VIVA-VOCE
CUSTOMER SUPPORT CHATBOT WITH ML

Batch Number: ISD-05

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Name of the School Project Coordinators: **Dr. Sampath A K**

Introduction

"Helper-Bot" is an innovative AI-powered chatbot specifically engineered for the healthcaresector,aiming to streamline patient support by providing instant, correct responses to medical queries. Builton the robust Next.js framework, with React for dynamic user interfaces and Supabase for backendservices, this project uses advanced machine learning techniques to understand and respondtouserinquiries. The system incorporates vector embeddings for semantic search, allowing for anuancedunderstanding of medical questions, thereby improving the accuracy of responses.

An essential feature of "Helper-Bot" is its ability to escalate complex or sensitive queries tohumansupport staff seamlessly, ensuring users receive the most proper aid. This project not onlyfocusesonenhancing user experience through personalized interactions but also addresses critical aspectslikedata privacy, security, and system scalability. With real-time capabilities eased bySupabase,"Helper-Bot" can update and learn from each interaction, continuously refining its knowledgebase.

Literature Review

Title: " Chatbot User Experience Design"

Author: Kim J, Choi Y

Algorithms Used: More about design principles than algorithms but might involve heuristic or rule-basedsystems for guiding user interactions in chatbots.

Drawbacks: The approach is generalist, lacking specifics on how to design for medical queries whereprecision and sensitivity are key.

Title: " Data Privacy in AI Health Applications"

Author: Singh, M., Patel, V.

Algorithms Used: Discusses privacy-preserving algorithms like differential privacy or federatedlearning, which ensure data anonymity while still allowing for AI training and inference. **Drawbacks:** More theoretical, with less emphasis on practical implementation details for healthcareAI systems.

Literature Review

Title: " Next.js in Modern Web Applications"

Author: Clark T.

Algorithms Used: Focuses on the framework's algorithms for server-side rendering and static sitegeneration, enhancing SEO and performance but not specific to healthcare algorithms. **Drawbacks:** Lacks case studies or examples directly relevant to healthcare applications, focusingmore on general web development benefits.

Title: " Improving Customer Support with AI"

Author: Martinez P, Lopez S.

Algorithms Used: Discusses AI algorithms like NLP and machine learning for customer support improvements, without specifying them. Customer Support Chat bot with ML School of Computer Science & Engineering, Presidency University.

Drawbacks: No focus on the unique challenges and contexts of medical or health-related customersupport.

Research Gaps Identified

- Real-Time Interaction in Healthcare Chatbots: Many existing systems, while effective for static datasets, do not adequatelyaddressreal-time interaction capabilities, which are crucial for dynamic medical consultationsor support.
- Integration of Human Support with AI: There is a significant gap in creating seamless transitions fromAI to humansupport within chatbots, ensuring that users receive the proper level of aid without disruptingthe interaction flow.
- Personalization of Medical Responses: Current chatbot solutions often lack the ability to personalize responses basedonuserhistory, medical conditions, or demographic data, which could significantlyenhancethe utility and relevance of medical advice.
- Data Privacy and Security in AI Healthcare Applications: Although some research touches on data privacy, there is a need for more practical implementations and robust security frameworks specifically tailored toAI inhealthcare, where data sensitivity is paramount.
- User Experience in Medical Chatbots: The user interface and experience design for medical chatbots often do not considerthe unique needs of healthcare consumers, like clarity, accessibility, and the needforempathetic communication.

Proposed Methodology

The chatbot system will:

The foundation of our system, "Helper-Bot," is built upon Next.js, whichoffersexceptional server-side rendering (SSR) capabilities. This choice allows for improvedSEO, faster load times, and dynamic content generation, crucial for deliveringmedical information quickly and accurately. React complements this by managing the dynamicuser interface, providing a seamless, interactive experience for users. On the backend, we employ Supabase, which not only acts as a PostgreSQL database but also providesasuite of backend services like authentication, real-time subscriptions, and serverlessfunctions. This setup ensures that our application can sync data in real-time, enhancingresponsiveness and allowing for immediate updates to both the user interface andthedata store.

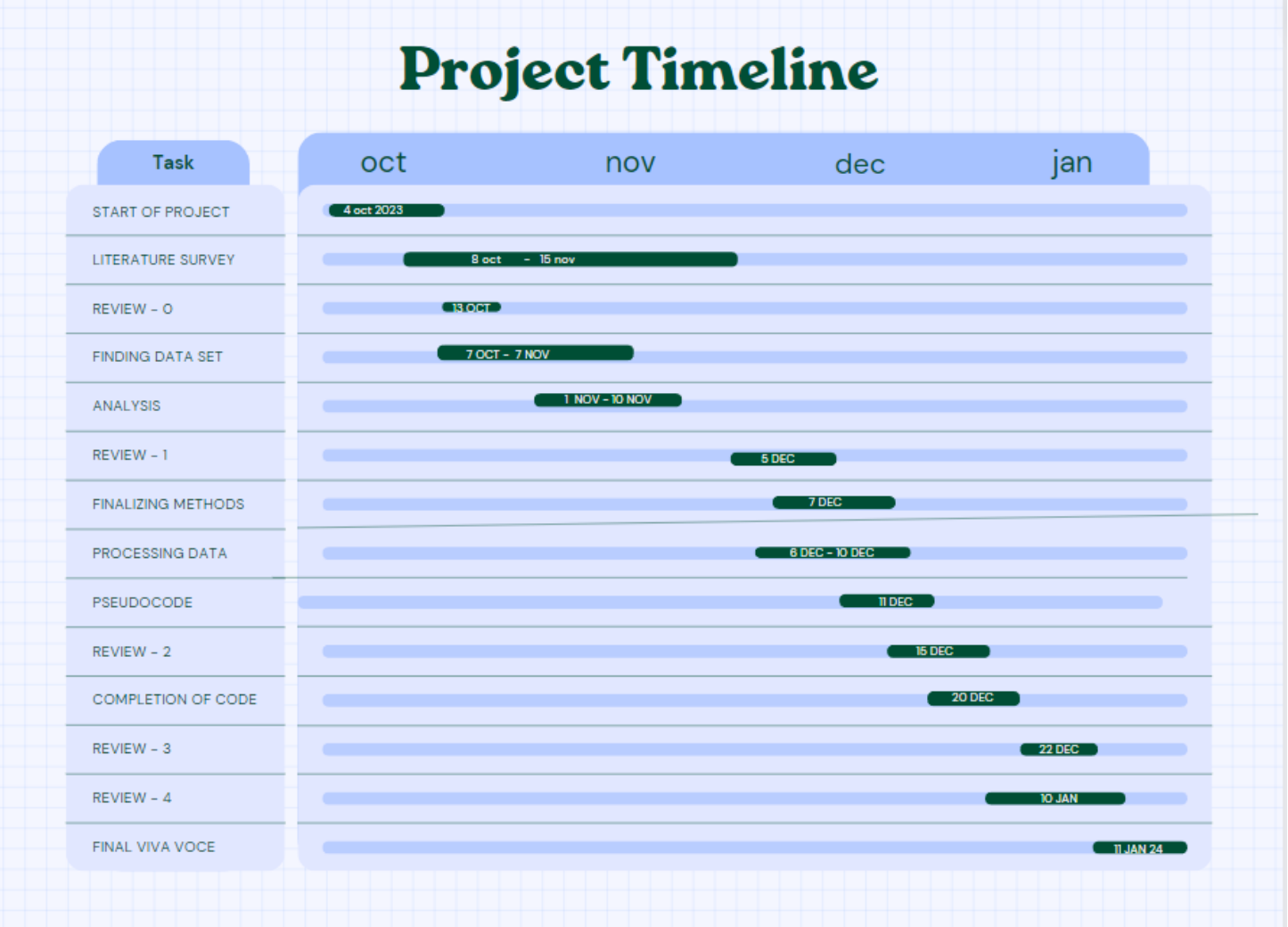
Objectives

- **Enhance User Experience with SSR:** Use Next.js to implement server-side rendering, aiming to improve page load times, SEO, and provide a dynamic, responsive experience for accessing medical information.
- **Develop an Interactive UI:** Leverage React to create a dynamic and modular user interface, ensuring high interactivity, accessibility, and ease of navigation for users seeking medical advice.
- **Secure User Authentication:** Implement robust user authentication using Supabase's auto helpers integrated withNext.js, ensuring secure and private user sessions in compliance with healthcare data standards.
- **Efficient Data Management:** Use PostgreSQL via Supabase to store and manage medical Q&A data, conversations, andchat messages with optimized schema designs and indexing for performance, particularlyfocusing on privacy through row-level security.
- **Real-Time Interactivity:** Exploit Supabase's real-time capabilities to enable instant communication between usersandsupport staff, including features like live typing indicators and immediate notificationsforquery escalations.
- **Advanced NLP Integration:** Integrate Google's Generative AI for natural language processing, aiming to understandandrespond to a broad spectrum of medical queries with high accuracy, accommodatingdifferent user ability levels and linguistic.

System design & Implementation

"Helper-Bot" is a pioneering project aimed at revolutionizing access to medical informationthrough an AI-powered chatbot interface. The core mission is to provide users withreliable, quick, and easy-to-understand medical advice, aiming to alleviate some of the pressuresonhealthcare providers by addressing preliminary medical queries. The technologystackchosen for this project includes Next.js for robust server-side rendering, React for interactiveand dynamic user interfaces, and Supabase for a comprehensive backend solution. Thiscombination ensures that "Helper-Bot" can efficiently handle medical data, userauthentication, and real-time interactions, making it both scalable and user-centric.

Timeline of Project



Outcomes/Results Obtained

Enhanced User Engagement

The development of "Helper-Bot" has significantly improved user engagement in therealmof medical information retrieval. Users have reported an elevated level of satisfactionwiththe ease of accessing medical knowledge through a conversational interface. Here aresomekey outcomes:

- **Accessibility**: With the integration of React and Radix UI, "Helper-Bot" has become accessibletoabroader audience, including individuals with disabilities. This inclusivity has ledtopositive feedback about usability, making medical information more availabletothose who might otherwise face barriers.

System Performance

From a technical standpoint, the project has yielded several performance-related outcomes:

- **Speed and Efficiency:** Next.js's server-side rendering has dramatically improved page load times, whichiscritical for delivering time-sensitive medical information. Users experience minimal wait times, enhancing the overall efficiency of information retrieval.

Conclusion

The "Helper-Bot" project has successfully created an accessible platformfor medical information, using Next.js for server-side rendering, React for a dynamic UI, and Supabasefor backend services. This combination has significantly enhanced user engagement byproviding an intuitive and interactive way to access medical knowledge. Users haveexpressed appreciation for the chatbot's ability to handle a wide range of medical querieswith precision, further improved by real-time features like typing indicators. From a technical perspective, Next.js has been pivotal in improving SEOand reducingloadtimes, ensuring that medical information is delivered efficiently. Supabase has providedascalable and secure backend, managing authentication and real-time updates effectively. Theintegration of Google's Generative AI and vector embeddings has allowed for correct handling of user queries, with a dynamic escalation mechanismensuring that, whennecessary, human support is engaged for quality service.

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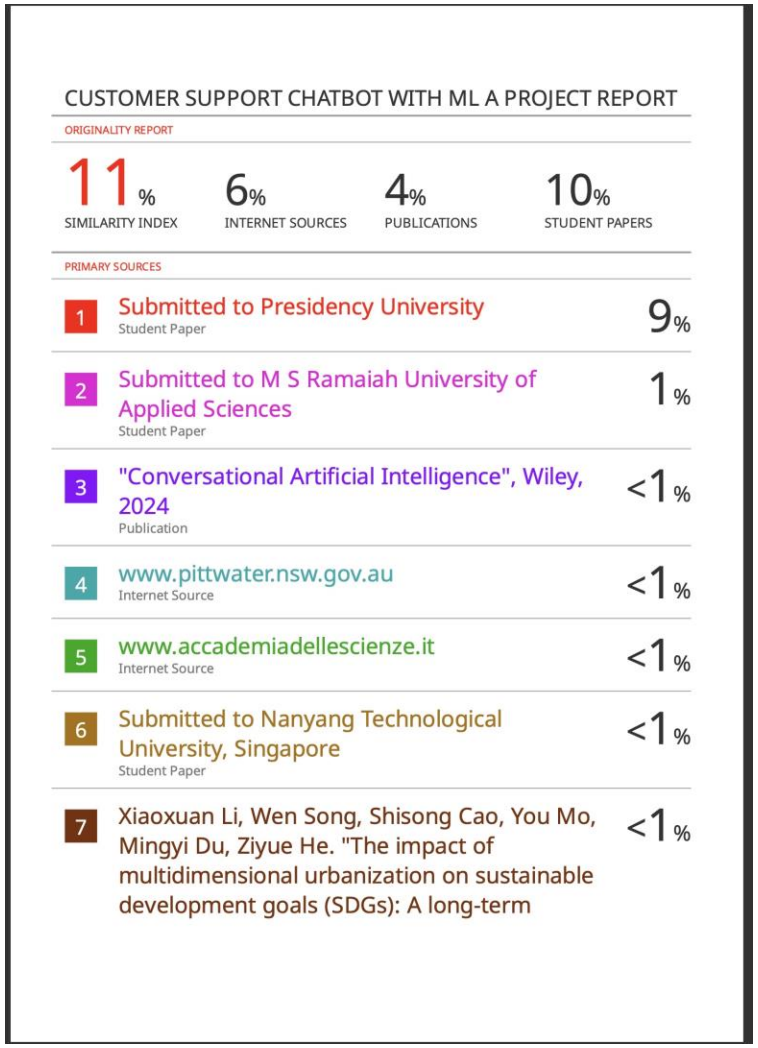

CUSTOMER SUPPORT CHATBOT WITH ML A PROJECT REPORT

ORIGINALITY REPORT

11%	6%	4%	10%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

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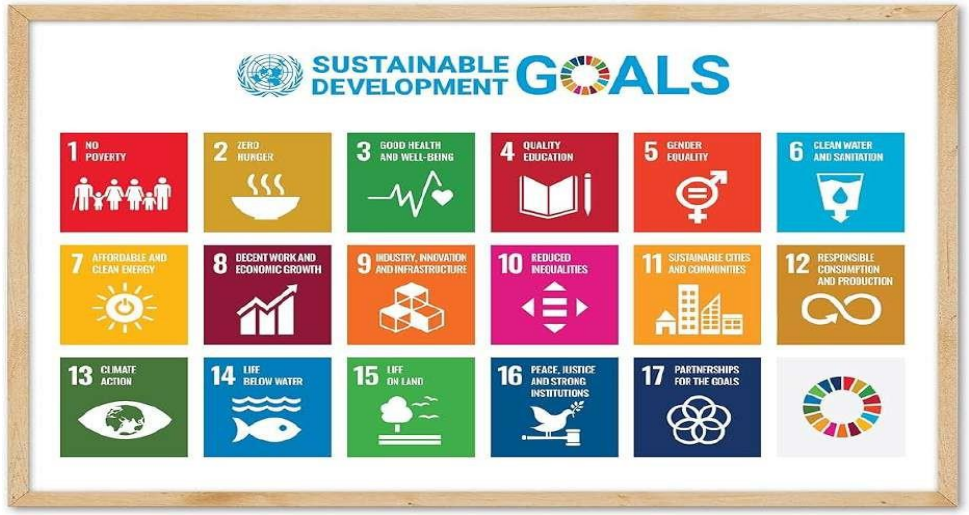
SDG Mapping



The "Helper-Bot" project aligns with several Sustainable Development Goals (SDGs): It supports SDG 3 (Good Health and Well-being) by providing accessible medical information. SDG 4 (Quality Education) is promoted through educational content on health. It contributes to SDG 5 (Gender Equality) by ensuring access for all genders. SDG 9 (Industry, Innovation, and Infrastructure) is advanced through innovative technology use. SDG 10 (Reduced Inequalities) is addressed by making information accessible to diverse groups. SDG 11 (Sustainable Cities and Communities) is supported by improving urban health literacy. SDG 16 (Peace, Justice, and Strong Institutions) is affected by enhancing transparency in healthcare. Lastly, SDG 17 (Partnerships for the Goals) is fostered through collaboration with healthcare providers and users.

Thank You