**A System for Medical Assistance by Text Conversation**

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**Authors**

**Abstract**

In the medical arena, it's often tough to get quick and reliable information about symptoms, health conditions, and what to do next. Many people can't easily reach healthcare professionals, and there's a growing number of health questions. This situation calls for a smart solution to make sure everyone can access the information they need.

Fixing the problem we talked about would be really good for both doctors and regular people. If everyone can easily find accurate health information, it helps people make better choices about their health. This could also mean fewer trips to the emergency room for things that aren't super urgent. And overall, it helps everyone understand more about staying healthy.

The idea is to create a smart computer assistant known as a chatbot, with expertise in medical information. This chatbot uses advanced language skills and a database of medical knowledge. It's designed to help people by giving them accurate and timely information about symptoms, conditions, and what steps to take. The chatbot's design aligns with the objective of addressing the broader problem of limited accessibility to reliable medical information. make it more simple.

For health-related queries, the chatbot is like having a health assistant. Its vast knowledge base contains current and reliable medical information, so users can rely on its advice. Speaking with the chatbot enables people to make informed decisions and have a better understanding of their health. In addition, a lot of people might receive the assistance they require because the chatbot is made to be simple to use by anyone.

**Contents**

|  |  |  |
| --- | --- | --- |
|  |  | **Page** |
| Acknowledgement |  | ii |
| Abstract |  | iii |
| Contents |  | iv |
| List of Tables |  | vi |
| List of Figures |  | vii |

|  |  |  |
| --- | --- | --- |
| **1** | **Introduction** | 1 |
|  | 1.1 Background / Problem statement | 1 |
|  | 1.2 Objectives | 3 |
|  | 1.3 Scopes | 3 |
|  | 1.4 *Unfamiliarity of the problem/topic/solution* | 4 |
|  | 1.5 *Project planning* | 6 |
|  |  | 6 |
| **2** | **Related Work** | 7 |
|  | 2.1 Existing solutions | 7 |
|  | 2.2 Limitation in existing solutions | 8 |
|  |  | 10 |
| **3** | **System Design** | 14 |
|  | 3.1 Analysis of the system | 14 |
|  | 3.2 System architecture | 14 |
|  | 3.3 *Tools / Platform used* | 15 |
|  | 3.3.1 Google Colab | 16 |
|  | 3.3.2 python flask | 17 |
|  |  | 19 |
| **4** | **Project Implementation** | 22 |
|  | 4.1 System implementation | 22 |
|  | 4.2 *Morality or Ethical issues* | 24 |
|  | 4.3 *Socio-economic impact and sustainability* | 25 |
|  | 4.4 *Financial analyses and budget* | 26 |
|  |  | 27 |
| **5** | **Conclusions** | 28 |
|  | 5.1 Conclusion and challenges faced | 28 |
|  | 5.2 Future work | 29 |
|  |  | 30 |
|  |  |  |
|  | **References** | 31 |
|  |  |  |

**List of Tables**

|  |  |  |
| --- | --- | --- |
| **Table No.** | **Description** | **Page** |
| 2.1 | Network construction using Physarum. | 6 |
| 3.1 | Time comparison in car, bus and bicycle. | 23 |

**List of Figures**

|  |  |  |
| --- | --- | --- |
| **Figure No.** | **Description** | **Page** |
| 3.1 | Real traffic network. | 16 |
| 4.1 | Selected Dhaka city Map. | 18 |

1. Introduction
   1. Background

In the world of health, sometimes it's hard to find the right information quickly. People have questions about symptoms, illnesses, and what to do to feel better, but they might not always have easy access to a doctor. That's where our smart friend, the ChatBot, comes in. It's here to help bridge that gap and make sure everyone can get reliable information about their health. Think of it like having a knowledgeable friend who can answer your health questions anytime, day or night. The idea is to solve the challenge of not always being able to find accurate and timely health information when you need it. This ChatBot is like a friendly guide in the world of health, ready to assist and provide trustworthy advice whenever someone has a health-related question. People may feel a little uncertain or concerned about their health in numerous circumstances, particularly if they find it difficult to get in touch with a medical practitioner. The ChatBot is intended to be a comforting and trustworthy information source. It's similar to getting a nice virtual health companion that comprehends your inquiries.

Ensuring that everyone, wherever they may be, has hassle-free access to clear and accurate health information is the challenge we're taking on. The ChatBot simplifies health information for all users by speaking your language like a human encyclopedia. People will be able to take control of their health and well-being and make knowledgeable decisions about it. The ultimate objective is to equip people with the knowledge they need to maintain their health and feel.

* 1. Objectives
* Create a Medical Chatbot System: Develop a system that can answer health questions and help people understand possible medical issues.
* Make an Easy and Friendly Interface: Design a website that's simple to use, so anyone can find the health information they need without confusion.
* Understand Questions Better: Teach the chatbot to comprehend what people say in a natural way, improving its ability to figure out possible health problems.
* Give Simple Info on Diseases: Ensure that the Chatbot shares clear and easy-to-understand details about what might be causing a health issue and what can be done about it.
* Maintain a database: The system maintains a database to store user information and past conversations. This ensures that users can easily refer back to previous responses, promoting reliability and continuity in interactions.

These objectives aim to build a Medical Chatbot that's not only good at tech stuff but also makes it easy and helpful for everyone who needs health info, using regular language.

* 1. Scope

The medical Chatbot project has a broad scope that includes a variety of elements to offer a customized and broad user experience. This is a summary of the project's scope:

* User Authentication and Profile Management: Users can log in to the website, creating individual profiles that allow for personalized interactions and secure storage of health-related data.
* Chat Interface: A user-friendly chat interface where users can communicate with the Chatbot by providing symptoms and asking health-related questions.
* Symptom Analysis: The Chatbot analyzes user-inputted symptoms to identify potential health conditions or diseases.
* Disease Information: Provides detailed information about identified diseases, including causes, symptoms, and preventive measures to enhance user awareness and understanding.
* Treatment Recommendations: Offers personalized treatment recommendations based on identified diseases, guiding users on potential courses of action or medical interventions.
* Conversation History: Saves and categorizes each user's conversation history, allowing users to review previous interactions, symptoms, and responses for ongoing health management.
  1. Unfamiliarity of the problem

The unfamiliarity with the problem in the context of a medical chatbot lies in the challenge of limited accessibility to timely and accurate health information. Many individuals face difficulty obtaining quick and reliable answers about symptoms, conditions, and healthcare options. The unfamiliarity arises from the gap in easily reaching healthcare professionals and the increasing need for accessible and trustworthy health guidance. The medical chatbot aims to address this unfamiliarity by providing a user-friendly solution that offers reliable information, empowers users, and contributes to improved health literacy.

* 1. Project planning

Our plan for the medical Chatbot is like a roadmap showing how we'll turn our idea into reality. We want to solve the problem of people not easily getting health info. The plan includes features like checking symptoms, explaining diseases, and suggesting treatments. We've set a clear schedule and figured out what we need, like people and money, to make it happen. We're also thinking about possible problems and how to make sure everything works well. Our plan is like a guide, making sure we stay on track and create a helpful and easy-to-use chatbot for everyone.

1. Related Works

* “**Maya - It's ok to ask for help**” [1]: A online android based application. It’s a health care app which connects users with hundreds of doctors, psychiatrists and beauticians ready to serve 24 hours a day. Here user can write questions about his problems about health and the doctors’ advice giving reply and facility to video call and can get digital prescription from doctors and there is extra facility to shop and read medical blogs.
* “**Text messaging-based medical diagnosis using natural language processing and fuzzy logic.**” [2]: The service focuses on assessing the symptoms of tropical diseases in Nigeria. Telegram Bot Application Programming Interface (API) was used to create the interconnection between the chatbot and the system, while Twilio API was used for interconnectivity between the system and a short messaging service (SMS) subscriber.
  1. Gap in Existing Solutions
* “**Maya - It's ok to ask for help**” [1]: There are some limitations. In the app, the user has to wait for doctors, psychiatrists and beauticians to reply which is frustrating and may delay treatment. Manpower is a limitation here. In some cases, users have to pay for conversations with doctors.which may make these technologies less accessible to some patients.
* “**Text messaging-based medical diagnosis using natural language processing and fuzzy logic.**” [2]: Here a limitation is the conversation is based on question-answering. Its algorithm makes decisions by asking questions and based on the reply the bot gives the solution for diseases. So it is time-consuming and the user may get monotonous.

1. System Design

The proposed approach involves the use of a chatbot that can interact with users through text conversation, providing them with an avenue to express their concerns in a way that is comfortable and accessible to them. To respond to the user's queries, the system uses an expert model that uses advanced algorithms to provide intelligently and accurate responses.

* 1. Analysis of the system

The system is analyzed through a couple of diagrams to depict the procedures and interactions of various elements. It follows with DFD and a Use Case diagram to exhibit the flow of working steps.

* + 1. **DFD Diagram**

The user input, which usually consists of a list of symptoms connected to a specific medical condition, is analyzed by the chatbot using advanced algorithms. To produce an accurate result, these algorithms are designed to process and interpret the user's input. Working with large amounts of data or sensitive information requires an efficient understanding of the system flow. As such the movement of data is shown in the Data Flow Diagram (DFD), figure 3.1

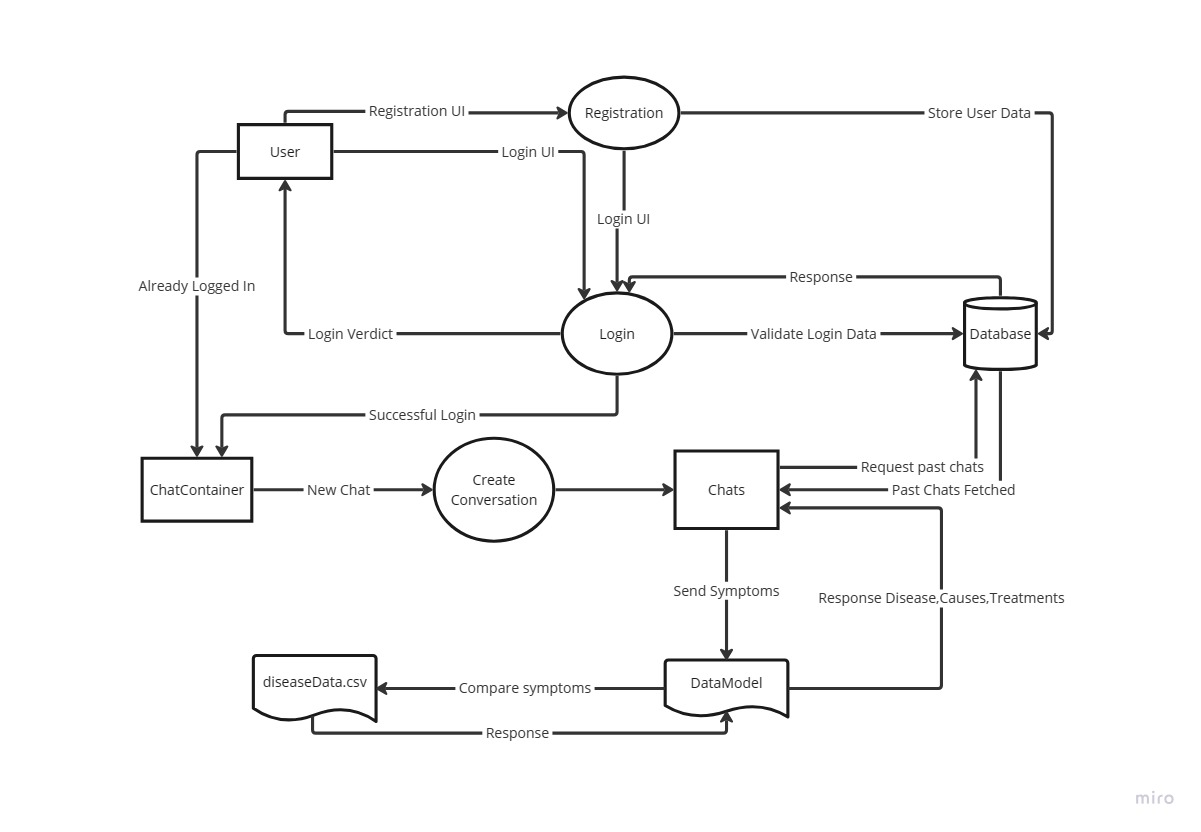


Figure 3.1: Data Flow Diagram of the medical chatbot system.

* + 1. **Use Case Diagram**

There are many different types of roles in the system. The figure 3.1.2 illustrates these roles' points of view.

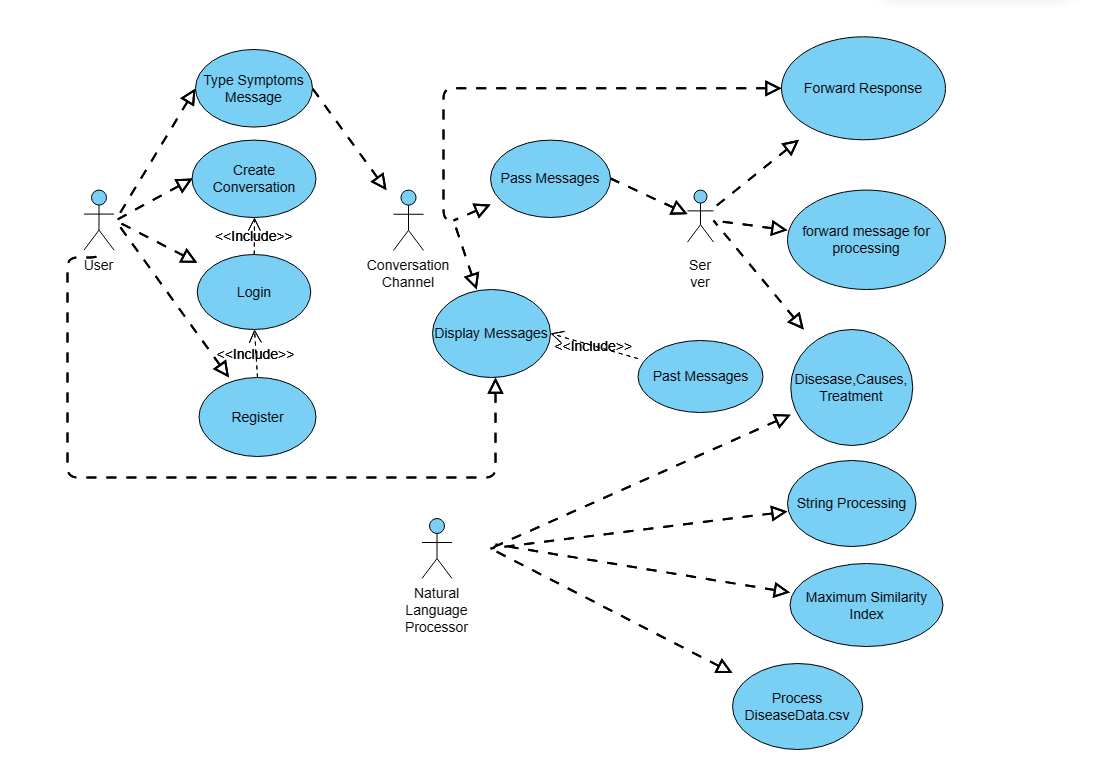


Figure 3.2: Use case diagram of Medical chatbot System

* 1. System architecture

The project's architecture must be fully understood in order to build it. A class diagram displays the project's structure by encapsulating and associating important classes, while an ER diagram displays the database that houses the information and the relationships that are related to it.

* + 1. **Class Diagram**

The information and functionality of association and encapsulation of each individual class or building block is shown in the figure 3.3. where the necessary information is reflected by the blocks.

* + 1. **Schema Diagram**

A schema diagram visually represents the structure and relationships within a database, illustrating tables, fields, and their connections. The Schema diagram for this project illustrates the key entities and relationship among them in the figure 3.4.

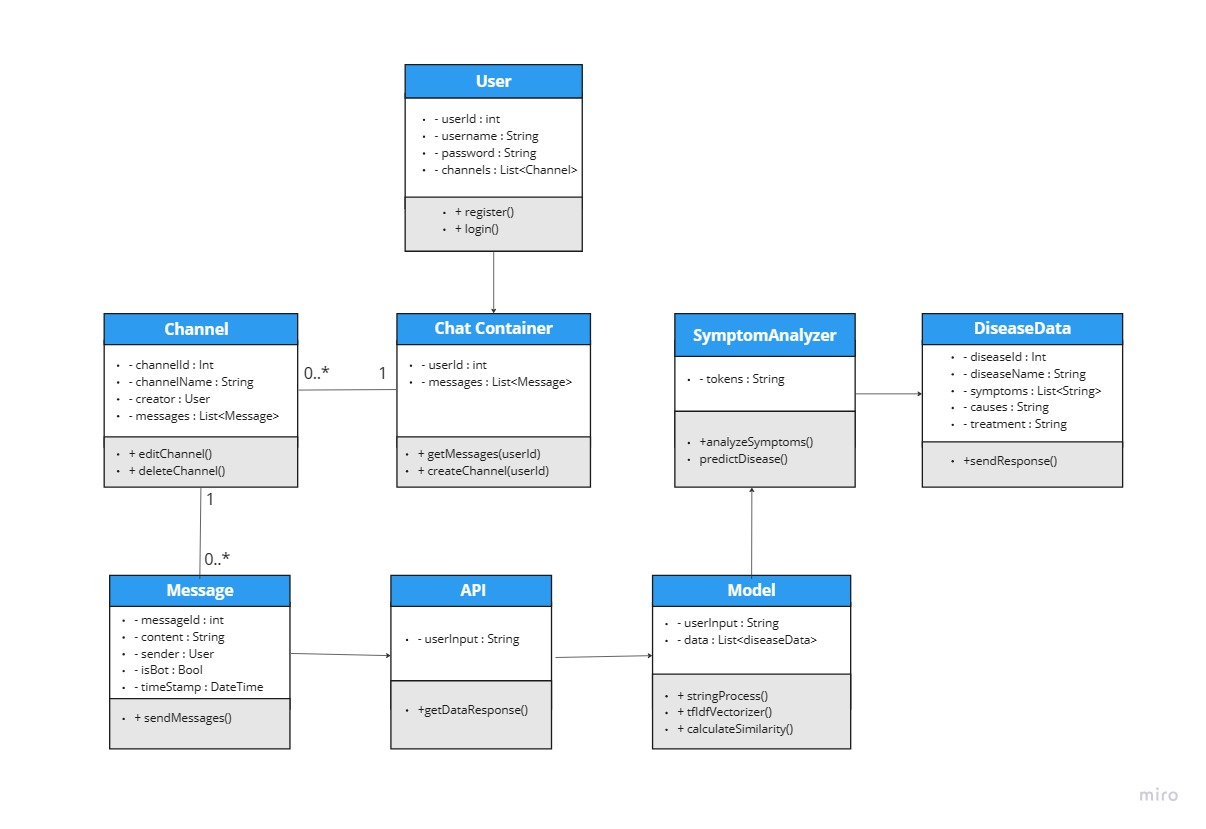


Figure 3.3: Class Diagram of Medical Chatbot System.

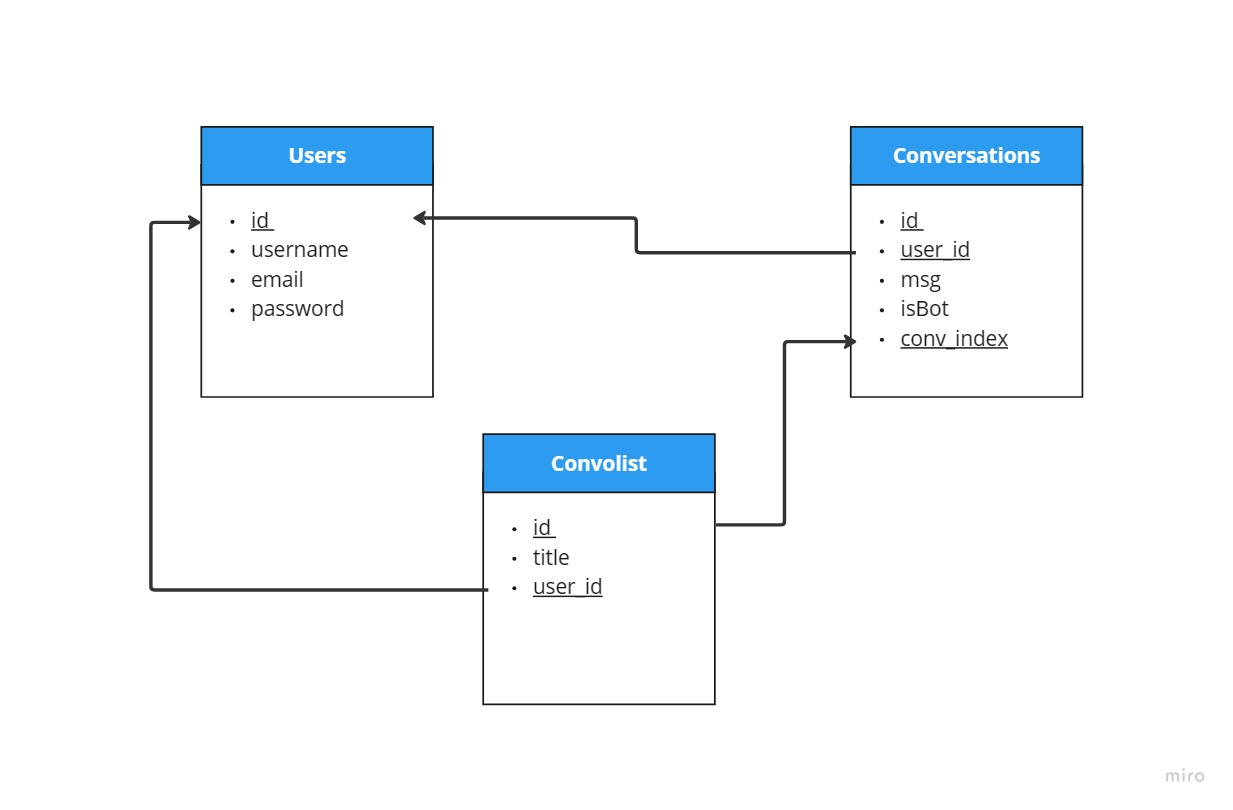


Figure 3.4: Schema Diagram for Medical Chatbot System.

* 1. Tools used

In more ways than one, driving a bicycle has a positive impact on the environment. They are also less expensive than other forms of ………………………………………

* + 1. Android Studio

Bicycles are considered zero-emission vehicles i.e. they do not release any carbon emissions. Bicycles, as vehicles with ………………………………………

* + 1. Kotlin

Bicycles are considered zero-emission vehicles i.e. they do not release any carbon emissions. Bicycles, as vehicles with ………………………………………

* 1. UML Class Diagram:

Bicycles are considered zero-emission vehicles i.e. they do not release any carbon emissions. Bicycles, as vehicles with ………………………………………

1. Project Implementation

This chapter implements the……………….

* 1. System implementation

At first, a selected portion of Dhaka city is considered to construct the network using Physarum inspired technique…………….

* 1. Morality or ethical issues

At first, a selected portion of Dhaka city is considered to construct the network using Physarum inspired technique. And it can also lead to better mental health and energy by bicycling 30 minutes a day [3], [4]………………………….

* 1. Socio-economic impact and sustainability

At first, a selected portion of Dhaka city is considered to construct the network using Physarum inspired technique……………....................................

* 1. Financial analyses and budget

At first, a selected portion of Dhaka city is considered to construct the network using Physarum inspired technique……………………….

1. Conclusion

A modified Physarum-inspired model is presented in this project to address the design of the bicycle lane network…………………………………….

* 1. Conclusion and challenges faced

The network design technology inspired by Physarum is believed to have balanced costs, effectiveness, and resilience. Inside Dhaka city, an unorganized and unplanned city, we have developed an electric bicycle ……………………

* 1. Future Study

# In the future, parallel computing and the optimal model for the design of the transport network are part of our work. Furthermore, our research includes the implementation of the Physarum ……………………….

# References

[1] https://play.google.com/store/apps/details?id=com.maya.mayaapaapp&hl=en&gl=US

[2] Omoregbe, Nicholas AI, et al. "Text messaging-based medical diagnosis using natural language processing and fuzzy logic." *Journal of Healthcare Engineering* 2020 (2020): 1-14.

[3]