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##### **NIT6150 Advanced Project**

##### Project Proposal

**Healthcare Chatbot System**

**Team Leader:** Jitendra Shrestha (s8104215)

**Team Member:** Pranish Acharya (s8100698)

**Client:** Holroyd Private Hospital

**Supervisor:** Fakhra Jabeen

VU Sydney

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# Introduction

The way people interact with one other has been completely transformed by internet-connected devices. As a result of technological advancements, "people are demanding more intelligent self-service options and experiences answers within seconds, not minutes." Machine learning (ML) and artificial intelligence (AI) are being adopted by several sectors to improve customer service. Chatbots are employed in various fields these days, including e-commerce to answer product-related queries from customers and banking systems for customer support. A chatbot is a computer software that receives human input in natural language and responds to it with a perceptive and pertinent response before sending it back to the user. Hospitals are now permitting patients to engage with technology, such chatbots, to learn more about disease, doctor or hospital speciality. This technology will assist in offering the user support around-the-clock. (Ayanouz, S., Abdelhakim, B.A. and Benhmed, M.) also explains that Physicians, nurses, patients, and their families could benefit from a chatbot. Chatbots may assist medical personnel in several scenarios, such as better patient information organization, medication administration, emergency assistance, first aid, and providing a solution for minor medical problems.

# Background and Client Profile

The need to manage growing expenses and expanding demand while improving patient care is driving a major transition in the healthcare sector. Healthcare providers are under pressure to offer services in a more effective and efficient manner as the population ages and expands. There are several significant issues facing the sector:

**Patient Overload**: Long wait times and lower patient satisfaction are results of the difficulty many healthcare institutions have in handling many patients. The demand for both ordinary questions and more complicated medical consultations often leaves healthcare workers overworked and underprepared.

**Administrative Inefficiencies**: Appointment scheduling, routine question responding, and patient record management take up a significant amount of the time of healthcare personnel. Although necessary, the time spent on these duties takes away from directly caring for patients.

**Accessibility and Patient Engagement**: Patients, particularly those who live in distant places or have restricted mobility, require healthcare to be more accessible. Improving health outcomes also depends on including people in their own treatment, yet many patients find it difficult to obtain trustworthy medical information or to properly manage their care.

With the ability to automate repetitive processes, provide quick patient support, and improve communication between patients and doctors, chatbots have become more and more relevant in the healthcare industry because to advancements in AI and NLP. A healthcare chatbot system has been created in response to industry issues. It offers individualized health insights, ease of use, and 24/7 support all of which enhance patient care and operational effectiveness.

Since this system will be created as a part of the academic project, we may consider Holroyd Private Hospital as our client. We can integrate chatbot in their website.

# Purpose and Objectives

The primary goal of the proposed system is to offer a quick and practical method for handling health queries. The healthcare chatbot system will aid with personal health care and ease user inquiries.

The objectives of the system are as follows:

* To provide response on health queries
* To diagnose disease based on symptoms provided based on yes/no statement
* To provide way to maintain patient health record

# Scope and Exclusion

The proposed healthcare chatbot system could offer significant advantages, such as eliminating long wait times for customer service by providing 24/7 virtual support. This system would be particularly beneficial for managing chronic conditions like diabetes, cancer, as well as supporting self-care, elderly care, and more.

However, there are potential limitations, such as the chatbot's possible inability to recognize all diseases due to limited data. The system might also lack features like medication reminders and appointment notifications. Additionally, there are concerns about the AI's reliability and privacy, as it could potentially misdiagnose conditions or expose personal health data to risks like hacking.

# Assumptions and Constraints

There are several restrictions and presumptions that apply to this system. It is anticipated that enough medical data would be accessible to properly train the chatbot, enabling it to offer precise diagnosis and health-related information. Additionally, the project assumes that users will have access to computers or cell phones and that the chatbot would abide by healthcare rules to protect the privacy and security of user data. It further assumes that users, including patients and healthcare practitioners, would be receptive to embracing this technology and that the AI and NLP technologies employed will be sufficiently sophisticated to comprehend and react to user questions.

The project is limited, though, and the chatbot's capacity to identify uncommon circumstances may be impacted by things like possible data availability issues. The accuracy and comprehension of complicated questions by the system may be affected by technical constraints in AI and NLP. The efficacy of the chatbot in a variety of demographics may also be impacted by issues with language and cultural barriers. The project must also take legal and ethical issues into account, such as the possibility of misdiagnosis and making sure the chatbot enhances rather than replaces crucial human-machine interactions in the healthcare industry.

# Deliverables

Here are the deliverables for proposed system which are explained below:

**Functional Chatbot System**: A fully functional healthcare chatbot that can converse with users around-the-clock, offer prompt support, and provide individualised health insights depending on user input.

**Technical Documentation**: Detailed documentation covering the overall system architecture, design and implementation guidelines.

**Testing and Quality Assurance Report**: A full phase report on the testing phases of the chatbot system, which ensure the functional requirements and quality standards.

**User Manual**: This is a document which consists of brief description of the chatbot system, its purpose and users who will be using this system. Also, this manual helps users to access the chatbot system. Steps for user registration, login and logout from the system. Moreover, this document also helps user to navigate through user interface, features, troubleshooting common issues and error messages, and some of the common questions about the system. This will be provided in digital format.

**Installation Guide**: This document provides how to install the whole system from start to end with some screenshots.

# Schedule

Our project has been planned over a period of seven weeks starting from 31st July 2024 to 11th September 2024.

Week 1: **Project Initiation**

* Requirement gathering
* Project proposals

Week 2: **Planning and Design**

* Create wireframes and mock-ups for user interface
* Develop a detailed project plan, timelines

Week 3: **Backend Development**

* Create backend APIs for chatbot functionalities
* Setup integration with frontend tools

Week 4**: Frontend Development**

* Develop the frontend interface
* Connect frontend to the chatbot engine and backend services

Week 5: **Testing and Quality Assurance**

* Testing individual components
* Black box testing and getting feedback

Week 6: **Refinement and Finalization**

* Bug fixing if any issues found during testing

Week 7: **Deployment and Project Closure**

* Deploy the chatbot system to the production environment
* Monitor the system and create user manuals

# Budget

For this project we will be creating project prototype on our own without spending any cost but if we need to go to the large scale which will be available to use by every user which is used for revenue generation here is the budget breakdown for healthcare chatbot system.

1. Development Costs - ($150,000)

* Salaries
  + Frontend Developer
  + Backend Developer
  + Project Manager
  + Product Manager
  + DevOps Engineer

1. Infrastructure Costs - ($10,000)

* Cloud Services
* Hosting Costs
* APIs and third-party services

1. Tools and Software - ($2,000)
   * Testing Tools
   * Development Tools
   * Communication and Collaboration Tools
2. Testing and Quality Assurance - ($20,000)

* QA Engineer

1. Compliance and Security - ($10,000)
2. Marketing and Deployment - ($5,000)
3. Maintenance and Support - ($30,000)
4. Contingency - ($20,000)

Total Price: **$247,000**(approx.)

# Resources, Roles and Responsibility

As we are two members in group, we both will be equally responsible for every phase of this project from beginning to the end. Also, we have breakdown each phase which is as follows.

|  |  |  |
| --- | --- | --- |
| **Resources** | Human Resources | We'll be working simultaneously and, if necessary, asking our supervisor for assistance. |
| Technical Resources | **Software**: Django Programming language with NLP  **Hardware**: Own laptops |
| Financial Resources | We will be using the tools, software, and supplies that are available to complete this project. |
| **Roles and Responsibility** | Requirement Analysis | Both from group |
| Development | Both from group |
| Design | Both from group |
| Testing | Both from group |
| Documentation | Both from group |

# Meeting Schedule

We have fixed the meeting schedule for this project which is shown as below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S.N.** | **Discussion** | **Location** | **Date** | **Time** | **Discussions** |
| 1 | Weekly Status Meeting | Classroom | Every Monday | 6am-7am | Review things from previous week and set deadlines for this week. |
| 2 | Designing Review Meeting | Classroom | Every Wednesday | 6pm-7pm | Discuss design related issues and update them as needed |
| 3 | Development Updates | Outdoor campus area | Every Friday | 1pm-2pm | Review progress of code and synchronize tasks |
| 4 | Overall Progress Meeting | Online Meeting using Zoom | Every Saturday | 6pm-6:30pm | Review and prepare for final documentation |

# Version Control

About the version controlling system for both report and source code we will be using the tool **Git** to track the changes to the project code and **GitHub** for collaboration through remote. We will commit the changes through our own branch and merge the changes to main branch after reviewing. If merge conflict occurs when merging the source code, we will discuss and resolve it by ensuring the correct and functional change.

# References

Ayanouz, S., Abdelhakim, B.A. and Benhmed, M., 2020 March. A smart chatbot architecture based NLP and machine learning for health care assistance. *In Proceedings of the 3rd international conference on networking, information systems & security,* pp. 1-6.

Divya Madhu, N. J. C. J. E. S. S. S. A. A., 2017. *A Novel Approach for Medical Assistance Using trained chatbot.* s.l., s.n.

Kurup, G. and Shetty, S.D., 2022. AI conversational chatbot for primary healthcare diagnosis using natural language processing and deep learning. *In Computational Intelligence in Pattern Recognition: Proceedings of CIPR 2021,* pp. 259-272.

Mendapara, H., Digole, S., Thakur, M. and Dange, A., 2021. Ai based healthcare chatbot system by using natural language processing. *International Journal of Scientific Research and Engineering Development,* 4(2).

Rashid Khan, A. D., 2018. *Build Better Chatbots.* I ed. Bangalore: Apress.

Sagar, R.H., Ashraf, T., Sharma, A., Goud, K.S.R., Sahana, S. and Sagar, A.K., 2021. Revolution of AI-enabled health care chat-bot system for patient assistance. *In Applications of Artificial Intelligence and Machine Learning: Select Proceedings of ICAAAIML 2020,* pp. 229-249.

Sven Laumer, C. M. F. T. G., 2019. *CHATBOT ACCEPTANCE IN.* Stockholm & Uppsala, European Conference on Information Systems (ECIS).