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UTILIZING META-BOTS TO MANAGE ISSUES IN THE HEALTHCARE

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Abstract. Healthcare can cause uncomfortable, even life-threatening, situations for patients when used incorrectly. Meta-bots will help to solve healthcare problems by providing an easy way for doctors to access information on patients. They will also improve communication between patients and health providers such as doctors and nurses. Meta-bots are used in healthcare to provide remote consultations, advice and education. Meta-bots are part of the Robotic Process Automation building blocks that enable complex automation. Meta-bots are a form of artificial intelligence that can be programmed to communicate with humans in natural language. They enable you to connect various bot instances that communicate with all of your different systems.

Keywords: Artificial Intelligence, Healthcare Meta-bot, Robotic Process Automation, patients.
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1 Introduction

Healthcare is a system of services that, when used correctly, allow people to live healthy lives. However, when used incorrectly, healthcare can cause uncomfortable, even life-threatening, situations for patients. This has led to widespread dissatisfaction among patients, who often want to go elsewhere if their first choice is not providing the service they need. This has in turn negatively impacted the health of the overall population, which has led to a decline in patient healthy and patient trustworthiness. Some problem confronts widely by patients in the healthcare sector (Medifind, 2020). The problem with patient relationship management is that patients are often unhappy with their experience, and this can lead to a decline in patient loyalty (Medifind, 2020). The problem with patient information management is that there are too many different systems in place, which makes it difficult for doctors and nurses to know what information they have access to about a patient (Medifind, 2020). The problem with patient interaction management is that patients are often confused about which doctor or nurse they should talk to when they need help (Medifind, 2020). The solutions for these problems will involve using artificial intelligence tools. These tools can help with all three of these problems by providing an easy way for doctors and nurses to access information on patients, by helping with communication between patients and health providers such as doctors and nurses, and by letting patients know who they should talk to when they need help.

2 State of the art

That is why Artificial Intelligence-powered healthcare meta-bots are designed to deliver personalized experiences to your patients for identifying the illness, scheduling doctor appointments,

notifying caregivers of patients about symptoms, monitoring the health status, and updating the home-care assistant from time to time and more. It can provide a solution to the healthcare sector in the form of a chatbot that can improve the way patients interact with doctors or any healthcare organization. Patients get a quicker solution to their health-related questions and can thus act promptly during critical conditions. A chatbot that is created for healthcare and patient care can easily perform certain functions on a patient's behalf, thus making interaction smoother on both ends.

3 Formulation of a working hypothesis

A. What exactly are task-bots?

Task-bots are at the heart of automation. These bots automate rule-based, repetitive tasks in areas such as document administration - for example, claims management, procure-to-pay, quote-to-cash, IT services, Human Resources, Public Relations and more - resulting in immediate productivity, cost savings, and error reduction (Kappagantula, 2020).

B. What exactly are chatbots?

Chatbots are a form of artificial intelligence that can be programmed to communicate with humans in natural language. They are capable of answering questions and providing information, as well as performing tasks such as inputting information into a database, also chatbots are frequently very good at handling a single type of request, which is typically Question and Answer(Q&A) flows. Chatbots are used in healthcare to provide remote consultations, advice and education. They can be used by patients who live in remote areas without access to medical professionals or during emergencies when hospitals need extra help. They can also be used by doctors and nurses who want to focus on more pressing matters instead of routine tasks such as filling out paperwork. Can you imagine how perplexing it would be for a user to have to access four different chatbots in order to perform an action like cancelling a flight? (Porter, 2022)

C. What exactly is a meta-bot?

A meta-bot is a type of chatbot that connects with smaller task-bots and determines which one is best suited to handle a specific patient request. Businesses have increasingly begun to implement Robotic Process Automation to handle tedious or repetitive tasks in an automated manner in recent years. Metabots are part of the Robotic Process Automation building blocks that enable complex automation. These bots orchestrate the processes and can summon smaller bots, known as task-bots, to perform specific tasks. These bots can perform actions that have an impact on other platforms such as Customer Relational Models, Enterprise Resource Planning, Supply Chain Operations, and so on (Docs, IBM, 2021).

D. Meta-bot Example

Healthcare Meta-bot is a healthcare meta-bot that can offer personalized advice on a range of topics including lifestyle, diet, and exercise. The chatbot is the first of its kind in the healthcare industry, providing consumers with the ability to interact with a healthcare expert in a simple, intuitive way. Healthcare Chatbots are becoming a powerful tool for patients to interact with their healthcare providers in a convenient, effective, and efficient manner. The current state of healthcare, where patients often feel forgotten or left in the dark, has led to an explosion of interest in chatbots as a potential solution. This has the potential to revolutionize the healthcare industry, bringing it to the forefront of people's minds as a solution for their healthcare needs, rather than an afterthought. Consider a hospital that allows customers to open a new hospital account from the comfort of their own homes using a chatbot interface. A visitor approaches the chatbot and requests that an account be created. While the chatbot may be able to respond with a simple "Yes, I'll be happy to do that for you," it is unlikely to be able to open an account

on the hospital's system on its own. Fortunately, there is another bot that can handle that. The main meta-bot then communicates with the bot in charge of opening the account in the hospital's system and requests that the action be performed behind the scenes (Franco, 2021).

E. What are the primary advantages of employing meta-bots?

Using a meta-bot instead of a simple chatbot has numerous advantages for-both chatbot users and businesses. Interconnection of systems It can be difficult to keep the information up to date across all of your business systems. Using a meta-bot enables you to connect various bot instances that communicate with all of your different systems and keep the information updated in an automated manner. A single point of entry to various actions and processes. Different actions can be performed by users in a single interface. A meta-bot is a scalable solution that grows with your company. A meta-bot is easily adaptable to new use cases (like voice-based search, connection to new platforms or devices, and more). Improved user experience. Many bots redirect to new browser tabs whenever an action is required. Everything can happen within the chatbot with a meta-bot. Remember that satisfied customers are loyal customers (Franco, 2021).

4 Data and method used

The application serves a social purpose by connecting people from geographically dispersed areas with doctors who are otherwise inaccessible.

A. Application interfaces

1) Interface for Administration

The admin's role is to add all updates to the map with nearby medicals and laboratories, as well as information about free government campaigns and schemes, and to look into the application's maintenance. The admin's primary function is to monitor the doctors on a daily basis and analyse patient experience and feedback. Administrators can also block patients who book bogus appointments with doctors. Additionally, by adding an admin panel in the code we write, using Web programming languages such as PHP, Java, and Python. With the help of the administrator panel, we can make the work for administrators the most convenient. However, the administrator may experience additional difficulties in a program where all work is written, may suffer additional pain, and may extend the time of the work to be done.

2) Interface for Patients

Patients can communicate their problems to a chatbot for common day-to-day healthcare issues and receive immediate assistance from the meta-bot. It can recommend common medicines for common health problems such as a common fever, cold, headache, and so on. Patients can also seek assistance from doctors through the application by texting them or video calling them. In addition, we will make the user experience and user interface designs comfortable and deploy them in a fast system and high performance. We can make the application that we will prepare responsive so that it will be an easy system for patients to use.

3) Interface for Doctors

Doctors can use the application to respond to patients and, if necessary, interact with them via video call. Doctors can view the patient's medical history to gain a better understanding of the problem. Doctors can communicate with the patient's circle of care in the event of an emergency.

B. Artificial Intelligence

The term artificial intelligence refers to the development of algorithms that should perform tasks that are typically performed by humans and are thus associated with intelligent behaviour.

The term is used colloquially to refer to a machine that mimics cognitive functions such as learning and problem-solving. We are currently using Artificial Intelligence (AI) to create chatbots in our application.

In artificial intelligence, we will develop **Learning Agents** (Shah, 2021) with the help of machine learning. With the help of the **Natural Language Processing (NLP)** (TDS Editors, 2019) techniques, which is a component of artificial intelligence, we build our Chatbot system. During chatbot learning, we use text analyzes and classifiers and select the symptoms of the disease from the text entered by the patient. Then, we send those symptoms to a **Supervised Classification Machine Learning** model that we pre-trained, through which we predict the disease based on the symptoms, which, as a result of this prediction, communicates with the task-bots developed within our chatbot and requests a doctor's appointment for the patient. Otherwise, if the disease is serious, the chatbot again contacts the nearest hospital with the help of task-bots and quickly calls an emergency service (ambulance).

In another scenario, we will build such a system according to smartwatches. This application stores relevant information for patients, if the patient's condition worsens, then this application sends a message to the nearest hospital with the help of task-bots written in task-bots.

And we can strengthen these meta-bots with the help of Neuroevolution of **Augmenting Topologies (N.E.A.T.)** (Heidenreich, 2019) and **Compositional pattern-producing network (C.P.P.N.)** (Wolfe, 2019) techniques, these choice of functions for the canonical ensemble can target specific types of patterns and regularities, for these patterns they can make own patterns and prevent potential problems in advance.

C. Data Warehouse in the Cloud

The global computer market is expected to grow to 64.7 billion by 2025, up from USD 28.1 billion in 2020, at a **CAGR** of 18.1 per cent. Flexible development of distributed medical services in the field of the computer business, for example, advanced approaches in the medical care environment increased distribution of IT medical care arrangements, and cloud-based areas, including improved capacity, flexibility, and adaptability. However, concerns about data protection and security, as well as complex guidelines governing cloud server cloud, can stifle market growth. Data storage and management are more expensive in the healthcare sector, where data is the primary asset today, raising additional costs associated with the demand for expensive servers. In such cases, Cloud Computing can assist in storing incorrect data and providing backup due to system failures. In addition, many healthcare providers provide video conferencing services (Srivastava & Khan, 2018). The reason I say this is that through cloud computing, we run all the processes through online servers.

5 Results

As a result, our artificial intelligence will perform these processes.

1. STAGE

1.1. With help of a meta-bot, doctors enter information about the health and past illnesses of each citizen into the health care system

1.2. Preparation of data, uploading to the cloud server and initial registration in the system by the patient

2. STAGE

2.1. Detection of disease from the symptoms

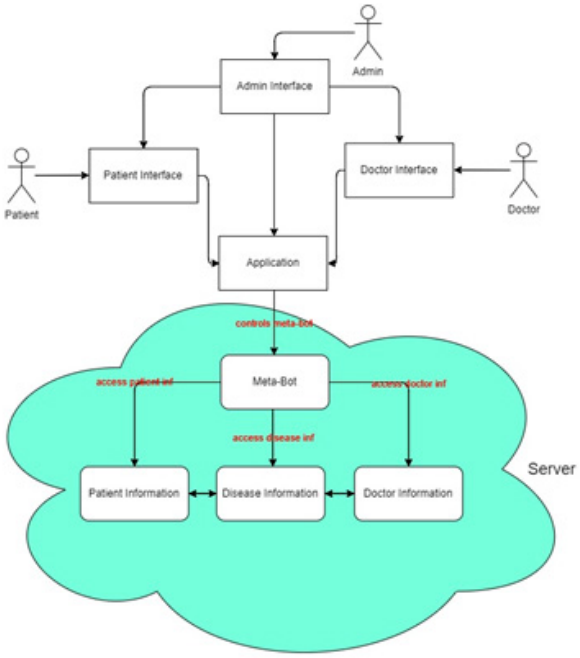
2.2. Prescribing initial treatment to the patient by means of artificial intelligence

2.3. Detection of the disease state after initial treatment

3. STAGE

3.1. Referring the patient to a doctor if necessary

3.2. Identifying the nearest hospital and doctor according to the appointment



3.3. Identifying the hospital closest to the residence according to the destination and requesting an appointment with the appropriate doctor

3.4. Appointment confirmation

4. STAGE

4.1. Scheduling a face-to-face meeting

4.2. The doctor's treatment of the patient during that appointment

4.3. If the doctor does not know how to treat, providing information help to cure the disease the doctor

My Artificial Intelligence has predicted the disease based on the symptoms of the patients and you can follow the learning process of the classification and as a result the necessary recommendations to the patient in Gayibov (2022).

References

8 Major Problems with the U.S. Healthcare System Today. Medifind, https://www.medifind.com/news/post/problems-us-healthcare-system.

Kappagantula, S. (2020). Automation Anywhere Bots - All You Need To Know About Bots In Automation Anywhere. Edureka, 13 July 2020, https://www.edureka.co/blog/automation-anywhere-bots/

Porter, Ex. (2022). The Ultimate Guide to Chatbots." Drift, Drift, 6 July 2022, https://www.drift.com/learn/chatbot/.

Docs, IBM. IBM RPA with Automation Anywhere Bots, MetaBots, and Workflows, 2021, https://www.ibm.com/docs/en/rpawaa/11.0?topic=bots-metabots-workflows.

Franco, H. (2021). What Is a Metabot? Why Should You Choose One for Your Chatbot Project? Inbenta, 31 Aug. 2021, https://www.inbenta.com/en/blog/what-is-a-metabot-why-should-you-choose-one-for-your-chatbot-project/.

Shah, I.Sh. (2021). What Is a Learning Agent? Artificial Intelligence Stack Exchange, 2021, https://ai.stackexchange.com/questions/8707/what-is-a-learning-agent.

TDS Editors. (2019). July Edition: Natural Language Processing." Medium, Towards Data Science, 2 July 2019, https://towardsdatascience.com/july-edition-natural-language-processing-272f28835af7.

Heidenreich, H. (2019). Neat: An Awesome Approach to Neuroevolution. Medium, Towards Data Science, 10 Jan. 2019, https://towardsdatascience.com/neat-an-awesome-approach-to-neuroevolution-3eca5cc7930f.

Wolfe, C. (2018). Understanding Compositional Pattern Producing Networks. Medium, Towards Data Science, 29 Dec. 2018, https://towardsdatascience.com/understanding-compositional-pattern-producing-networks-810f6bef1b88.

Srivastava, P., Khan, R. (2018). A review paper on cloud computing. International *Journal of Advanced Research in Computer Science and Software Engineering, 8*(6), 17-20.

Gayibov, A. (2022). Diseases Predictor from their symptoms
https://colab.research.google.com/drive/1waQTYeQqDbW93Jxb7mG3wNmHcg6FSMmn?usp=sharing