COVID-19 Screening Tool

Project Idea

A conversational AI (Chatbot) built with python and natural language processing models to address the COVID-19 pandemic problems faced by patients and doctors.

Detailed Description:

Basically this Chatbot idea solves two problems

1. Before the patients come to the hospital, let them take an appointment going to this website - Let the Chatbot asks a question like - Why the patient is visiting? What symptoms does he have? Like cough, cold or fever? Basically this app will decide what patients have to be really tested with COVID-19 sample kit So this solves the problem of COVID-19 kits shortage going on right now.

2. To reduce the workload to the doctor, let Chatbot answer the patient queries instead of a Doctor for all repetitive questions. If Chatbot couldn't answer then let's give an option to a patient to go to Doctor or Wait for the doctor to answer your question.

The bot will take care of conversation and triggering messages automatically between hospital members. The chatbot can suggest the nearby clinics or hospitals that can be consulted and the timings when the doctor is available.

Implementation:

There can be two ways to implement Chatbot:

1.Rule-based approach and 2. Self-learning bots.

We are planning to create self-learning bots that involve machine learning concepts since the Rule-based approach addresses only simple queries and fails to manage complex ones. We are trying to avoid NLTK as much as possible since it has all pre-built methods and try to use Natural Language processing models like Language Models and Hidden Markov Principles.

Project Requirements

click==7.1.1

Flask==1.1.1

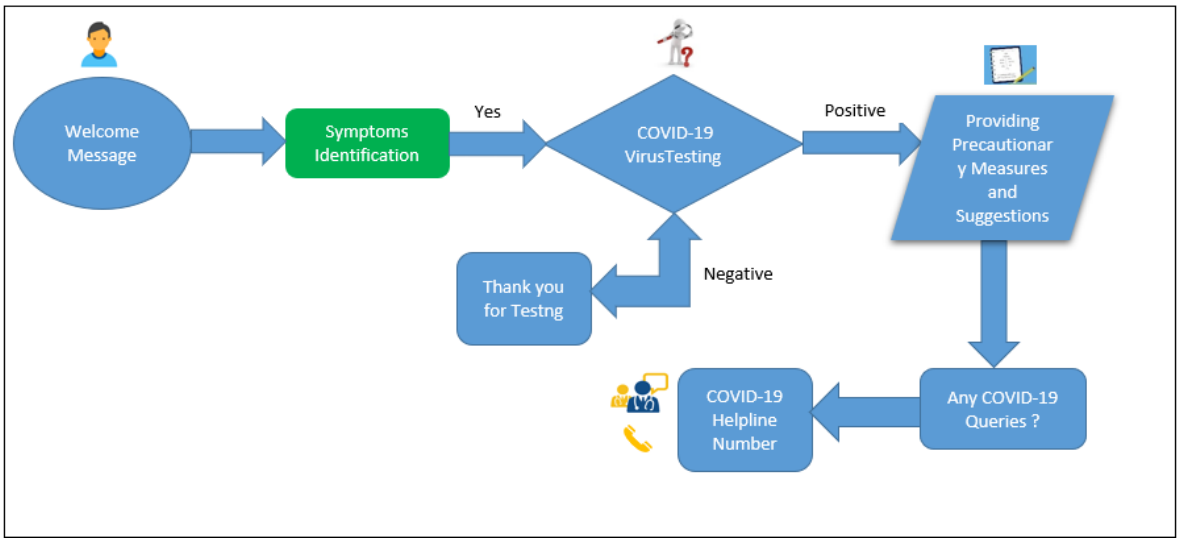
itsdangerous==1.1.0

Jinja2==2.11.2

MarkupSafe==1.1.1

Werkzeug==1.0.1

Project High Level Architecture Diagram



Project Source Code

Application.py

```
from flask
import Flask,
render_template
, request
                    import nltk
                    #import numpy as np
                    import random
                    import string # to process standard python strings
                    from sklearn.feature_extraction.text import TfidfVectorizer
```

```
from sklearn.metrics.pairwise import cosine_similarity
import warnings
warnings.filterwarnings("ignore")

app = Flask(__name__)

f=open('covid.txt','r',errors = 'ignore')
raw=f.read()
raw=raw.lower()# converts to lowercase
nltk.download('punkt') # first-time use only
nltk.download('wordnet') # first-time use only
sent_tokens = nltk.sent_tokenize(raw)# converts to list of sentences
word_tokens = nltk.word_tokenize(raw)# converts to list of words

lemmer = nltk.stem.WordNetLemmatizer()
#WordNet is a semantically-oriented dictionary of English included in
NLTK.
def LemTokens(tokens):
    return [lemmer.lemmatize(token) for token in tokens]
remove_punct_dict = dict((ord(punct), None) for punct in
string.punctuation)
def LemNormalize(text):
    return
LemTokens(nltk.word_tokenize(text.lower().translate(remove_punct_dict
)))

GREETING_INPUTS = ("hello", "hi", "greetings", "sup", "what's
up","hey",)
GREETING_RESPONSES = ["hi", "hey", "hi there", "hello", "I am glad!
You are talking to me"]
def greeting(sentence):

    for word in sentence.split():
        if word.lower() in GREETING_INPUTS:
            return random.choice(GREETING_RESPONSES)

def response(user_response):
    robo_response=''
    sent_tokens.append(user_response)
    TfidfVec = TfidfVectorizer(tokenizer=LemNormalize,
stop_words='english')
    tfidf = TfidfVec.fit_transform(sent_tokens)
    vals = cosine_similarity(tfidf[-1], tfidf)
    idx=vals.argsort()[0][-2]
    flat = vals.flatten()
    flat.sort()
```

```
    req_tfidf = flat[-2]
    if(req_tfidf==0):
        robo_response=robo_response+"I am sorry! I don't understand
you. Want to try something else?"
        return robo_response
    else:
        robo_response = robo_response+sent_tokens[idx]
        return robo_response


@app.route('/')
def home():
    return render_template("index.html")

@app.route("/get")
def get_bot_response():
    flag=True
    while(flag==True):
        user_response = request.args.get('msg')
        if(user_response=='1' or user_response=='2' or
user_response=='3'):
            return "Med-ROBO: Have you travelled internationally in
last 14 days? Yes or No"
        elif(user_response == 'yes'):
            return "Med-ROBO: Consult Doctor Immediately..CORONA
(COVID 19) HELPLINE: 011-23978046 OR 1075"
        elif(user_response == 'no' or user_response == '4' or
user_response == '5' or user_response == '6'):
            return "Take general tablets, wait for some more days. If
symptoms persists, Contact Doctor. <br> Do you have any queries on
COVID-19?"
        else:
            return str(response(user_response))


if __name__ == '__main__':
    app.run()
```

index.html

```
<!DOCTYP
E html>
            <html>
            <head>
            <link rel="stylesheet" type="text/css" href="/static/style.css">
            <script
            src="https://ajax.googleapis.com/ajax/libs/jquery/3.2.1/jquery.min.js"></scr
            ipt>
            </head>
            <body>
            <div>
                   <div id="chatbox">
                          <img src="/static/banner.png">
                          <p class="botText"><span>Hi! I'm Med-ROBO..</span></p>
                          <p class="botText"><span>Are you experiencing any of these
            symptoms?")</span></p>
                   <p class="botText"><span>1. Fever or sweating <br> 2. Difficulty
            breathing <br> 3. Prolonged Cough <br> 4. Sore throat <br> 5. Body ache
            \<br> 6. Vomiting and Diarrhea </span></p>
                   </div>
                   <div id="userInput">
                          <input id="textInput" type="text" name="msg"
            placeholder="Message">
                          <input id="buttonInput" type="submit" value="Send">
                   </div>
            <script type="text/javascript">
            function getBotResponse() {
            var rawText = $("#textInput").val();
            var userHtml = '<p class="userText"><span>' + rawText + '</span></p>';
            $("#textInput").val("");
            $("#chatbox").append(userHtml);
            document.getElementById('userInput').scrollIntoView({block: 'start',
            behavior: 'smooth'});
            $.get("/get", { msg: rawText }).done(function(data) {
            var botHtml = '<p class="botText"><span>' + data + '</span></p>';
            $("#chatbox").append(botHtml);
            document.getElementById('userInput').scrollIntoView({block: 'start',
            behavior: 'smooth'});
            });
            }
            $("#textInput").keypress(function(e) {
            if(e.which == 13) {
            getBotResponse();
            }
```

```
});
$("#buttonInput").click(function() {
getBotResponse();
})
</script>
</div>
</body>
</html>
```

covid.txt

“We perform our normal duties, like writing a report and interacting with patients, but everything is from within layers of protective gear for six straight hours… It cannot be explained without experiencing it,” Sheena, a nurse on COVID-19 duty, told actor Mammootty.

Sheena, a staff nurse at the Infection Control section of the Kozhikode Medical College, was on a phone conversation with Mammootty as part of a radio show. On the actor’s enquiry, Sheena patiently explained the daily ordeals of a nurse and other members in a COVID-19 ward.

“We get about 20 suspected cases almost every day. Only after testing can we conclude if they are positive. But we treat them with utmost precaution, anticipating that they might have the infection,” she said.

At the end of the conversation, which lasted for almost 20 minutes, Mammootty said, “I could only listen as a layman. But, the public should know the struggles of saving the life of a person infected with coronavirus.”

Here are the full details of what the nurse recounted, stressing that she was speaking on behalf of nurses, doctors, cleaning staff, lab technicians and X-ray staff.

The struggle to avoid exposure

All nurses, assistants and cleaning staff of the nursing department at the Kozhikode district hospital are on a six-hour duty. Throughout this duration, they have to wear the personal protective equipment (PPE) to take samples, interact with patients and even to clean the rooms of the patients, Sheena said.

“Once we wear the PPE gear, we cannot drink water or go to the toilet for six hours,” she said.

To further explain the difficulty in performing certain tasks in the PPE, she quotes a small example. “It is difficult to administer Intravenous (IV) fluids

wearing the goggles. We struggle to find the vein to insert the cannula. To limit the exposure, we cannot even touch the needle," she explained.

After the throat and nasal swabs and the blood samples of the patients are collected, the nurse has to pack the specimen in three layers of packaging before handing it over to the laboratory for testing.

Since the medical staff are covered head to toe in the gear, they cannot recognise each other. "We wear a sticker saying 'doctor' or 'nurse' on the gear, but we do not know who the person is. Of course, we know who is on duty that day," she said.

The most affected section of medical workers, Sheena said, is the cleaning staff. They have to handle the masks, papers and food waste of COVID-19 patients and those who haven't yet been confirmed, and dispose of all this waste separately according to the Biomedical Waste Management guidelines.

"Normally people sweat even while doing normal household chores, so imagine this. These cleaning staff members are dehydrated after the six-hour shift, they are drenched in sweat when they come out. Some have tears in their eyes at the end of the shift. But they do their job with dedication," Sheena told the actor.

Supporting patients

"The patients don't know who they are speaking to because of the head-to-toe gear; yet, they interact with us, enquire about us and appreciate us. Some patients tell us that they understand what we are going through in these PPE kits," said Sheena.

Volunteer organisations, too, lend a helping hand to the medical staff. For example, if a patient needs a three-pin plug to charge their phone, volunteers deliver it to the hospital immediately. "Books, pens, rice or clothes, they deliver it with just one call. They also deliver four meals and snacks every day for the medical staff," said Sheena.

Food for patients is supplied based on a set menu at the hospital. If the patient requests for kanji (rice porridge), it is immediately prepared at the hospital for them.

The staff make sure that they communicate with the patients' families regularly. When a patient or their family enquires if the test has come negative, they ensure that they do not announce the result outright. "Instead, we try to say that there is more virus in the body and that only if it is completely cleared can the patient be discharged," said Sheena.

Why they need public help

According to Sheena, the medical staff including doctors, nurses, assistants and X-ray staff, are on nine to 10 days of continuous duty, which is followed by a 14-day quarantine at the hospital. A majority of the nurses are women and many have young children.

“Some of these mothers cry as they have to stay away from their children, some as young as two or four years old, for close to a month. But we support each other,” said Sheena, adding, “Please consider that our families are also in this fight against COVID-19.”

Sheena said that there have been instances when health workers were treated badly or with suspicion. “Our families are also suffering. What keeps us going is that the government, Chief Minister and Health Minister have kept us close to them, supported us.”

She admitted that medical workers are scared when they hear about staff in other states testing positive for the virus. “We wait every day for this to subside. But teamwork plays a vital role in putting us at ease. A small communication gap can cause a lot of concerns. Besides, Kozhikode was a district that managed the Nipah outbreak. The knowledge of handling such crises and our training gives us confidence,” said Sheena, who is also a state-level infection control trainer.

Mammootty agreed when Sheena said Kerala is doing relatively better in containing the spread of COVID-19. “One should be happy about it but should not celebrate it. It is not time to celebrate it yet,” he quickly added.

“There are others who are suffering because of the pandemic. Only if people across the globe fully recover and are safe, can we be safe and completely happy,” he said, urging the public to follow the lockdown rules.

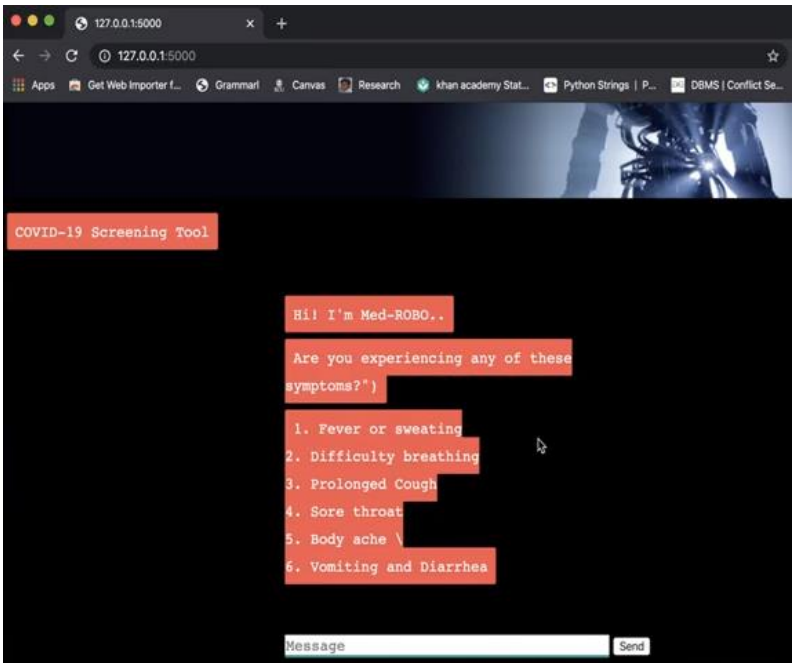
13 people tested positive for COVID-19 in Hyderabad on Friday after they came into contact with a woman who was staying in Talab Katta in old city. She passed away on April 10 shortly after testing positive for COVID-19. The people who tested positive now include five doctors and two nurses from Princess Durru Shehvar hospital where the woman had undergone treatment for two days.

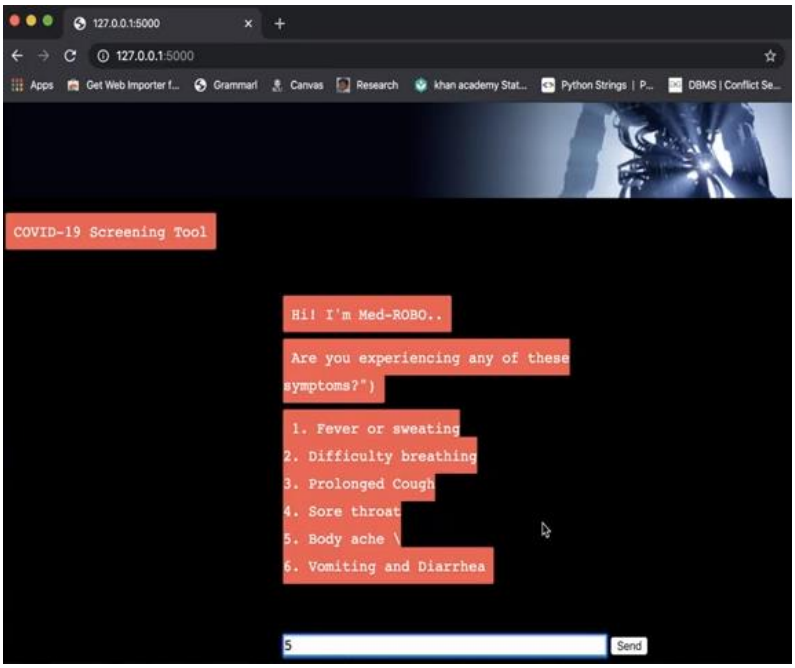
"The samples of another eight to nine doctors have been taken and they have been sent to the Nizamia Unani Hospital at Charminar for isolation," a source told TNM.

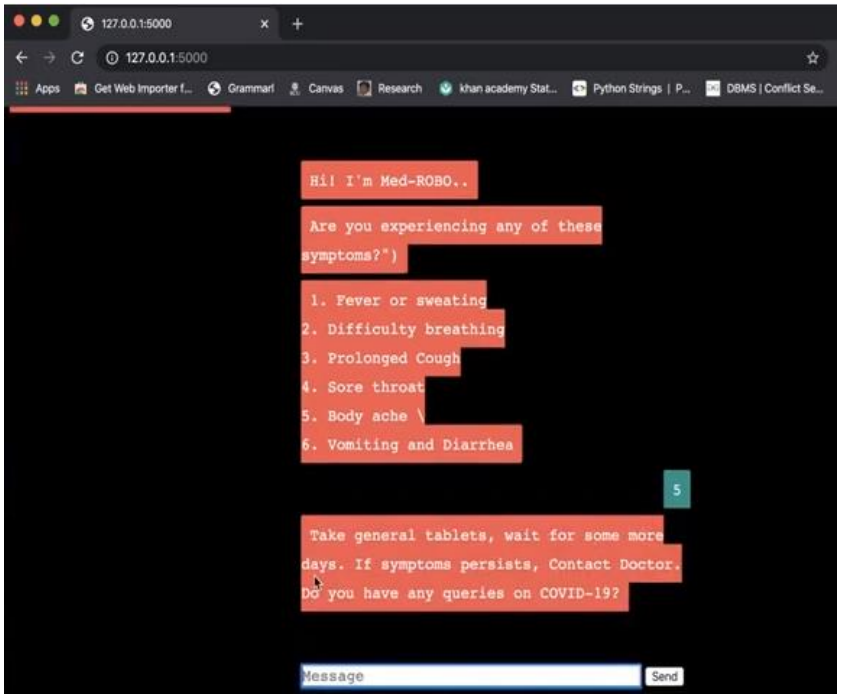
Those who tested positive on Friday have been shifted to the Gandhi Hospital for treatment.

The state government said that the woman came in contact with a person who attended the Tablighi Jamaat meeting in New Delhi last month, from where she may have contracted the virus.

Project Output



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Hi! I'm Med-ROBO..
Are you experiencing any of these symptoms?")
1. Fever or sweating
2. Difficulty breathing
3. Prolonged Cough
4. Sore throat
5. Body ache \
6. Vomiting and Diarrhea
5
Take general tablets, wait for some more days. If symptoms persists, Contact Doctor.
Do you have any queries on COVID-19?
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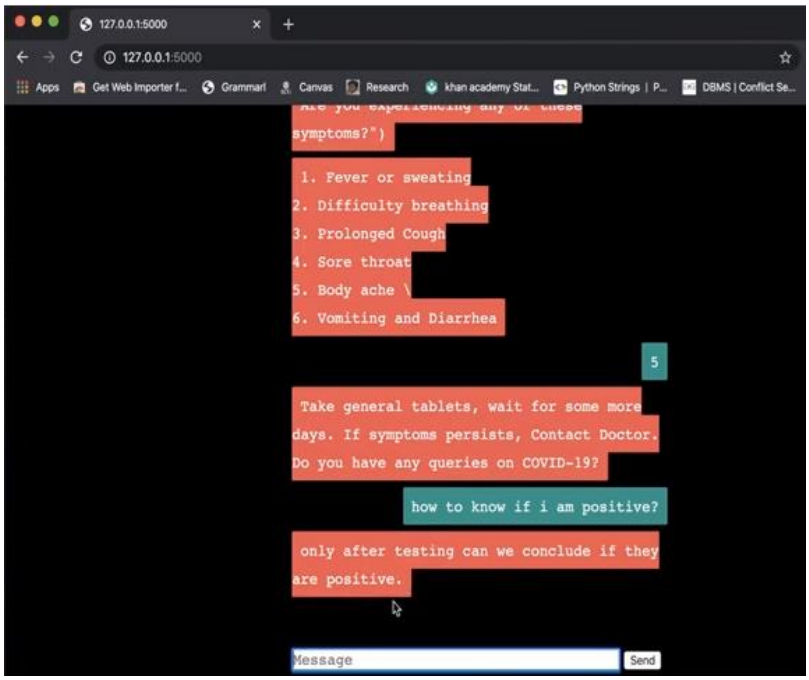
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only after testing can we conclude if they are positive.
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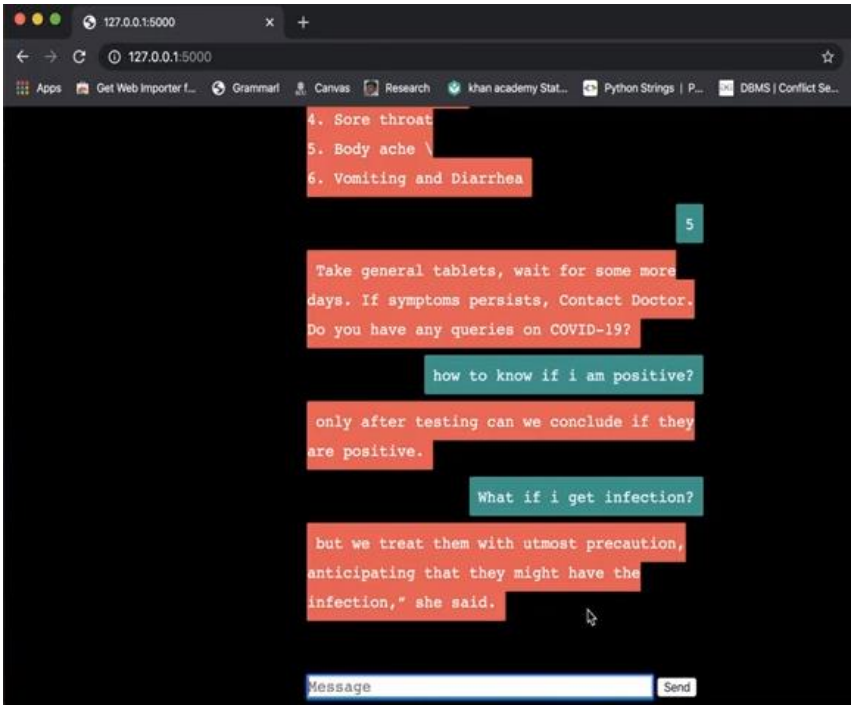
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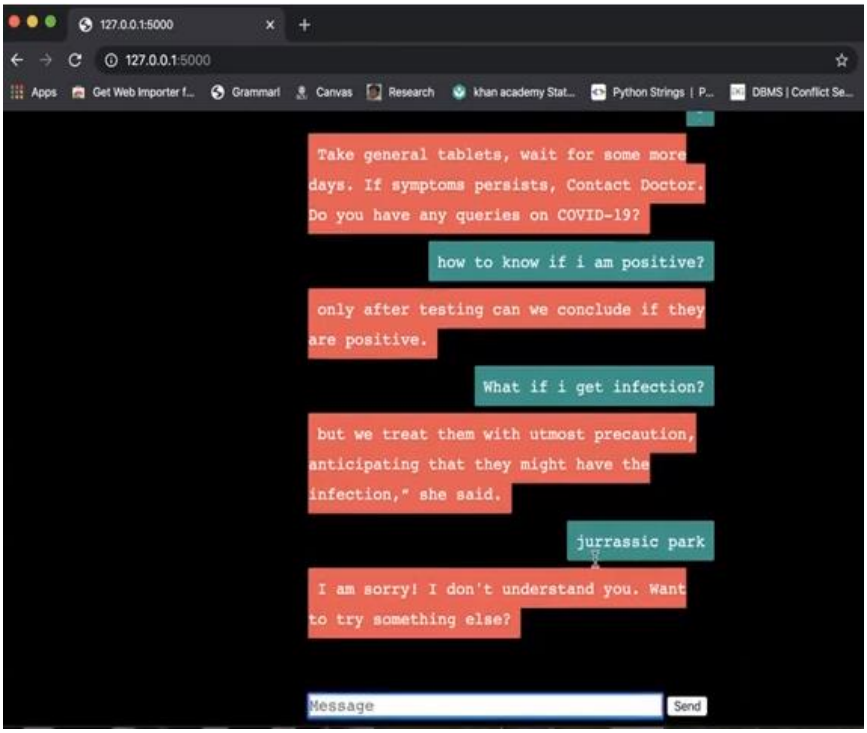
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jurrassic park
I am sorry! I don't understand you. Want to try something else?
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