

# **COVID – 19 CHATBOT**

**A Project Report**

*for*

**Human Computer Interaction (CSE4015)**

**B. Tech**

*By*

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**Fall, 2020**

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**School of Computer Science and Engineering [SCOPE]**

**November, 2020**

## **Introduction:**

The coronavirus outbreak has major consequences for society worldwide. People are rightly concerned and have many urgent questions. The World Health Organization provides answers to frequently asked questions regarding the coronavirus on their website. However, one may have to search for a while before one can find the right answer to their question. It is vital that people are well informed about current measures. This way we can efficiently limit mass spread. A chatbot could perfectly help with this situation.

In this project, we are going to create a chatbot for questions regarding the coronavirus. We will be making this chatbot with the help of **Watson Studio**, which is an IBM-owned developer of human-computer interaction technologies based on natural language conversations. It is a natural language understanding platform that makes it easy to design and integrate a conversational user interface into your mobile app, web application, device, bot, interactive voice response system, and so on. Using **IBM Watson Studio**, one can provide new and engaging ways for users to interact with their product.

## **Abstract:**

It is often difficult for users to find relevant, specific information regarding the COVID-19 pandemic over the internet because of the sheer amount of information that is available. Apart from that the users have know way of knowing which website's information should be trusted and is accurate. The process for searching for answers to their queries can often be time consuming and tedious because of all these reasons. Therefore a COVID- 19 Chatbot which will be able to answer all COVID related queries would be efficient and less time consuming. The chatbot will be equipped to handle questions regarding the coronavirus. The chatbot will be using relevant and valid sources to answer any questions the user has. We will be making this chatbot with the help of Watson Studio. The IBM Watson Studio API will help better

understand the user's intent when they're communicating with our chatbot and that will be of a great help, as this is the main functionality needed to get a successful chatbot. This chatbot will be able to successfully answer any COVID-19 related queries that the user wishes to ask.

## **Stake Holder Analysis**

### **Types of Users:**

- ▶ **Beginners:** These users are the users who do not have much knowledge about COVID-19 and will have basic queries like symptoms of the disease etc.
- ▶ **Intermediate:** These users have a basic knowledge about the COVID - 19 situation but are in search of a little more detailed queries like quarantine period in different states in their country, queries regarding upcoming vaccines, covid hospitals in a particular area etc.
- ▶ **Expert:** These people are well knowledgeable with regards to the subject and have very specific queries like covid-19 statistics, mortality rates, recovery rates rules for interstate travel for a particular state, procedure for permissions etc.

### **Identifying Major Stakeholders**

- ▶ People with zero or no knowledge about Coronavirus – this can include small kids in the age group of 7 to 10 years – **Beginners**
- ▶ Patients suffering from Corona Virus – **Intermediate**
- ▶ Non-patients who are looking for safety measures and health centres – **Intermediate**
- ▶ Doctors and other Health Aid Workers – **Experts**
- ▶ Researchers and Analysts – **Experts**
- ▶ People working in Pharmaceutical Companies who want to keep themselves updated with the other vaccines available in the market – **Experts**

## **User Need Analysis:**

### **People**

- ▶ Most of the people using this website would be Beginners or Intermediates.
- ▶ Beginners would comprise of those people who do not use internet so frequently- They would need special assistance in terms of pop-ups and other que displays to help them guide through the website.
- ▶ Intermediates would comprise of those people who very well know how to use internet, but would still be new to this website.
- ▶ Some experts may also use the website who are looking for COVID-19 statistics. These users are well aware and know how to use the website inside out.

### **Activity**

- ▶ Most of the tasks performed by the Chatbot are frequent in nature. The Chatbot should be able to answer all the common queries related to COVID-19 such as:
  - What is the total death rate?
  - What are the total active cases?
  - What is the recovery rate?
  - Which are the nearest testing labs available?
  - Which website to connect to get a donor?
  - What are the important help line numbers?, etc.
- ▶ All these tasks should be well defined for the chatbot to understand them and need to be performed regularly in less amount of time. The

input data should also be up to date to provide the users with the correct statistics at all times.

## **Context**

This website is open to anyone who wants answers to the commonly asked queries regarding CVOID-19.

## **Technology**

### ► **Input:**

The Input devices used would comprise of Mouse and Keyboard

### ► **Output:**

The output would be in the form of a display text.

## **Functional and Non-Functional Requirements**

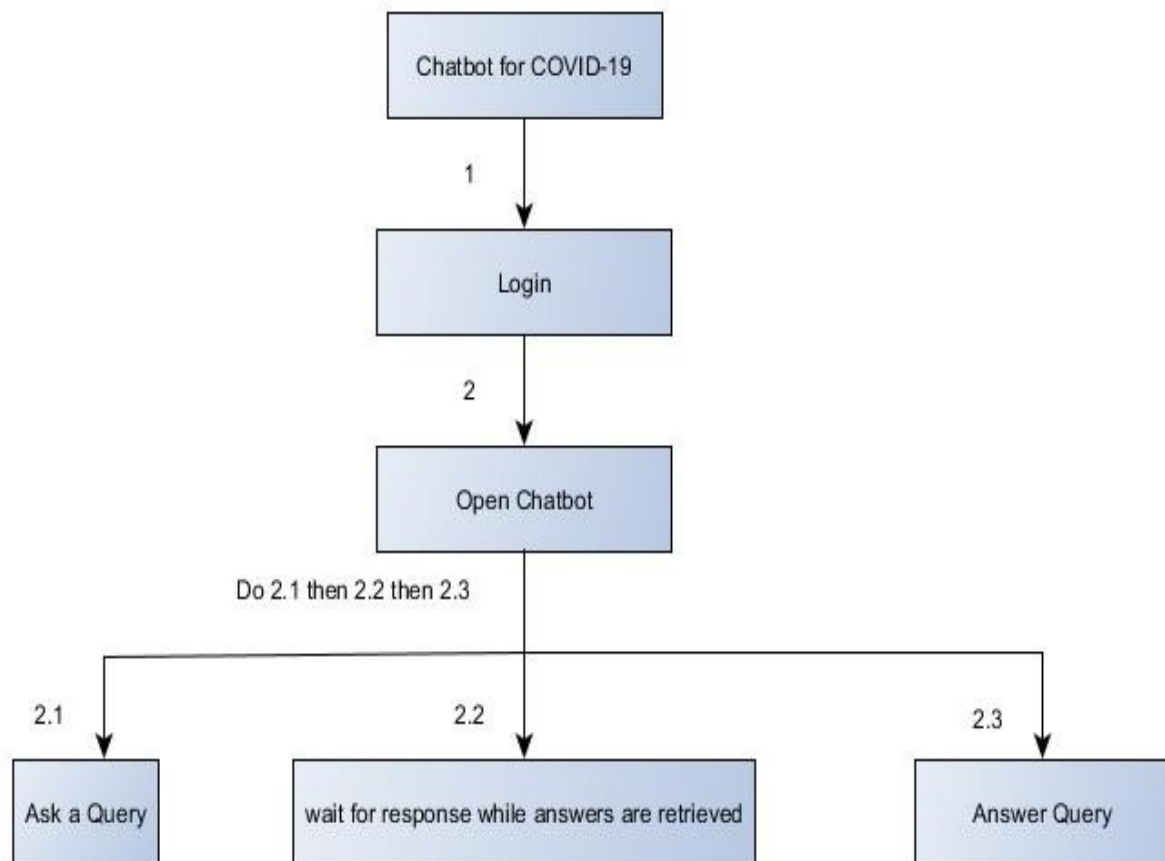
### ***Functional Requirements:***

- Real time data – COVID-19 Statistics
- Information extraction from database
- Generic Answer Construction
- Accuracy– The data provided should be accurate

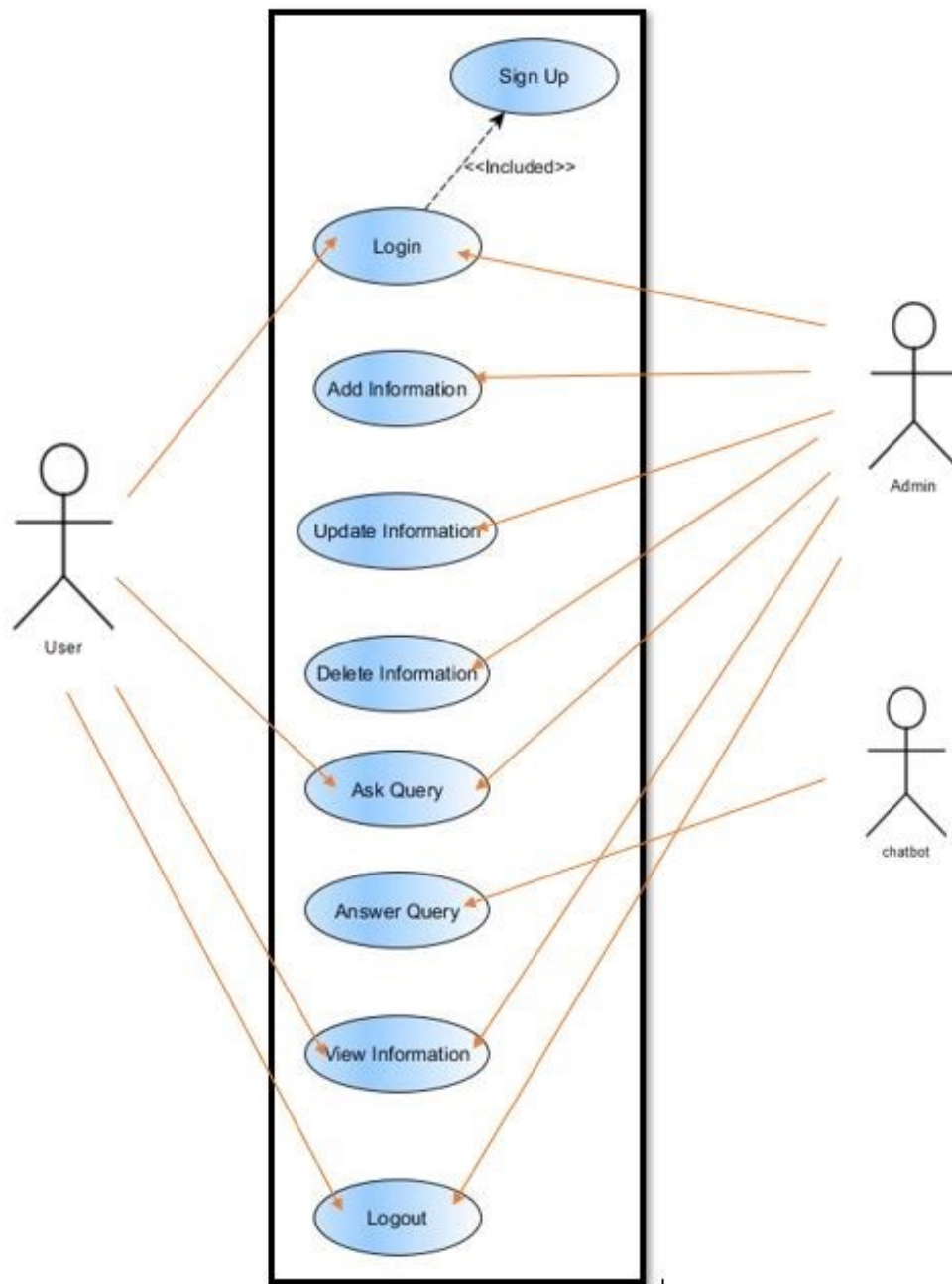
### ***Non-Functional Requirements:***

- Security features for Login
- Fast Response – Reducing the time of response for each event

## **Hierarchical Task Analysis:**



**Use case diagram:**



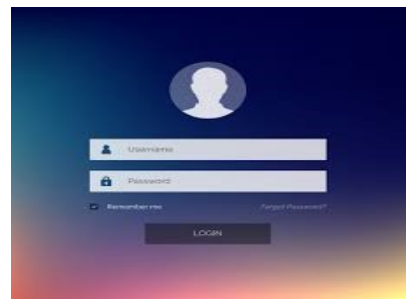
## Story Boarding

①



User Visits Website

②



Login

③



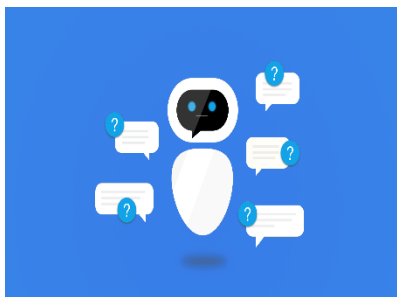
Activation of Chatbot

④



User Asks COVID-19 related Query

⑤



Chatbot Answers Query

⑥



Logout



## Stakeholder Profile:

### Context of Use

**Motivation**

☒ Discretionary  
☐ Mandatory

**Frequency of Use**

☐ Non-User  
☐ Infrequent  
☒ Frequent

**User Category**

☒ Beginner  
☒ Intermediate  
☒ Expert

**Task Nature**

☐ Mission Critical  
☒ Calm

**Interaction Mode**

☒ Direct  
☐ Indirect

☐ Continuous  
☒ Intermittent

**Social Environment**

☒ Public  
☐ Personal

☐ Colaborative  
☒ Individual

☒ Work  
☐ Entertainment

☐ Synchronous  
☐ Asynchronous

**Physical Environment**

☒ Indoor  
☐ Outdoor

**Auditory (Noise Level)**  
1 = Low 5 = High  
1 2 3 4 5

**Visual Quality**  
1 = Poor 5 = Good  
1 2 3 4 5

**Haptic**

☐ Constrained  
☒ Free

**Technical Environment**

☒ Networked  
☐ Isolated

☐ Wired  
☒ Wireless

☐ Intranet  
☐ Extranet  
☒ Internet

☒ PAN  
☒ LAN  
☒ MAN  
☒ WAN

☐ Fixed  
☒ Mobile

☐ Peripherals  
☒ Contained

## GUI and KLM

### 1. GUI : Login

<b>M</b>	
<b>P</b>	Point mouse to the username field
<b>BB</b>	Click on "username" with mouse click
<b>M</b>	
<b>H</b>	Switch from mouse to keyboard
<b>nK</b>	Enter username by pressing n keys
<b>M</b>	
<b>P</b>	Point mouse to the password field
<b>BB</b>	Click on "password" with mouse click
<b>M</b>	
<b>H</b>	Switch from mouse to keyboard
<b>nK</b>	Enter password by pressing n keys

**Login**

Username

Password

login

<b>M</b>	
<b>P</b>	Point mouse to login button
<b>BB</b>	Click on Login with mouse click

***KLM Equation:***  $5M + 3P + 4B + 2H + 2(n+1)K$

***Execution time for Expert Typist*** =  $11.49 + 2n$

***Execution Time for Poor Typist*** =  $11.81 + 2n$

***Execution Time for Non Typist*** =  $13.65 + 2n$

## 2. GUI: Sign Up

<b>M</b>	
<b>P</b>	Point mouse to the Name field
<b>BB</b>	Click on “name” with mouse click
<b>M</b>	
<b>H</b>	Switch from mouse to keyboard
<b>nK</b>	Enter name by pressing n keys
<b>M</b>	
<b>P</b>	Point mouse to the username field
<b>BB</b>	Click on “username” with mouse click
<b>M</b>	
<b>H</b>	Switch from mouse to keyboard
<b>nK</b>	Enter username by pressing n keys
<b>M</b>	
<b>P</b>	Point mouse to password field
<b>BB</b>	Click on “password” with mouse click
<b>M</b>	
<b>H</b>	Switch from mouse to keyboard
<b>nK</b>	Enter password by pressing n keys
<b>M</b>	
<b>P</b>	Point mouse to confirm password field
<b>BB</b>	Click on “confirm password” with mouse click
<b>H</b>	Switch from mouse to keyboard
<b>nK</b>	Enter password by pressing n keys
<b>M</b>	
<b>P</b>	Point at signup button
<b>BB</b>	Click on “sign up” with mouse click

**KLM Equation:**  $8M + 5P + 10B + 4H + 4(n+1)K$

**Execution time for Expert Typist** =  $19.38 + 4K$

**Execution Time for Poor Typist** =  $20.02 + 4K$

**Execution Time for Non Typist** =  $23.7 + 4K$

### 3. GUI: Chatbot Query

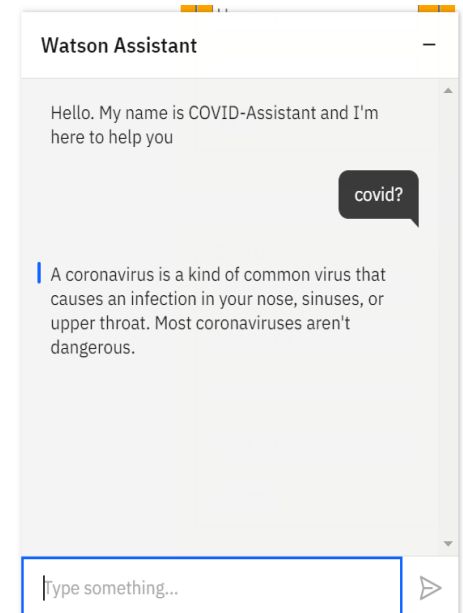
<b>M</b>	
<b>P</b>	Point to the chatbot icon
<b>BB</b>	To open chatbot with mouse click
<b>M</b>	
<b>H</b>	Switch from mouse to keyboard
<b>nK</b>	Enter a query by pressing n keys
<b>K</b>	Press Enter to ask the Question
<b>M</b>	Wait for reply

**KLM Equation:**  $3M + P + 2B + H + (n+1)K$

**Execution time for Expert Typist** =  $5.87 + 0.12K$

**Execution Time for Poor Typist** =  $6.03 + 0.28K$

**Execution Time for Non Typist** =  $6.95 + 1.2K$



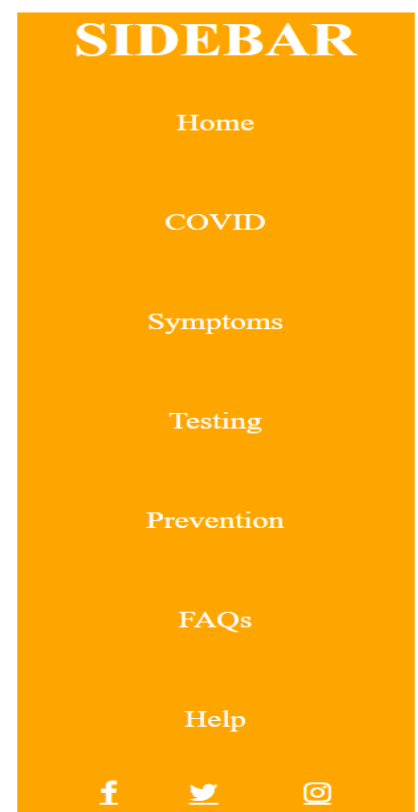
### 4. GUI: Retrieving information through sidebar

<b>M</b>	
<b>P</b>	Point at the Sidebar Category
<b>BB</b>	Click on the category
<b>M</b>	Look for information
<b>P</b>	Point to the sub-topic
<b>BB</b>	Click on the sub-topic link
<b>M</b>	

**KLM Equation:**  $3M + 2P + 4B$

**Execution time for Expert Typist** = 6.65

**Execution Time for Poor Typist** = 6.65



***Execution Time for Non Typist = 6.65***

***Here the time of execution for different types of typist will be the same as the KLM equation is independent of K***

## **Activity and GOMS**

### **1. Activity 1: Login**

Goal: To enter login credentials

Goal: to enter Username in login page

Operator: point mouse to username field

Operator: click on Username field

Operator: Type your username

Goal: To enter password and login

Operator: move mouse to password field

Operator: click on password field

Operator: Type in your password

Operator: move mouse to login button

Operator: click on login button

Operator: wait for login access

### **2. Activity 2: Sign Up**

Goal: To sign up as user

Goal: Enter name and username

Operator: move mouse to name field

Operator: click on name field

Operator: enter your name

Operator: Move mouse to username field

Operator: click on username field

Operator: enter username

Goal: Enter password and confirm password;

Operator: move mouse to password field

Operator: click on password field

Operator: enter password

Operator: move mouse to confirm password field

Operator: click on confirm password field

Operator: enter your password again

Goal: to submit signup credentials:

Operator: move mouse to submit button

Operator: click on submit button

### **3. Activity 3: Answering a query**

Goal: To answer User Query

[Select Goal: Access Data through sidebar

Operator: Move mouse to the sidebar

Operator: Scroll down to the desired section

Operator: Click on the section

Operator: Scroll down to the answer

Select Goal: Answer query through chatbot

Operator: Move mouse to the chatbot icon

Operator: Click on the chatbot Icon

Operator: Type your query

Operator: Wait for the Chatbot to answer]

### **4. Activity 4: User Feedback**

Goal: To Enter user feedback

Goal: To use Chatbot

Operator: Move mouse to the chatbot icon

Operator: Click on the chatbot Icon

Operator: Type your query

Operator: Wait for the Chatbot to answer

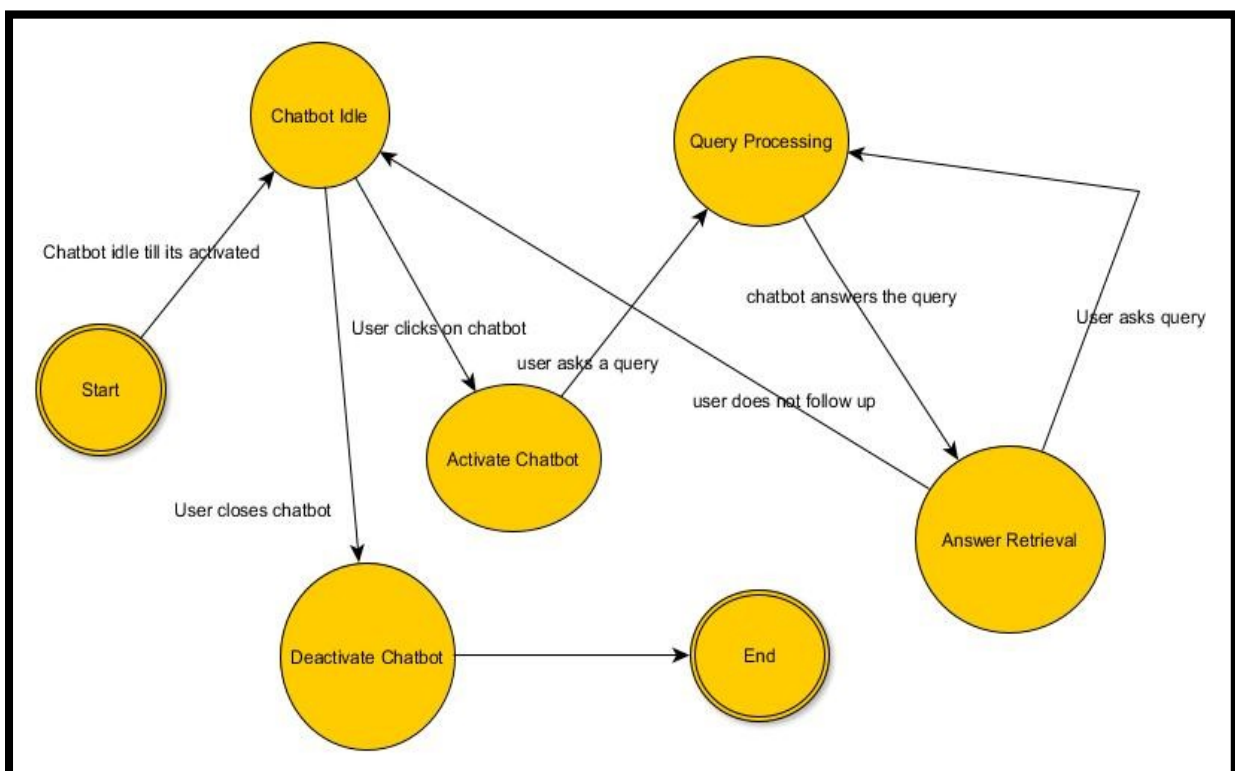
Operator: Close chatbot

Goal: Enter Feedback

Operator: Click on rating

Operator: Click on submit

## **State Transition Diagram for Project**



## **Guidelines followed:**

### **1. Login**

- ▶ ***Strive for Consistency*** : the login GUI has a fixed layout and procedure for operation
- ▶ ***Cater to a wide range and type of Users***: very easy to use; username and password only need to be types directly in the fields
- ▶ ***Offer simple error handling***: the login page shows error messages if wrong username and password are entered
- ▶ ***Permit easy reversal of actions***: A user can always go back and change their username or password if they entered it wrong
- ▶ ***Reduce Short Term Memory Load***: The content displayed on the login page is pretty straightforward and simple to recognize which reduces the memory load of the user

### **2. Sign Up**

- ▶ ***Strive for Consistency*** : the sign up GUI has a fixed layout and procedure for operation
- ▶ ***Cater to a wide range and type of Users***: very easy to use; name, username and password and confirm password only need to be typed directly in the fields
- ▶ ***Offer simple error handling***: the signup page shows error messages if the field requirements are not met
- ▶ ***Permit easy reversal of actions***: A user can always go back and change their username or password or any of the fields if they entered it wrong
- ▶ ***Reduce Short Term Memory Load***: The content displayed on the signup page is pretty straightforward and simple to recognize which reduces the memory load of the user

### 3. GUI: Chatbot Query

- ▶ **Strive for Consistency** : the Chatbot GUI has a fixed layout and procedure for operation
- ▶ **Cater to a wide range and type of Users:** a query can be asked by pressing the send button as well as by pressing “Enter: key as a shortcut
- ▶ **Offer Informative feedback:** the chatbot shows **3 dots** as sign that it is processing the query. If it is not able to answer the query, it asks for a follows up question
- ▶ **Design Dialog to yield closure:** when the user says bye, the chatbot also replies by saying bye indicating that the user is done asking for queries
- ▶ **Prevent Errors:** A user may mis-spell words, but the chatbot is trained in a way that it is able to automatically assess what the user is asking for
- ▶ **Support Internal Locus of Control:** the user is always aware that in what state he/she is in as he can read the previously asked questions and answers generated by the chatbot

### 4. GUI: Retrieving Info through Sidebar

- ▶ **Strive for Consistency** : the Sidebar GUI has a fixed layout and procedure for operation on all the pages
- ▶ **Cater to a wide range and type of Users:** a sidebar can be operated using mouse and clicks as well as using the up-down arrow keys by an expert user
- ▶ **Offer Informative feedback:** The selected section on which the user goes gets highlighted. Moreover the user can see the page loading in the web browser.
- ▶ **Prevent Errors:** A user can always go back and refer a different section from the sidebar



- ▶ ***Support Internal Locus of Control:*** the user is always aware that in what state he/she is in as the current section gets highlighted in the sidebar.
- ▶ ***Reduce Short Term Memory Load:*** The content displayed on the sidebar acts as a means of Recognition which reduces the memory load of the user
- ▶ ***Permit easy reversal of actions:*** A user can always go back and refer a different section from the sidebar

## **Textual Notations:**

### **Event Based Textual Notation:**

#### **1. Login:**

Ent-username and password -> check\_database

Username and Password correct -> request\_valid

C-point login -> login\_successful <Home Page>

Username and Password incorrect -> request\_invalid

C-point login -> login\_failed <Login Page>

#### **2. Signup:**

Ent-username, name and password -> check\_database

Username is unique -> request\_valid

C-point signup -> signup\_successful <Home Page>

Username is not unique -> request\_invalid

C-point signup -> signu\_failed <Signup Page>

#### **3. Chatbot Query**

C-point icon -> chatbot\_activate

type-query -> disp\_query <Text box with query>

C-point enter-> process\_query <Three processing dots>

wait for response -> disp\_query results <Answer displayed in window>

C-point close -> chatbot\_deactivate

## Testing Report

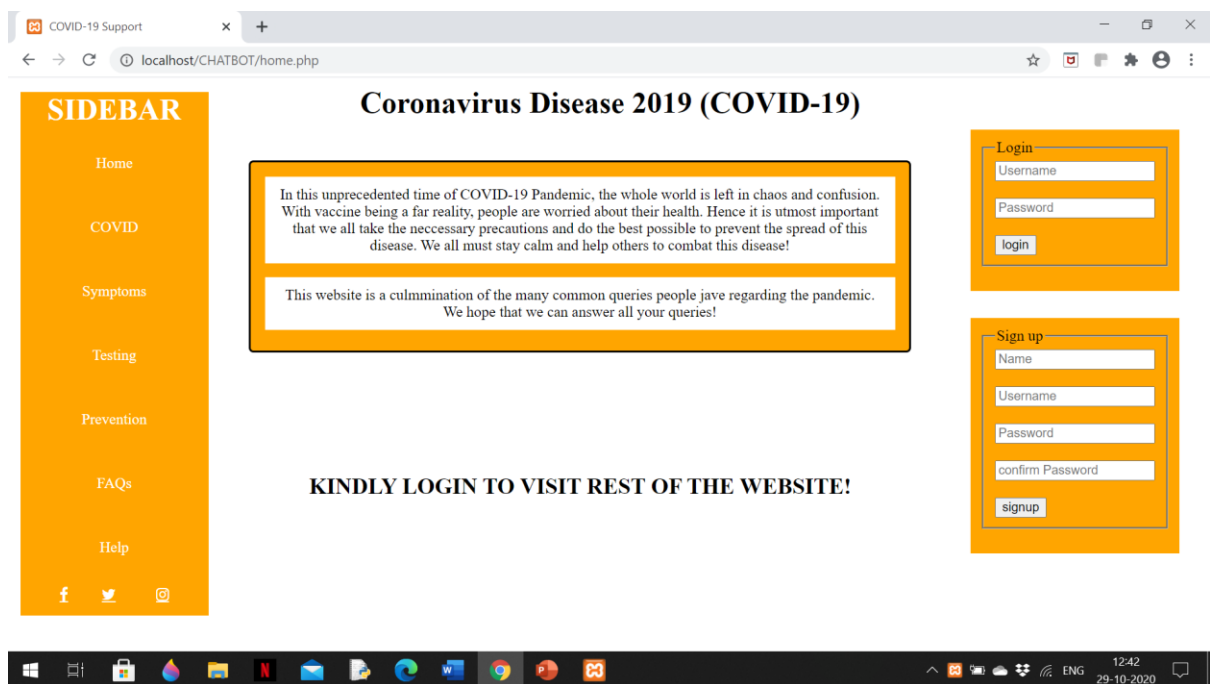
Test Case ID	Test Scenario	Test Steps	Test Data	Expected results	Actual Results	Pass/Fail
TC1	Successful login redirects to Home page	Enter Username and Password	Username = username in database and password = Password in database	Redirects to Home page	Redirects to Home Page	<i>Pass</i>
TC2	Successful signup redirects to the Home page	Enter Username, Password, Name and confirm password	If Username is unique	Redirects to Home Page	Redirects to Home Page	<i>Pass</i>
TC3	Home Page	Click on Home Page URL	Should find Home Page URL	Opens Home page	Opens Home Page	<i>Pass</i>
TC4	COVID Page	Click on COVID Page URL	Should find COVID Page URL	Opens COVID page	Opens COVID Page	<i>Pass</i>
TC5	Symptoms Page	Click on Symptoms Page URL	Should find Symptoms Page URL	Opens Symptoms page	Opens Symptoms Page	<i>Pass</i>
TC6	Testing page	Click on Testing Page URL	Should find Testing Page URL	Opens Testing page	Opens Testing Page	<i>Pass</i>
TC7	Prevention Page	Click on Prevention Page URL	Should find Prevention Page URL	Opens Prevention page	Opens Prevention Page	<i>Pass</i>

TC8	FAQs Page	Click on FAQs Page URL	Should find FAQs Page URL	Opens FAQs page	Opens FAQs Page	<i>Pass</i>
TC9	Help Page	Click on Help Page URL	Should find Help Page URL	Opens Help page	Opens Help Page	<i>Pass</i>
TC10	Chatbot Query	Click on chatbot icon And ask a query	Chatbot process query and retrieves answer for the query	Chatbot answers the query	Chatbot answers the query	<i>Pass</i>

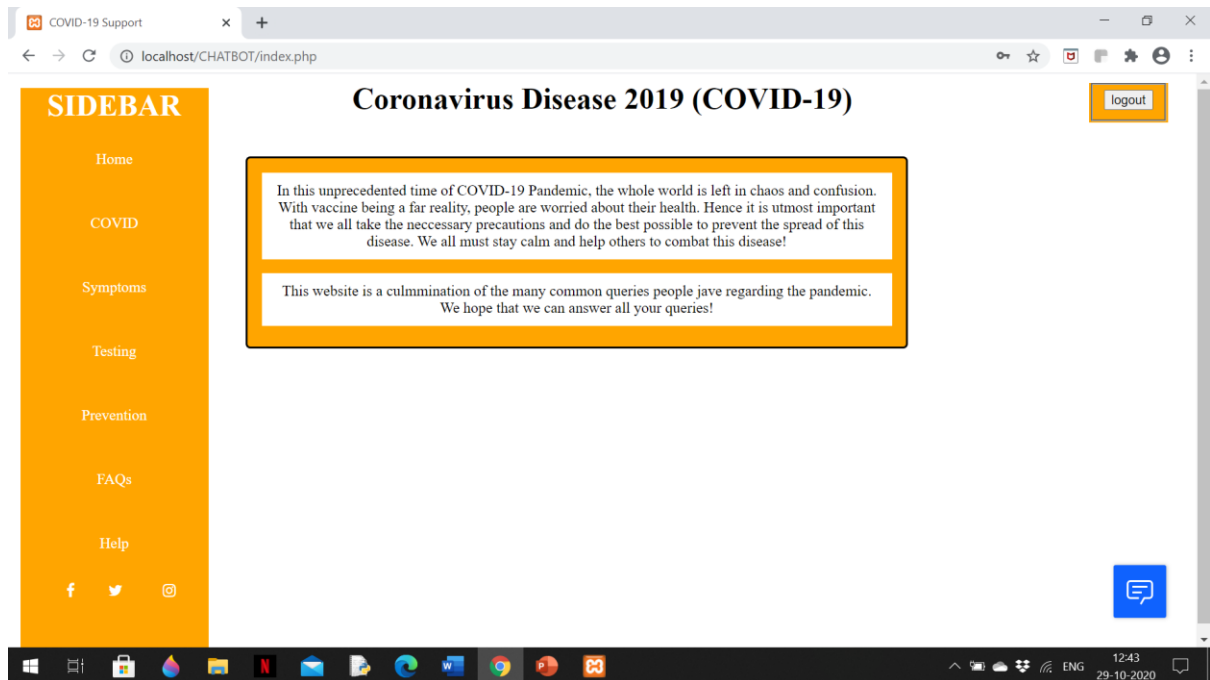
## Output Screenshots

### Website Outlook

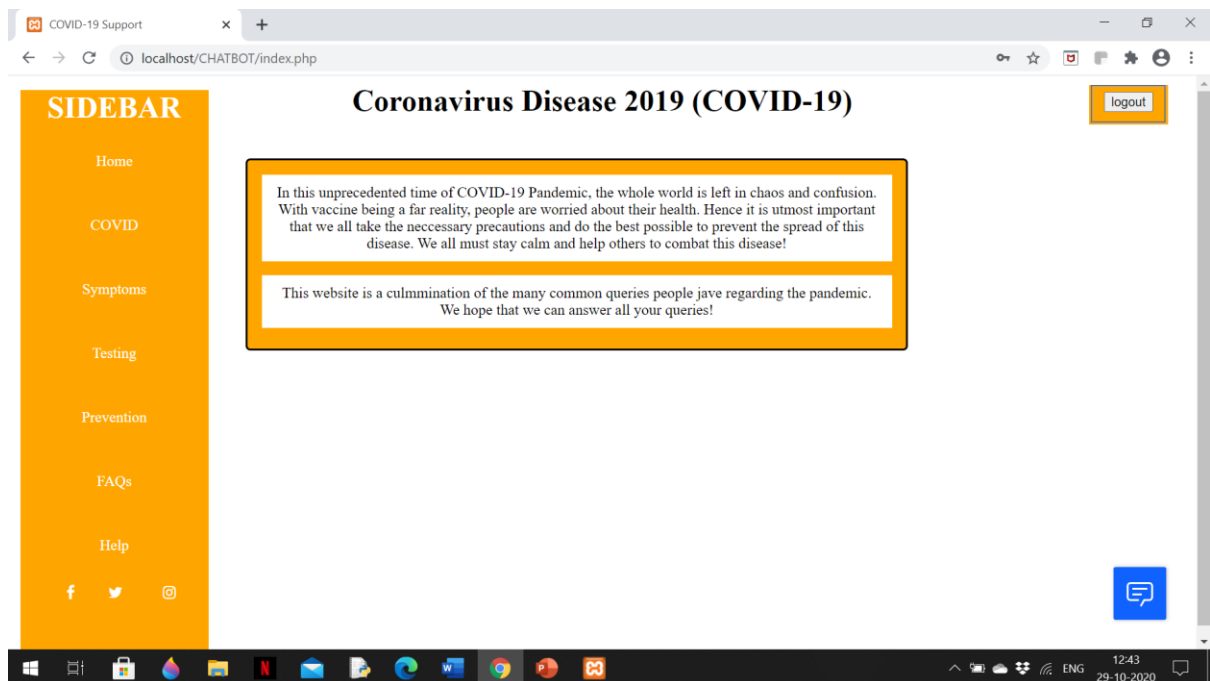
#### *Login and Signup Page*

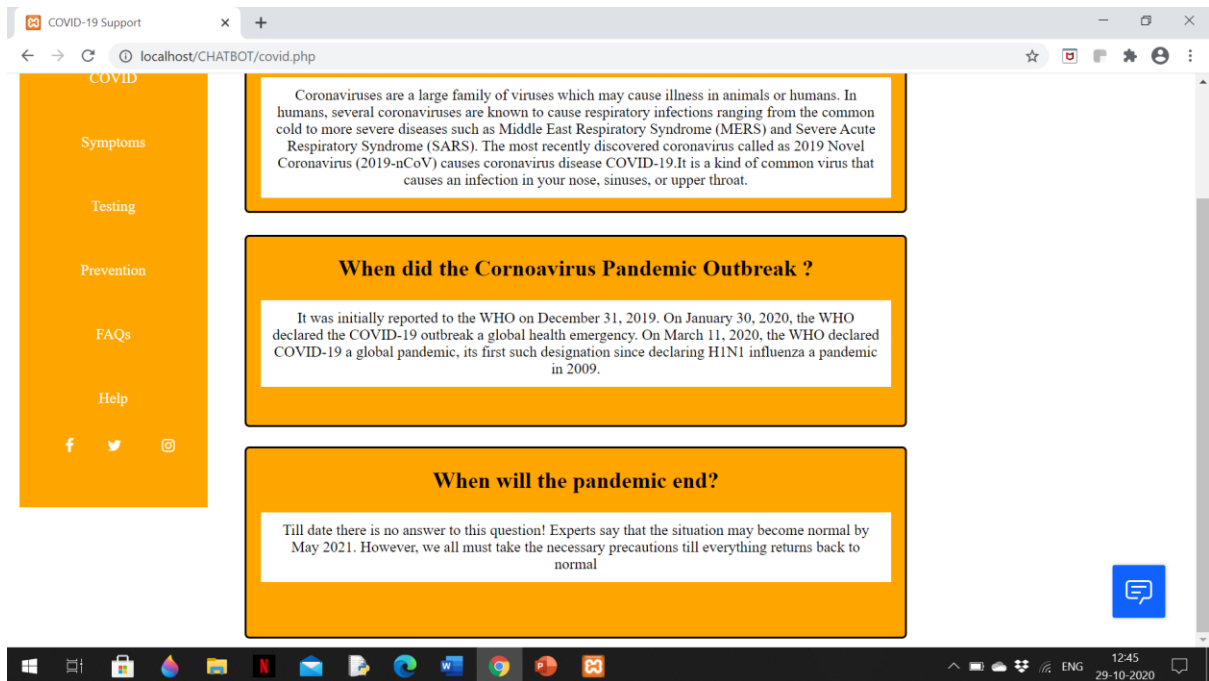


## Home page

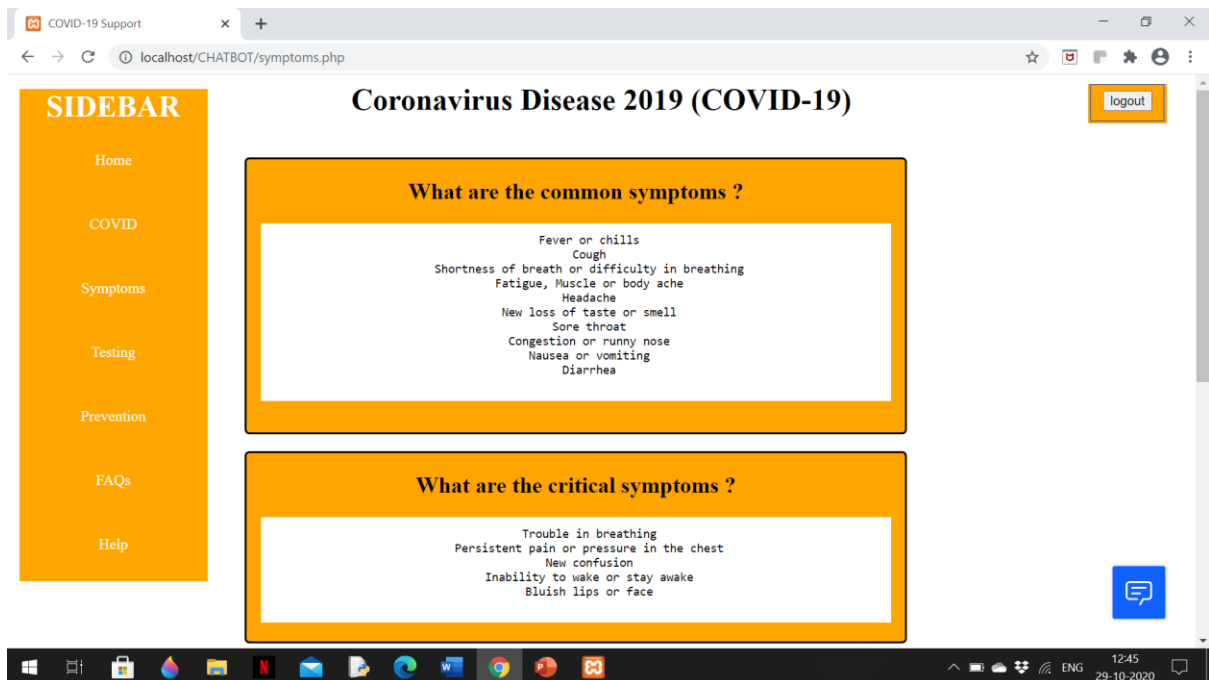


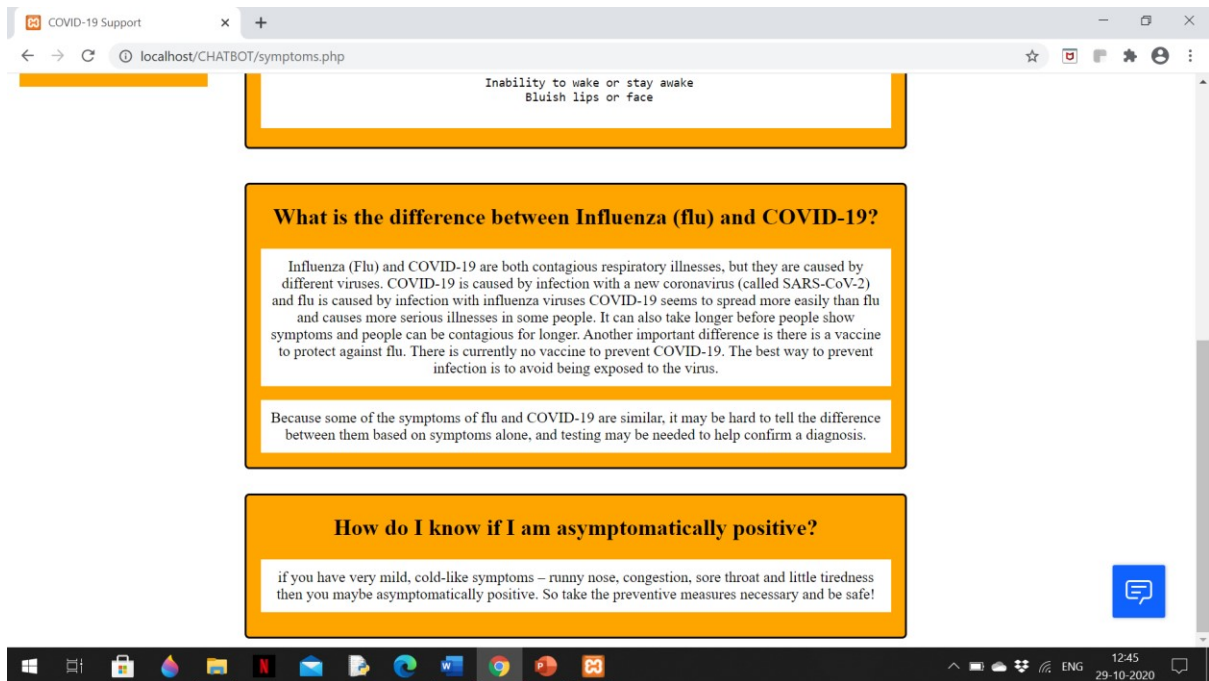
## COVID page



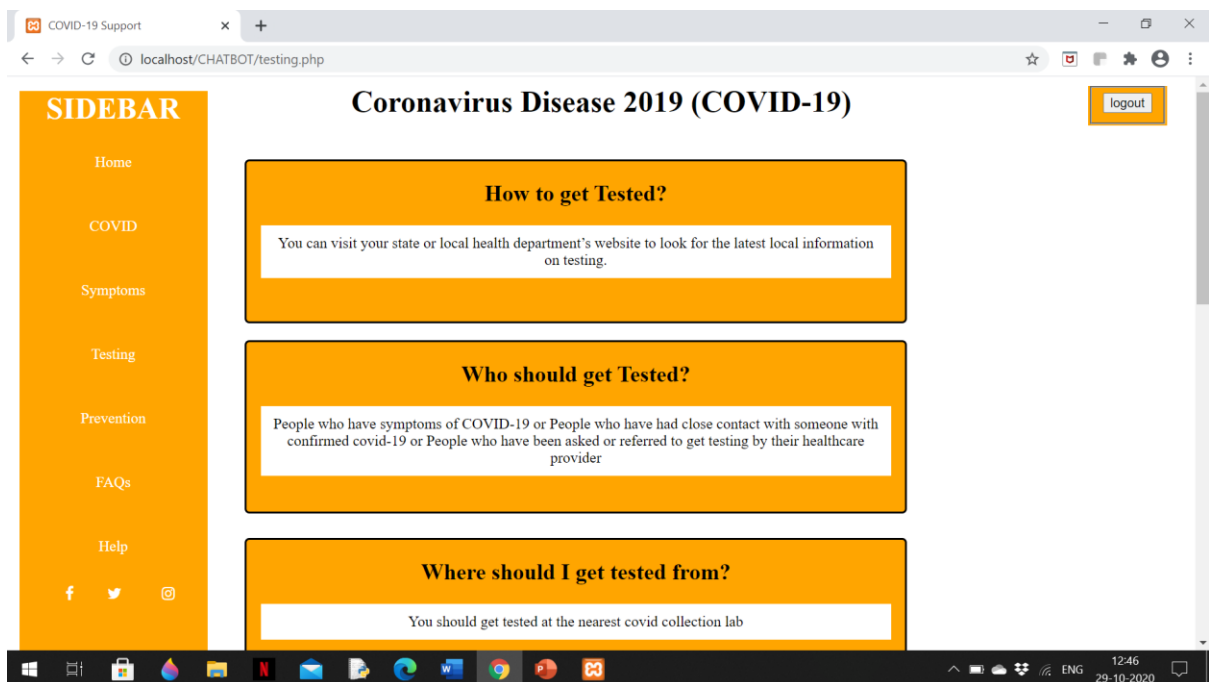


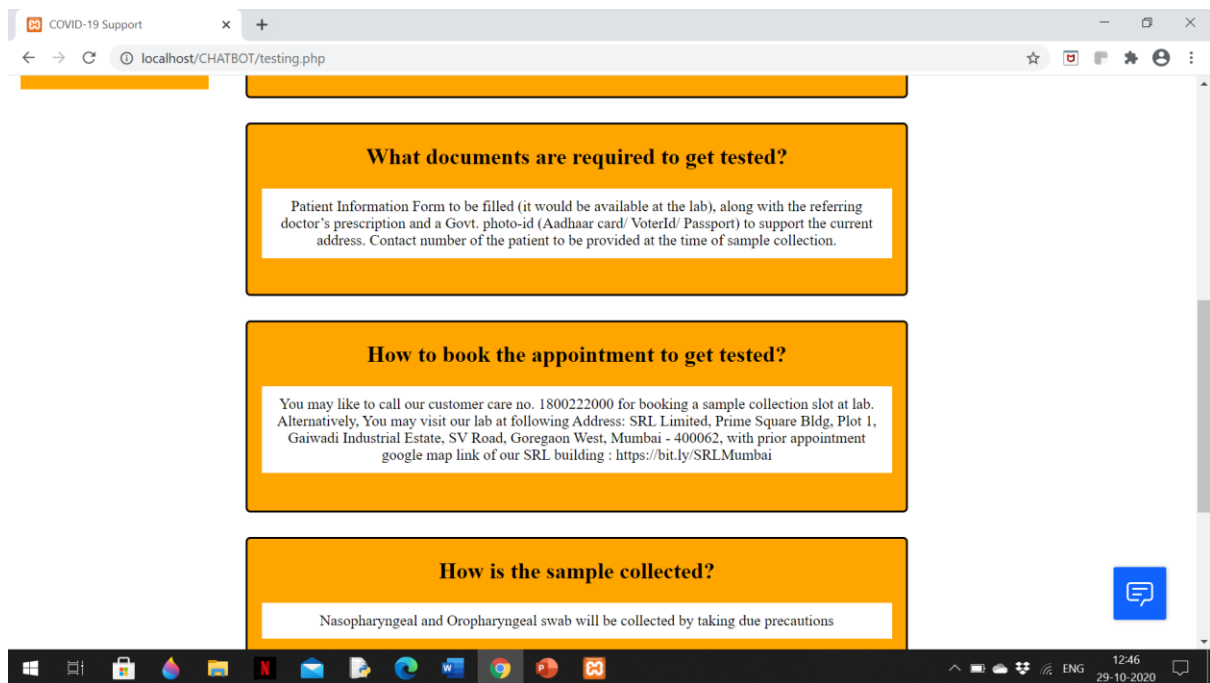
## ***Symptoms page***



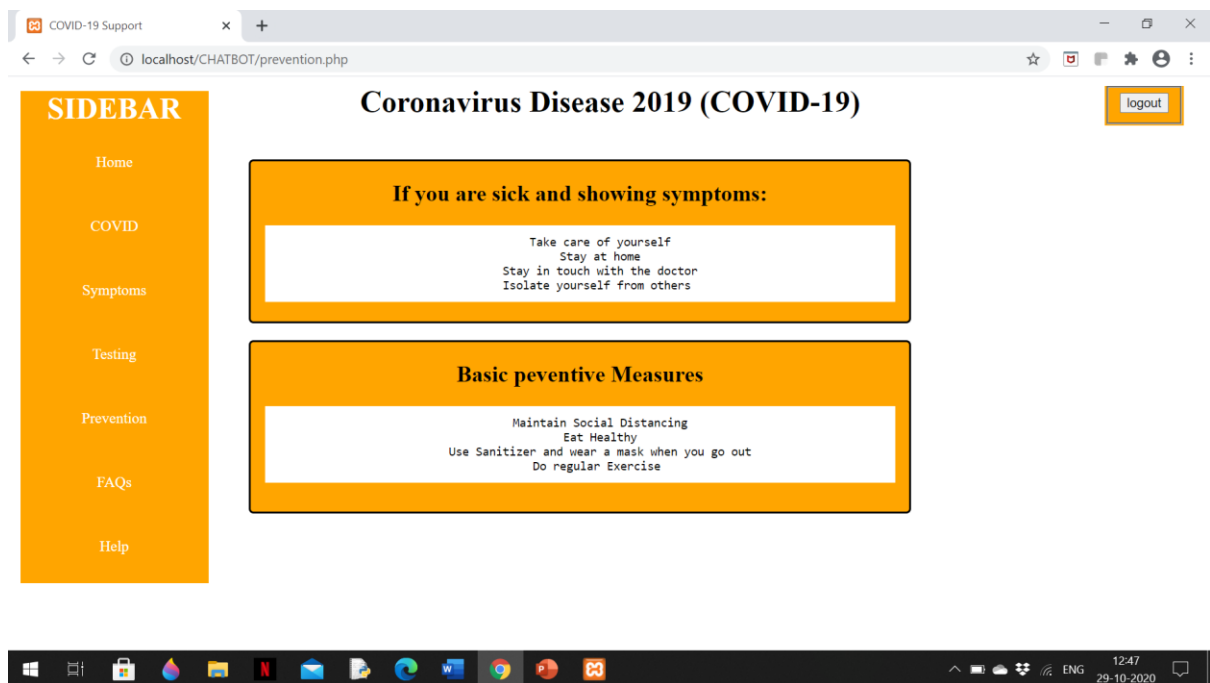


## Testing





## ***Prevention***



## FAQs Page

COVID-19 Support

localhost/CHATBOT/faq.php

**SIDEBAR**

- Home
- COVID
- Symptoms
- Testing
- Prevention
- FAQs
- Help

**Coronavirus Disease 2019 (COVID-19)**

**Which all vaccines are available?**

To date, just two coronavirus vaccine has been approved. Sputnik V – formerly known as Gam-COVID-Vac and developed by the Gamaleya Research Institute in Moscow

**Waht are the total confirmed Cases in India?**

7.99 Million

**What is the current Death Rate in India?**

1.5 %

logout

COVID-19 Support

localhost/CHATBOT/faq.php

**COVID**

- Symptoms
- Testing
- Prevention
- FAQs
- Help

**To date, just two coronavirus vaccine has been approved. Sputnik V – formerly known as Gam-COVID-Vac and developed by the Gamaleya Research Institute in Moscow**

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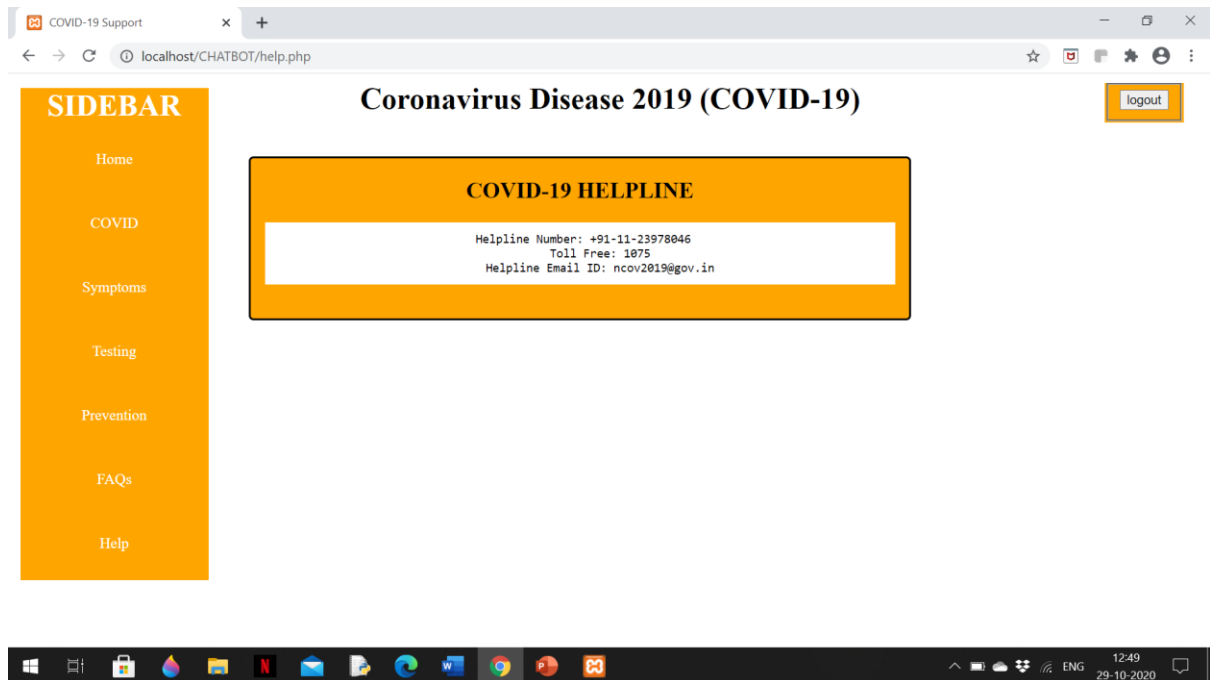
1.5 %

**What is the current Recovery Rate in India?**

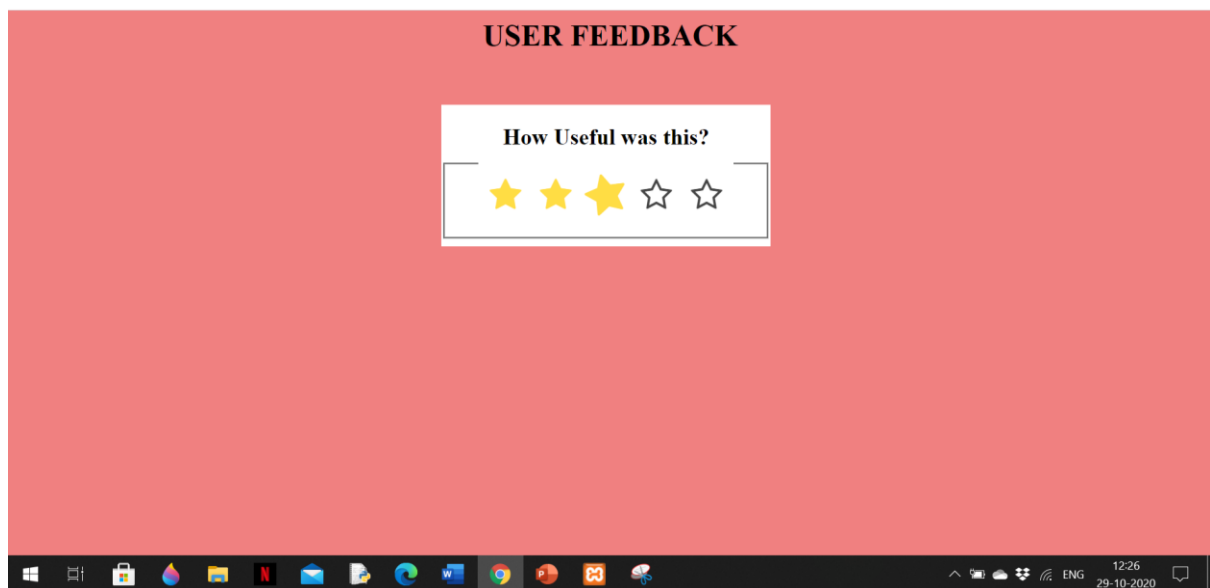
90 %



## ***Help Page***

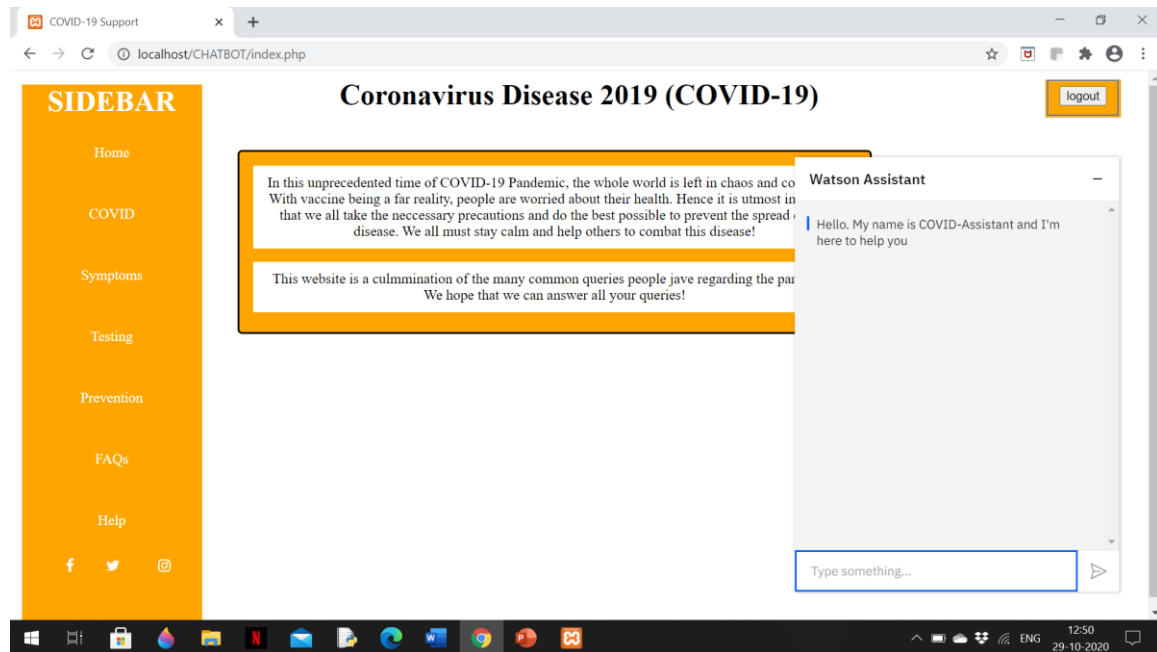


## ***Feedback page:***

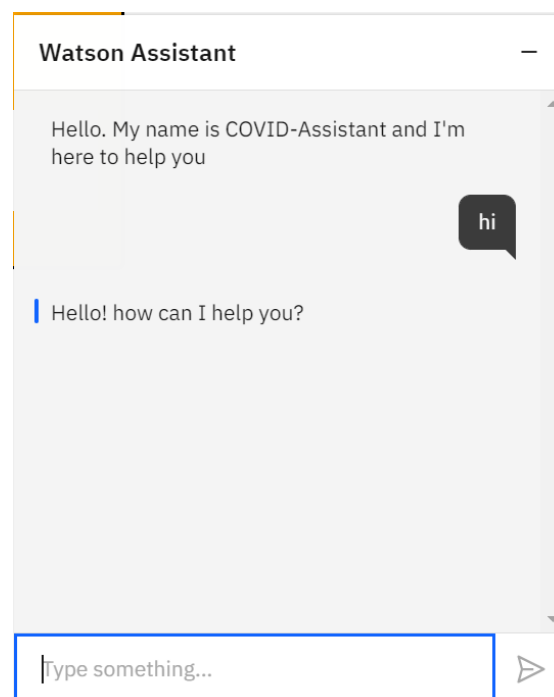


# CHATBOT

## *Chatbot Initialisation:*

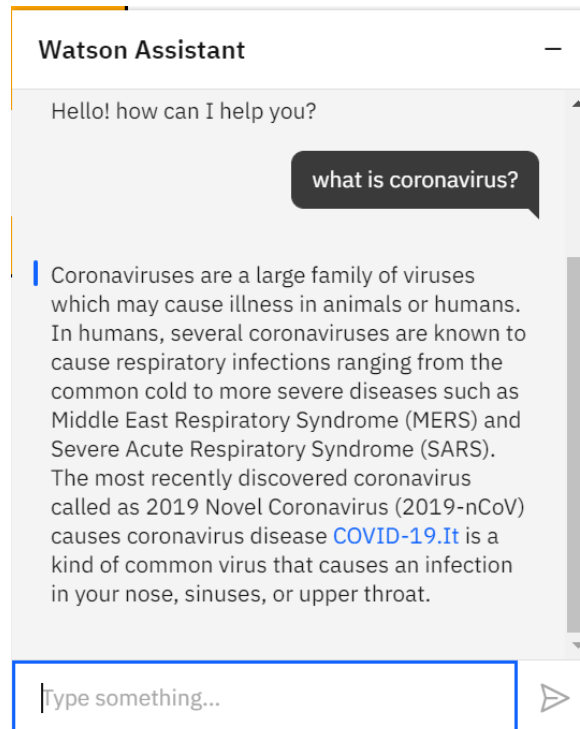


## *Greeting the chatbot:*

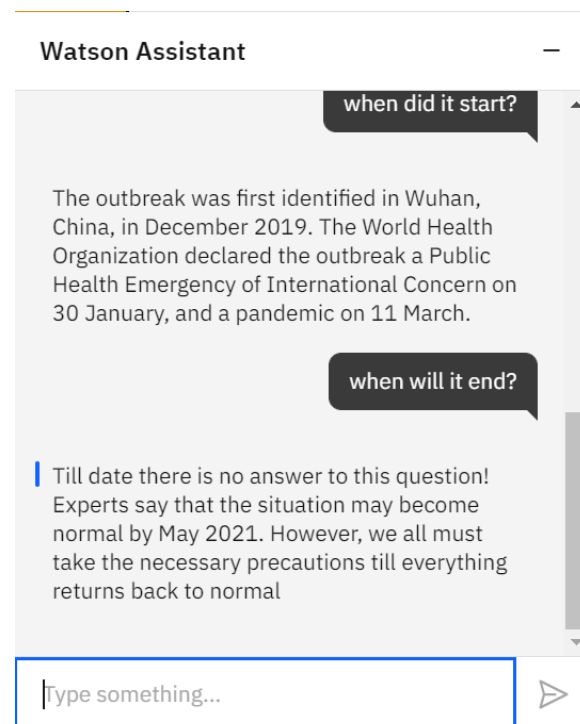


## ***Asking queries:***

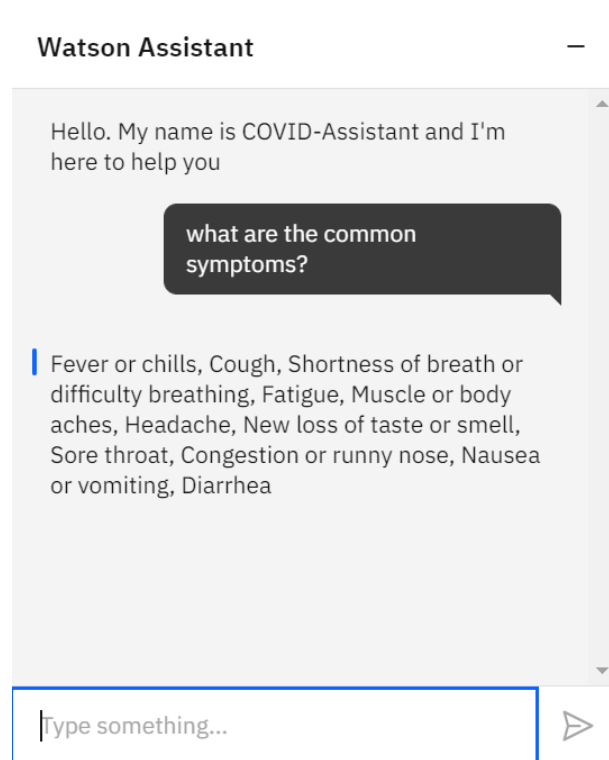
### ► *About coronavirus*



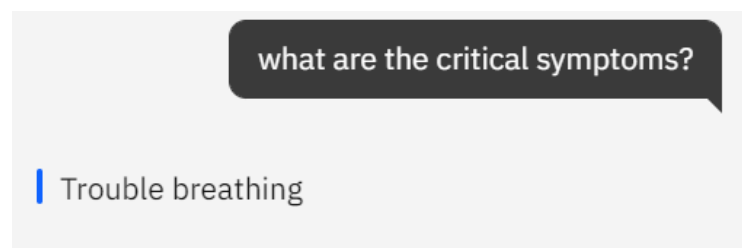
### ► *Some more information about the pandemic*



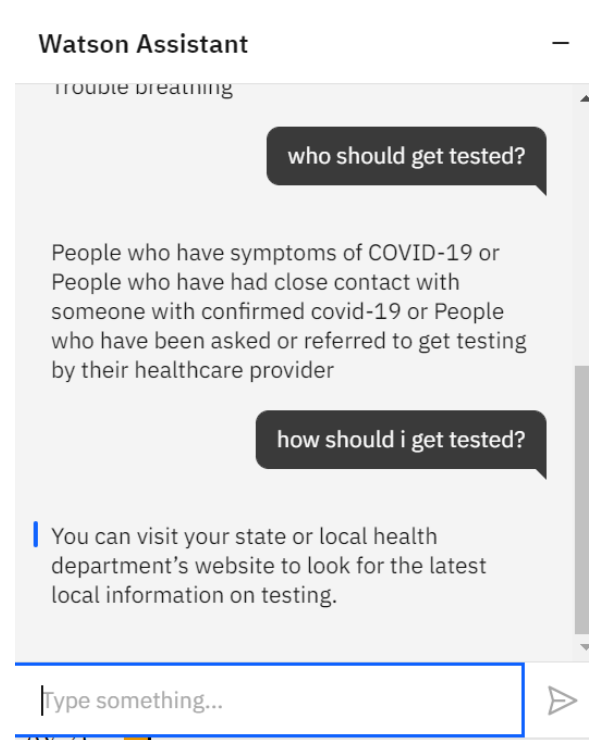
► *What are the common symptoms?*



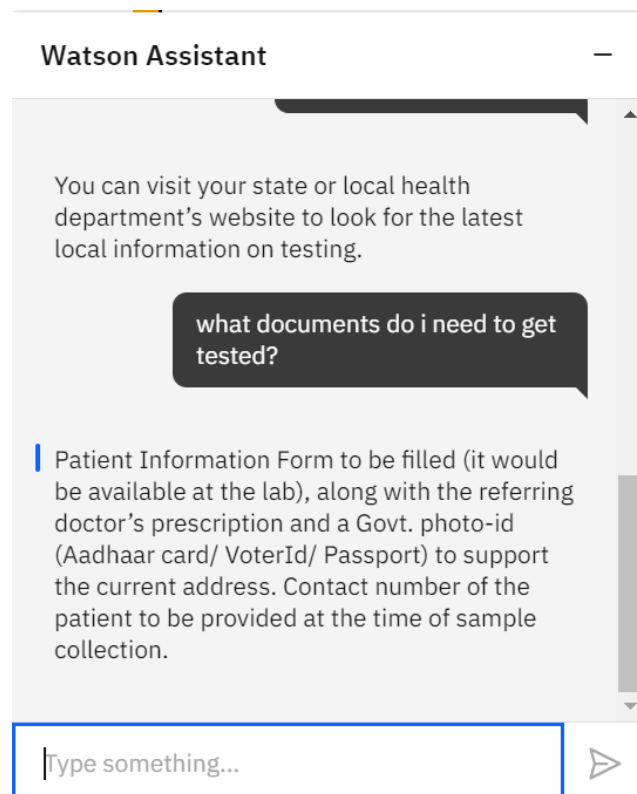
► *What are the critical symptoms?*



► *Who should get tested and how should they be tested?*



► *What documents are required for testing?*



► *What preventive measures should I take?*

Watson Assistant

collection.

what preventive measures should i take?

Are you feeling sick?

Yes

No

Yes

Take care of yourself, Stay at home, Stay in touch with the doctor, Isolate yourself from others

Type something...

Watson Assistant

others

what preventive measures should i take?

Are you feeling sick?

Yes

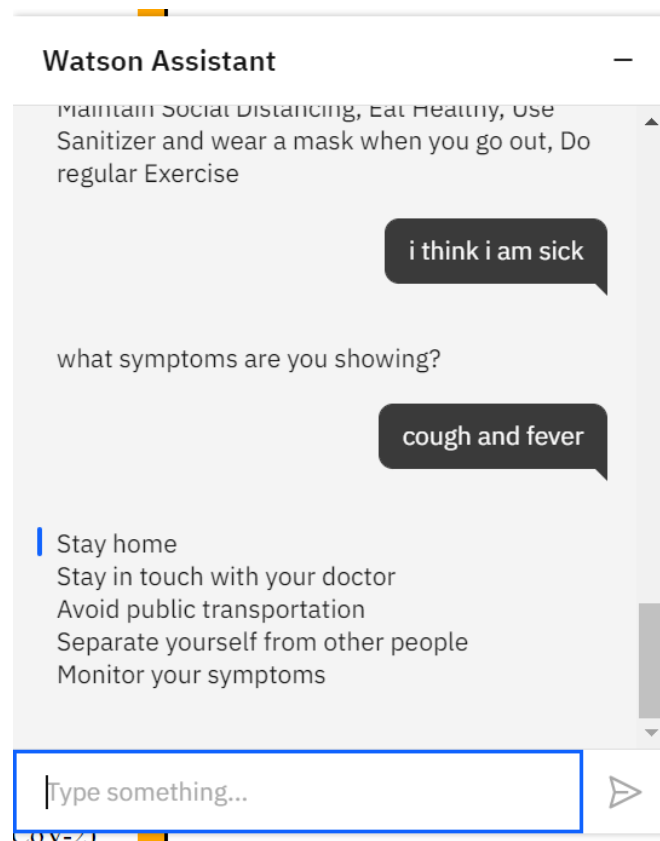
No

No

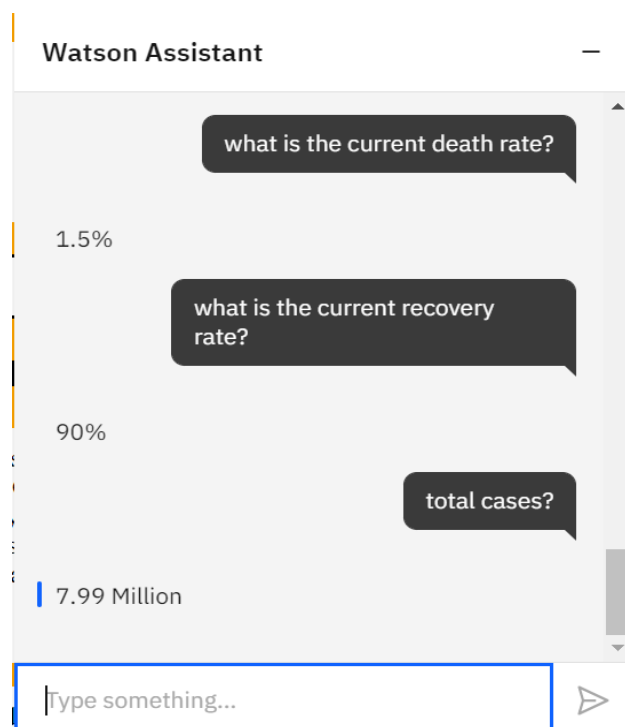
Maintain Social Distancing, Eat Healthy, Use Sanitizer and wear a mask when you go out, Do regular Exercise

Type something...

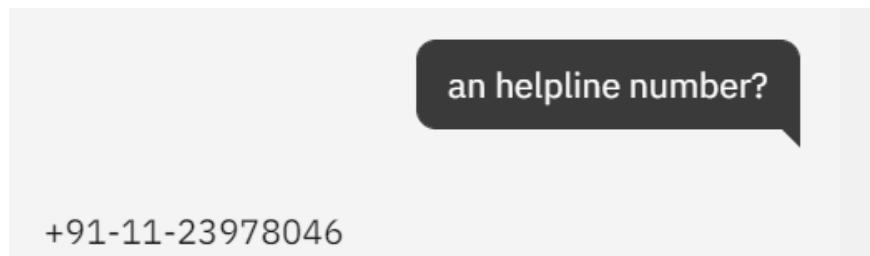
► *I think I am Sick*



► *What is the current death rate, recovery rate and the total number of cases?*



► *Any Helpline Number?*



***Culminating the conversation***

