  
Provide instant answers, minimizing wait times.
- **All-time Service** –  
Ensure 24/7 availability for customer queries.
- **Hybrid Support System** –  
Seamless transition between chatbot and human agents for complex issues
- **Improve Query System** –  
Enhance the accuracy and relevance of responses through continuous learning.
- **Multi-Platform System** –  
Offer support across various platforms (web, mobile, etc.).
- **Improved Feedback System** –  
Gather and utilize customer feedback to further improve the system.

### **4. PROPOSED METHOD**

- **System Architecture**
  - . **Hybrid Support Model:** The system will incorporate both AI-driven automated responses and human agents. Automated systems will handle repetitive, common queries, while complex issues will be escalated to human agents. This hybrid model ensures a balance between efficiency and personalized service.
- **Natural Language Processing (NLP) Integration**
  - . **Query Understanding:** Utilize advanced NLP models to interpret customer queries accurately. The system will analyze keywords, sentiment, and intent to deliver relevant responses. This will continuously improve through machine learning by learning from previous interactions.
- **AI-Powered Query Resolution**
  - . **Predictive Matching:** Based on past interactions and an extensive knowledge base, the AI will predict the best possible answers to customer queries. The system will prioritize frequently asked questions to deliver instant resolutions.
- **Real-Time Learning from Interactions**
  - . **Continuous Database Update:** As the chatbot interacts with customers, it will log new queries and solutions. The knowledge base will be updated automatically to improve future query resolution. This enhances both the query system and overall service quality.

- **Multi-Platform Integration**

- **Omni-Channel Support:** The system will be implemented across multiple platforms—website, mobile applications, social media, and messaging apps—allowing users to access support from anywhere, ensuring a consistent experience.

- **Feedback Collection and Analysis**

- **Customer Feedback Loop:** After each resolved interaction, the system will prompt customers for feedback. AI models will analyze feedback data to detect trends and areas for improvement, enhancing both the service and user experience.

- **Response Time Optimization**

- **Real-Time Processing:** The system will be optimized for rapid query handling. AI-driven responses will be near-instant, and human agents will have tools to streamline their response times when handling escalated issues.

- **Cost Efficiency and Resource Management**

- **Resource Allocation:** By automating up to 70% of the query handling process, operational costs will be reduced. Human agents will focus on complex queries, allowing better utilization of resources.

## 5. METHODOLOGY

- **Requirements Gathering and Analysis:**

Identify and document the functional and non-functional requirements for the chatbot.

- **Natural Language Processing (NLP) Integration:**

Enable the chatbot to understand and process customer queries in natural language.

- **Machine Learning Model Design and Training:**

Develop machine learning models that enable the chatbot to improve its responses over time.

- **Intent Recognition and Context Management:**

Ensure the chatbot can recognize user intents and maintain context during multi-step conversations.

- **Personalization Through Customer Data Integration:**

Provide personalized responses based on customer history, preferences, and behaviour.

- **Testing and Validation:**

Validate the performance, accuracy, and user experience of the chatbot.

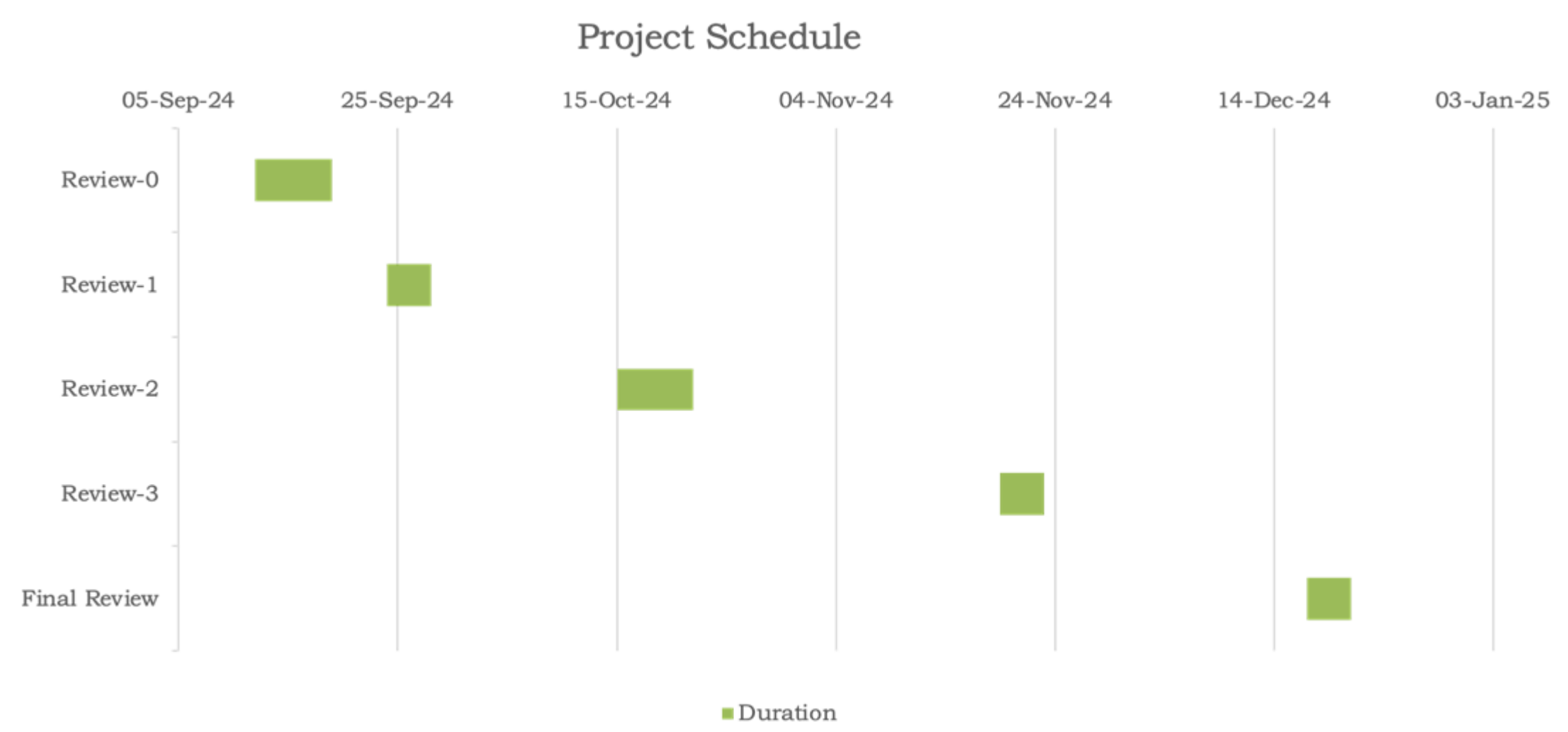
- **Hybrid Support Model:**

Seamlessly integrate chatbot automation with human agent support for complex queries.

- **Monitoring and Maintenance:**

Ensure long-term effectiveness and reliability of the chatbot system.

6. TIMELINE OF THE PROJECT



7. EXPECTED OUTCOMES

- 1.Improved Diagnostic Accuracy
  - AI systems achieve higher accuracy rates, reducing misdiagnoses and improving patient safety in acute care settings.
- 2.Faster Diagnostic Processes
  - Reduction in time required for diagnosing acute conditions, enabling quicker medical intervention and improving patient outcomes.
- 3.Enhanced Clinician Support
  - AI tools provide valuable insights and recommendations, aiding healthcare professionals in making informed decisions with greater confidence.
- 4.Comprehensive Data Utilization
  - Effective integration of diverse data sources (e.g., imaging, EHRs, vital signs) for a holistic view of patient health, leading to more precise diagnostics.
- 5.Ethically and Securely Deployed AI Systems
  - AI models adhere to data privacy regulations and ethical standards, ensuring safe and responsible usage in healthcare

8. CONCLUSION

The integration of AI into the diagnosis of acute diseases holds immense potential for transforming healthcare delivery. By enhancing diagnostic accuracy, reducing response times, and providing comprehensive support to clinicians, AI can significantly improve patient outcomes. Despite challenges such as data privacy and ethical concerns, ongoing advancements and research continue to optimize AI systems for broader and more effective clinical use. With responsible implementation, AI can become a vital tool in modern medicine, aiding in the timely and precise treatment of acute conditions

## **9. REFERENCES**

There are Several Pre-trained AI Models developed specifically for Customer Support Chat Bot. These Models utilize various Machine Learning (ML) and Deep Learning (DL) Architectures, particularly leveraging advances in Natural Language Processing (NLP).

- 1.A Survey on Chatbot Implementation in Customer Service Industry**
- 2.Automated Customer Service Chatbots Using NLP and ML**
- 3.Customer Service Chatbots: How Machine Learning Can Improve the User Experience"**
- 4.Designing Conversational Agents: Machine Learning and NLP Applications in Customer Support**
- 5.Enhancing Customer Support through AI Chatbots**

**Test Studying about this models to get more appropriate knowledge and advance development of the model where the further details of each model has been updated in github.**

