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1.Problem Statement

Revolutionizing customer support with an intelligent chatbot for automated assistance

2.Objectives of the Project

To develop and implement an intelligent AI-powered chatbot that automates customer support by accurately understanding and responding to user queries, providing instant, 24/7 assistance, reducing response times, minimizing support costs, and enhancing overall customer satisfaction through seamless integration with existing support systems.

3.Scope of the Project

- **In-Scope Activities:**

*Design and development of an AI chatbot using NLP for automated customer support.
*Integration with existing support systems (CRM, ticketing platforms, knowledge bases).
*Implementation of conversational flows for handling FAQs, basic troubleshooting, and transactional queries.
*Deployment on selected platforms (e.g., website, mobile app, WhatsApp, Facebook Messenger).
*Logging and analysis of user interactions for continuous learning and improvement.
*Dashboard for performance analytics (response time, resolution rate, user satisfaction).
*Escalation mechanism to transfer queries to human agents when necessary.

- **Technology Scope:**

*Use of AI/ML technologies (e.g., GPT, Dialog flow, Rasa) for natural language understanding.
*Backend systems for managing data and logic.
*Secure handling of user data in compliance with data privacy regulations (e.g., GDPR).

- **Out of Scope (Initial Phase):**

*Complex technical support requiring expert diagnosis or hands-on intervention.
*Full replacement of human agents (hybrid approach only).

**Voice-based chatbot systems (unless specified for future phases).*
Support in niche languages unless prioritized.

4.Data Sources

a. Customer Support Logs

- *Historical chat or email transcripts.*
- *Helpdesk tickets from platforms like Zendesk, Freshdesk, or Salesforce.*
- ***Purpose:** Train the model to understand common queries and responses.*

b. FAQs and Knowledge Base Articles

- *Existing company FAQs.*
- *Internal documentation or public help articles.*
- ***Purpose:** Build the chatbot's initial knowledge base.*

c. User Interaction Logs

- *Website interactions, previous bot chats, or call transcripts (if available).*
- ***Purpose:** Understand user intent, navigation flow, and problem areas.*

d. Public Datasets

These are useful for pre-training or augmenting your domain-specific data.

- ***Customer Support on Kaggle** (e.g., Customer Support on Twitter)*
- ***Ubuntu Dialogue Corpus** – For technical support-related dialogues.*
- ***M Ulti WOZ** – A large-scale multi-domain wizard-of-oz dataset.*

- ***DSTC (Dialog State Tracking Challenge)*** *– Useful for task-oriented dialog systems.*

2. Real-Time Data Sources (for chatbot responses and updates):

- ***CRM systems:*** *For retrieving/updating user data or ticket info.*
- ***Live Knowledge Bases:*** *For the most up-to-date answers (e.g., articles, product manuals).*
- ***APIs:*** *Company databases, shipping status, product availability, etc.*
- ***User Session Info:*** *Real-time browsing behaviour, purchase history, or preferences.*

5.High-Level Methodolog

1. ***Requirement Gathering & Analysis***
    - *Identify customer pain points and support use cases.*
    - *Gather data sources: FAQs, support tickets, chat logs, CRM inputs.*
    - *Define success metrics (e.g., response time reduction, resolution rate).*
2. ***Design Phase***
    - *Create user personas and define conversational flows.*
    - *Design chatbot architecture (NLP engine, integration points, databases).*
    - *Prepare UI/UX mock-ups for chatbot interface (if needed).*
3. ***Development Phase***
    - *Train NLP models using collected support data and predefined intents.*
    - *Implement the chatbot engine using tools like Dialog flow, Rasa, or GPT APIs.*

- *Set up backend infrastructure for managing sessions, APIs, and logs.*
- *Integrate with CRM/ticketing systems and company knowledge base.*

4. ***Testing Phase***
   - *Perform unit testing of chatbot modules.*
   - *Conduct end-to-end testing across supported platforms.*
   - *Run user acceptance testing (UAT) with real-world scenarios.*
5. ***Deployment***
   - *Deploy chatbot on live channels (website, app, or messaging platforms).*
   - *Monitor real-time performance and user feedback.*
   - *Ensure fallback mechanisms to human agents work smoothly.*
6. ***Monitoring & Continuous Improvement***
   - *Collect and analyse interaction data and KPIs.*
   - *Fine-tune models and update conversation flows based on feedback.*
   - *Add new features (multi-language support, voice input, sentiment analysis).*

6.Tools and Technologies

1. Natural Language Processing (NLP) & AI Platforms

- ***OpenAI GPT (ChatGPT API)*** *– For advanced conversational AI and context handling.*
- ***Google Dialog flow*** *– For intent recognition and dialog management.*
- ***Rasa*** *– Open-source framework for custom chatbot development.*
- ***Microsoft Bot Framework*** *– For enterprise-grade chatbot development.*

2. Programming Languages

- ***Python*** *– For backend logic, NLP integration, and ML model training.*
- ***JavaScript/TypeScript*** *– For frontend integration or Node.js-based bots.*
- ***HTML/CSS*** *– For embedding chatbot UI into websites or apps.*

3. Backend & Infrastructure

- ***Node.js / Flask / Django*** *– To manage chatbot logic and API interactions.*
- ***Express.js*** *– For building RESTful APIs.*
- ***Firebase*** *– For real-time database and quick prototyping.*

4. Database & Storage

- ***MongoDB*** *– NoSQL database for storing user sessions, logs, and chatbot data.*
- ***PostgreSQL / MySQL*** *– For relational data storage (user profiles, ticket records).*
- ***Redis*** *– For caching user sessions and context.*

5. Integrations & APIs

- ***CRM Systems:*** *Salesforce, HubSpot, or Zoho CRM*
- ***Ticketing Systems:*** *Zendesk, Freshdesk, Jira*
- ***Messaging Platforms:*** *WhatsApp Business API, Facebook Messenger, Slack, Telegram*
- ***Webhook & REST APIs:*** *For integration with internal systems*

6. DevOps & Hosting

- ***Cloud Platforms:*** *AWS, Google Cloud Platform (GCP), Microsoft Azure*

- ***Containerization:*** *Docker for scalable deployment*
- ***CI/CD Tools:*** *GitHub Actions, Jenkins, or GitLab CI for automated deployment*

7. Monitoring & Analytics

- ***Google Analytics / Firebase Analytics*** *– For tracking usage.*
- ***Bot press Analytics*** *– Built-in chatbot analytics.*
- ***Custom Dashboards:*** *Built using Grafana, Kibana, or Power BI*

8. Project & Collaboration Tools

- ***Jira / Trello*** *– Project management and task tracking.*
- ***Figma*** *– UI/UX design for chatbot interface.*
- ***Postman*** *– For API testing.*

7.Team Members and Roles

*** Team Leader : Pragadeesh A**

**Data collecting and Coding*

*** Team Member : Thiveshan G**

**Report writing and documentation*

*** Team Member : Sanjai Ram N**

** Data cleaning and preprocessing*

*** Team Member : Sabarisan D**

** EDA and vitalisation*