

A HEALTH CARE CHATBOT SYSTEM

1.0 ABSTRACT

This work aims to present a design for a medical Chatbot that provides diagnosis and remedies based on the symptoms provided to the system. The system also provides contact to doctors for further medical diagnosis.

1.1 PRELIMINARY STUDIES/INTRODUCTION

A Chatbot is a system that can interact with human users with natural language. Chatbots are used in domains like Customer Support, Virtual Assistance, Online Trainings, and Online Reservations and also for general conversations.

The proposed health care Chatbot can interact with the users, giving them a realistic experience of chatting with a Medical Professional. Our Chatbot can detect human message patterns and was developed with Javascript. It retrieves keywords from the initial messages to know the possible medical problems that the user has, based on their input. Most Chatbots in circulation today make use of AIML (Artificial Intelligence Markup Language) which is a mark-up language based on XML to build AI applications, but this work explores the option of doing a similar thing with the aid of Javascript AI.

The need for easy access to medical help can't be over emphasized. Thus this health care based Chatbot provides medical help to anyone with the information they supply.

1.2 MATERIALS AND METHODS

The waterfall development method was adopted for the development of this project. The waterfall method is a rigid linear model that consists of sequential phases (requirements, design, implementation, verification and maintenance) focusing on distinct goals.

As mentioned earlier, Javascript was used for the development of this Chatbot. JQuery was specifically used for this work. JQuery is a fast and concise JavaScript library. JQuery simplifies HTML document traversing, event handling, animating, and Ajax interactions for Rapid Web Development. This library has inbuilt functions that when called makes the work

easier for the developer. A special Javascript file was created that houses the code that does the work. Also HTML5 (Hyper Text Markup Language) was used for the front end development. A different portal was also created using php (Hypertext Preprocessor). The aesthetics of the project was handled with CSS (Cascaded style sheet) and the responsiveness of the platform was handled using Bootstrap. Bootstrap is a sleek, intuitive, and powerful mobile first front-end framework for faster and easier web development. MySQL database was used to store data for the user dashboard area once the user signs up. Notepad++ text editor was used to write all the lines of code.

1.3 FUNCTIONALITY

The first page to be seen is the Chatbot interface with the heading Chatbot medics. The Chatbot is user friendly as such it gives answers to anyone with or without registration. The system focuses on the messages that the user provides while initiating the conversation. The idea behind this is to detect the preliminary symptoms and the problems that the user may be experiencing. The Chatbot provides the name of the possible ailment the user is facing and prompts him to sign up or sign in if he already has an existing account. At the signup end, the user will be required to fill a form containing his basic details. After the he must have signed in, he is provided with a form to fill up his previous medical details. This form will help the doctor once he calls up his profile. The doctor will be aware of his previous medical challenges together with his current ill health thus helping the doctor to know where to start from. Also contacts of the available doctors are provided, so that the user can call him. Their physical hospital addresses are provided as well. This helps the user to secure an appointment with the doctor over the phone and quickly.

This Chatbot was also carefully built not to proffer quick solutions or remedy to the user without speaking further with a medical personnel. This is to avoid undue self-medication as that is totally not recommendable.

1.4 CHATBOT COMPONENT DESIGN:

Using Javascript AI our Chatbot can detect patterns from the user messages and would be able to generate correct and meaningful responses. For instance, the Chatbot gives room for patterned questions such as: "I am sick", "not feeling fine", "am ill", "not well", to determine what the user has in mind.

The Chatbot is displayed in a container on the screen and it houses the chat and has a scrollbar.

The Chatbot despite being health-based also gives other useful information such as date and time and how the day is going. The principle that governs this design it's the ability of the Chatbot to learn different user responses.

1.4.1 DESIGN CONSIDERATION AND CRITERIA:

- **Simplicity:** This Chatbot was designed to be very simple and easy to use. The linking between its pages removes all ambiguity.
- **Aesthetics:** While ensuring the functionality of its different parts, I ensured that the beauty of the pages involved was not neglected.
- **Responsiveness:** This means that the site is mobile friendly as well as desktop friendly. To do this, Bootstrap was used.

1.4.2 SYSTEM FLOWCHART:

The system flowchart below, depicts how the system works from start to finish.

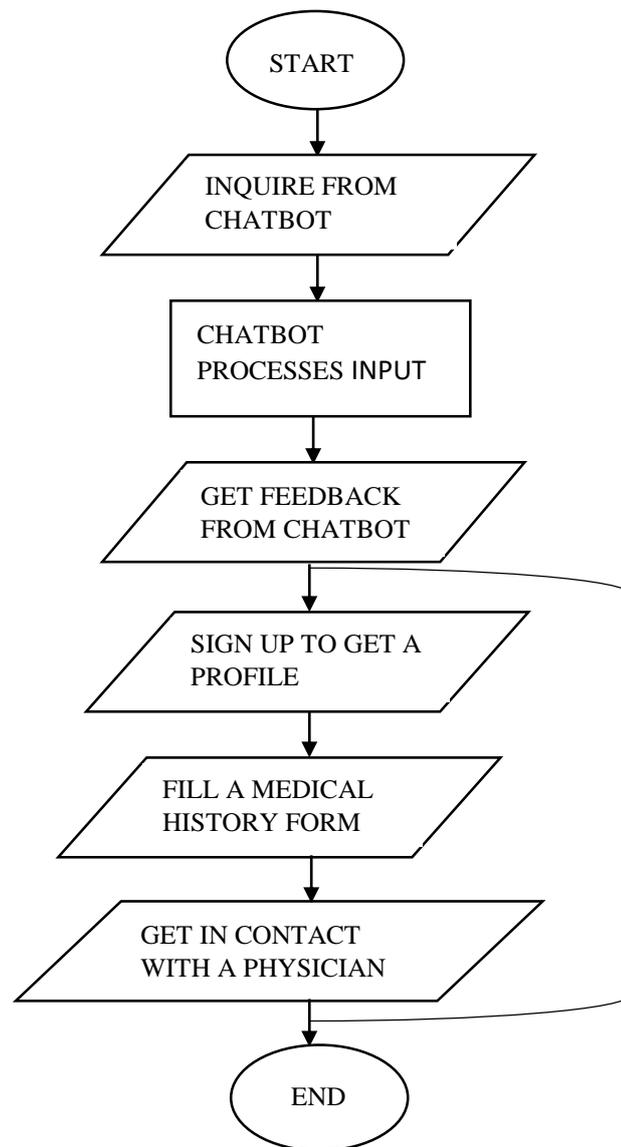


Figure 2.1 Flow chart of the Chatbot system

1.5 PROJECT IMPLEMENTATION:

For the implementation, a work breakdown structure (WBS) was developed. The Work Breakdown Structure is a deliverable-oriented grouping of the work involved in a project that defines the total scope. A schedule including the WBS was also developed for the completion of the project as shown in the Gantt chart below.

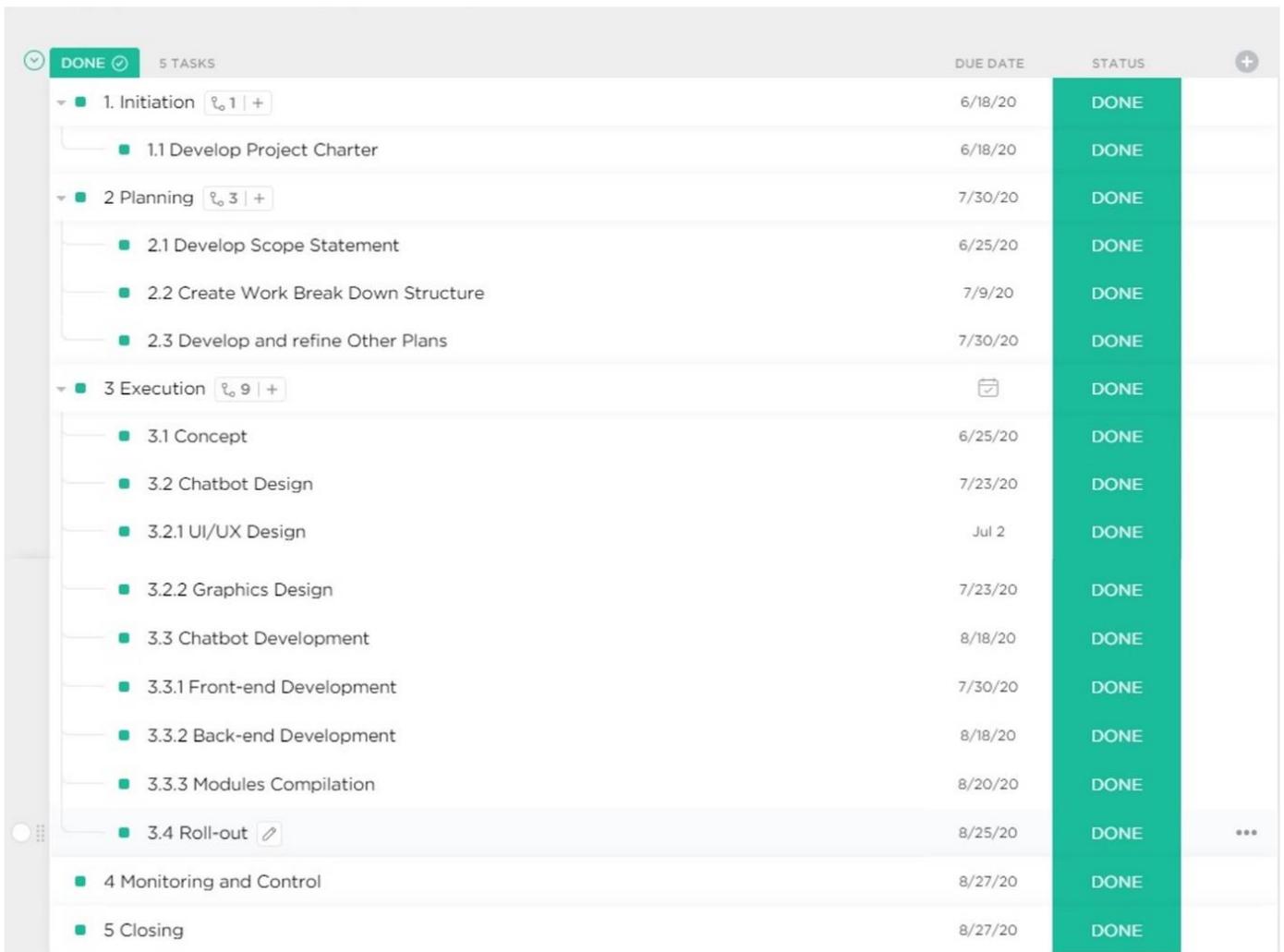


Figure 2.2 Gantt chart for the Implementation of the Chatbot system

The implementation of this project was in stages. These stages had deadlines as seen from the schedule part of the Gantt chart. The arrows pointing from one project activity to another depicts dependencies, which implies that the output of the preceding activity is required to start the next one. Despite the fact that the entire project design, implementation and monitoring was done by me, in real sense, the project is broken into activities as seen on the Left hand side of the Gantt chart and delegated to a team of software engineers.

1.6 TESTING AND SYSTEM ANALYSIS

The testing of this software project was divided into 3 parts:

- Unit testing: This focused on the readability and functionality of individual units of code. It also checks if the codes are in accordance with the industry standards.
- Integration testing: Here the pages and modules were examined to ensure there are no errors before linking and integration is done.
- System testing: The entire system was checked to ensure functionality and portability of the entire system. It also compared the final product to ensure it serves the objective for which it was created.

The system was tested by four persons and was confirmed to be optimally functional.

1.6.1 SYSTEM INTERFACES: Figure 2.3 below shows the first page to encounter once the Chatbot is accessed. It contains a conversation between a user and the Chatbot. From the symptoms provided by the user, he has been diagnosed of having Typhoid. Also we can see a Sign up and Sign in page at the left hand side of the screen, which is left for the user to make use of if he wants to book an appointment with a physician.

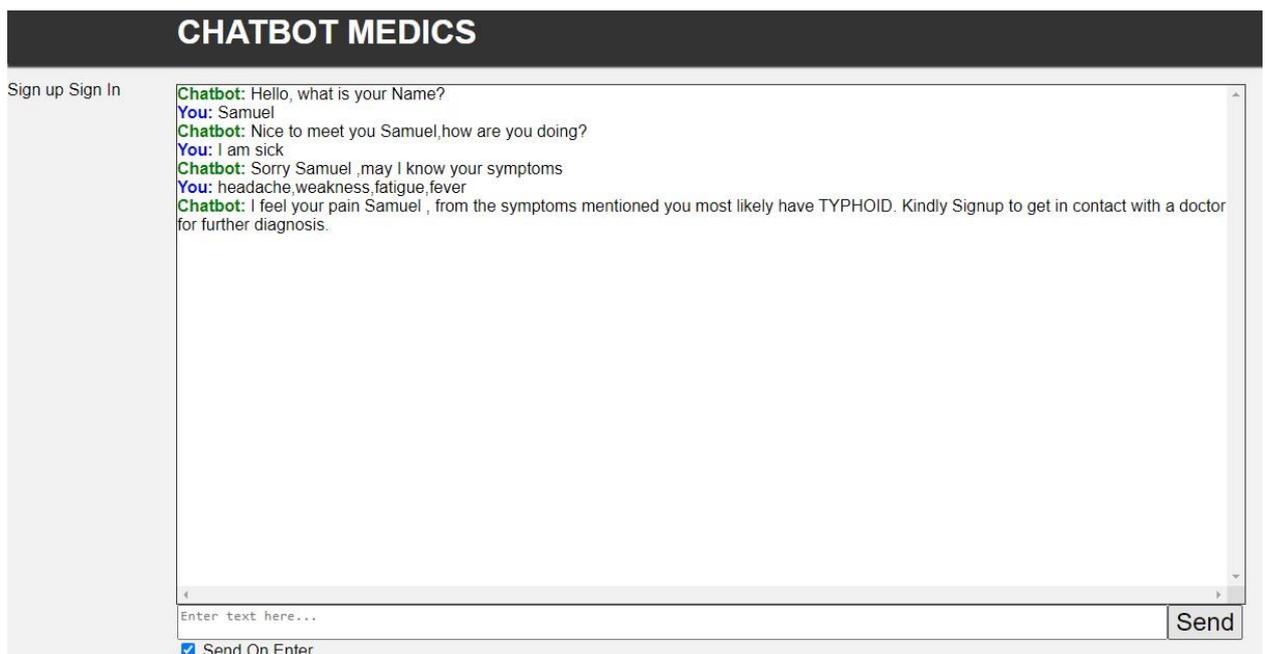


Figure 2.3 Chatbot home interface.

Figure 2.4 below depicts the Sign In page for a user with a profile already. Aesthetics was really considered to make it appealing to the user.

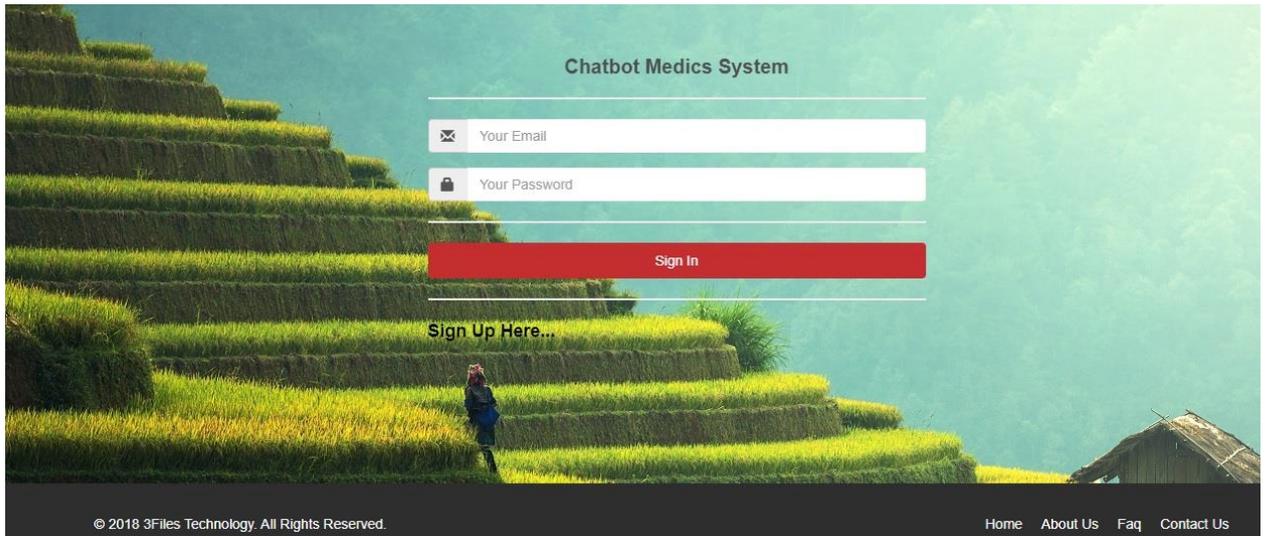


Figure 2.4 Chatbot Sign In interface.

Figure 2.5 below shows the Sign up page for a new user who will like to get in touch with a physician. After signing up, the user has a profile of his own and his past medical records can easily be accessed by the physician.

The image displays a 'Registration Form' with a light blue header. The form is set against a background of the same terraced rice fields seen in Figure 2.4. The form contains several input fields: 'Surname' (placeholder: surname), 'First Name' (placeholder: first name), 'Other Name' (placeholder: other name), 'Email' (placeholder: Enter Your Email), 'Date Of Birth' (placeholder: dd/mm/yy), 'State of Origin' (placeholder: state of origin), 'L.G.A' (placeholder: L.G.A), 'Gender' (a dropdown menu with 'Gender' selected), 'Address' (placeholder: Address), and 'Home phone' (placeholder: phone number).

Figure 2.5 Chatbot Sign Up interface.

1.7 BILL OF ENGINEERING MEASUREMENT (BEME):

Software Engineering is a field that encompasses computing and engineering, as such its measurement and evaluation is not easily outlined. This becomes even more difficult because much of the activities are mental works and depicted as effort. To cost this software project, a Grantt chart might be used as well. The Table below would be an estimate for the costing.

S/N	Activity	Start date	End date	Cost(₦)
1	Planning	11/06/2018	31/07/2018	250,000
2	Requirements	06/06/2018	18/06/2018	380,000
3	Prototyping	15/06/2018	21/06/2018	120,000
4	Functional design	20/06/2018	27/06/2018	80,000
5	Detail UI/UX design	25/06/2018	07/07/2018	130,000
6	Graphics design	28/06/2018	03/07/2018	225,500
7	Quality Assurance	27/06/2018	26/08/2018	187,000
8	Coding	30/06/2018	13/08/2018	1,200,00
9	Code inspections	27/07/2018	15/08/2018	135,550
10	Unit test	16/08/2018	18/08/2018	50,000
11	Integration test	17/08/2018	19/08/2018	50,000
12	System test	19/08/2018	21/08/2018	50,000
13	Roll out/Deployment	13/08/2018	25/08/2018	110,500
14	Miscellaneous	--	--	75,000
	GRAND TOTAL	--	--	3,043,550

1.8 RELEVANCE OF THE HEALTH CARE CHATBOT SYSTEM TO THE SOCIETY AT LARGE

- Quick access to health related advice.
- Automated system that uses simple understandable human language.
- Easy access to a health care personnel from your convenience.
- Saves cost while upholding efficiency.
- Beneficial to the elderly and people with very busy schedules

1.8.1 RELEVANCE OF THE HEALTH CARE CHATBOT SYSTEM TO THE ENGINEERING PROFESSION.

- Enhanced research in Artificial Intelligence.
- Creation of a unique system to bridge a the gap between patients and doctors
- Delivery of peculiar, functional design to achieve project goals.
- Innovate a special design using Javascript AI.
- Design and development of an interactive virtual doctor.

1.9 CONCLUSION

This health care Chatbot will have a great impact on the life of its users. It provides the benefit of carrying a virtual Doctor in our pockets. It is very interactive and uses words similar to that of a doctor. More so, it provides an opportunity to meet with a doctor physically since their contacts are readily available. A doctor too can assess your previous medical history before commencing treatment. This provides more clients to the doctors and ease of access to the patients.

This system was developed with JQuery (a Javascript library), Html, Php, and MySQL. The major Idea behind this system is exploring Javascript AI as other Chatbot systems must have been developed using python or AIML.

1.9.1 RECOMMENDATION

This work is far from being done as other exciting features can be added to it. In future, I look forward to adding voice texts to it. Thus users who do not have energy to type can talk to the Chatbot using voice notes while the Chatbot replies both with text and in audio as well. This can be done using python NLTK

library. Also another exciting feature to be added is the ability to initiate a video call with any available physician online while still on this platform.