NLP Final Project

HEALTH BOT – JESS! (ANSWERS QUESTIONS RELATED TO COVID-19

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Introduction

Bots are software application that is programmed to certain task. They are automated and easily run with instructions without the need to human intervention. They are often intimated to replace task which are repetitive in nature. Bots are used in place or task which which can be done quickly without the need of human intervention.

They are total four types of bots which are:

1) **Chatbots**: Majority of bots used today are chatbots as they easily eliminate human intervention in repetitive conversation and can be programmed with certain responses.
2) **Web Crawlers**: Bots that can scan content on webpages all over the internet.
3) **Social Bots**: Bots that are operated on the social media platform as an extension.
4) **Malicious Bots**: Bots that scrape content, carry out spam and fraudulent attacks.

The Bot that I have developed as a part of my project is a chatbot. The bot

Why do we a chatbot?

- Automated answer for similar queries making the whole process faster.
- Chatbots are easily to develop, deploy and require less time.
- Save human resources for qualitative task.
- Accelerate the whole process.
- Easy to use.

Introduction to the Project

My project is healthbot is named Jess! The bot is mainly related to covid-19 tracking. Currently during the pandemic everyone wants to stay safe and healthy by staying at their homes but in order to restock some of the items once in a while people have to go out.
The bot is a simple experiment which ask user some of the question listed on the CDC website to determine if the user is infected during the whole process or not.
Based on user response the bot helps in assessing the user's situation.

Methodologies

1) Why I choose amazon Lex and amazon lambda over traditional bot development?

- As we all know about amazon's amazing Alexa which has fantastic deep learning power amazon allows you to use the same technologies If you use their platform to build bots through amazon Lex.
- It allows us to run on amazon infrastructure and it is easy and faster to develop and develop which makes the operation fast which saves so much of overhead cost.
- It is integrated with amazon lambda a service that allows us to run the code without any servers which makes us bot smarter and allows to give a more personalized experience.
- Lastly it is easy to deploy an amazon Lex bot to a mobile application by the amazon SDK provided which makes it easier for us the scale.

Steps involved in development of system to address the research questions.

Step involved in building Jess the health bot

- The first step involved creating an amazon AWS account.
- Second is creating intent based on the need of the platform. For the project there were some core intent and some secondary intent.
  Core intent for the application are
  - Introduction intent
  - User intent
  - symptoms capture intent
  - user age intent
  - user disease intent
  - recommendation intent.

- Based on user action/feedback the intent is further managed by amazon Lambada to provide a personalized user response. The Secondary intents which are created with the help of function deployed in amazon lambda.

- Next thing what we need to create slots which helps us in capturing the response and providing the necessary feedback based on that.

Question and Research used in the development of the bot

The research question/material which were used in the development of bot was amazon Lex development guide and the question that are presented to user are the symptoms present on the CDC website. Below mentioned are the listed of symptoms present on the CDC website which are presented to the user inform of questions.

- Mild or Moderate difficulty breathing
- Fever or chills
- New or worsening Cough
- Sustained loss of smell, taste, or appetite
- Sore throat
- Vomiting or diarrhea
- Aching throughout body

Further to make the bot more intuitive I did a bit more research how COVID -19 is impacting people with some of the common disease like asthma, heart issue, or kidney issue or cancer patients as in some of the disease the user immune system is slowed down to prevent the spread of diseases.

For example, if the Psoriasis is an auto-immune disease and patients suffering from Psoriasis are given medicine to slow down their immune system but with current pandemic outside National Psoriasis Foundation has issued a guideline for the Psoriasis patients if they are contacted with a psoriasis patient.

The list of disease which I have covered in the given bot are:
Moderate to severe asthma or chronic lung disease

- Psoriasis
- Cancer treatment or medicine causing immune suppression
- Inherited immune system deficiencies or HIV

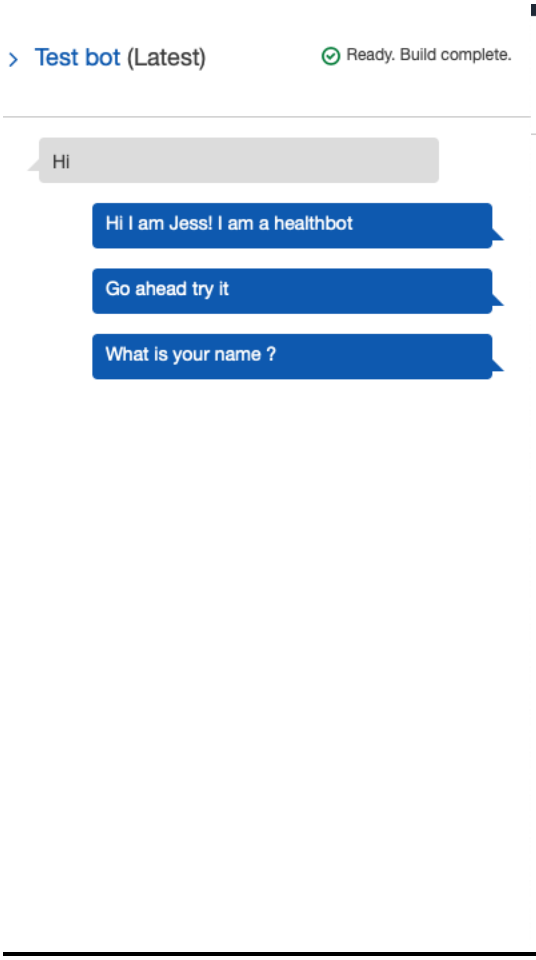
- Serious heart condition, such as heart failure or prior heart attack
- Diabetes with complications
- Kidney failure that needs dialysis
- Cirrhosis of the liver
- Extreme obesity
- Pregnancy

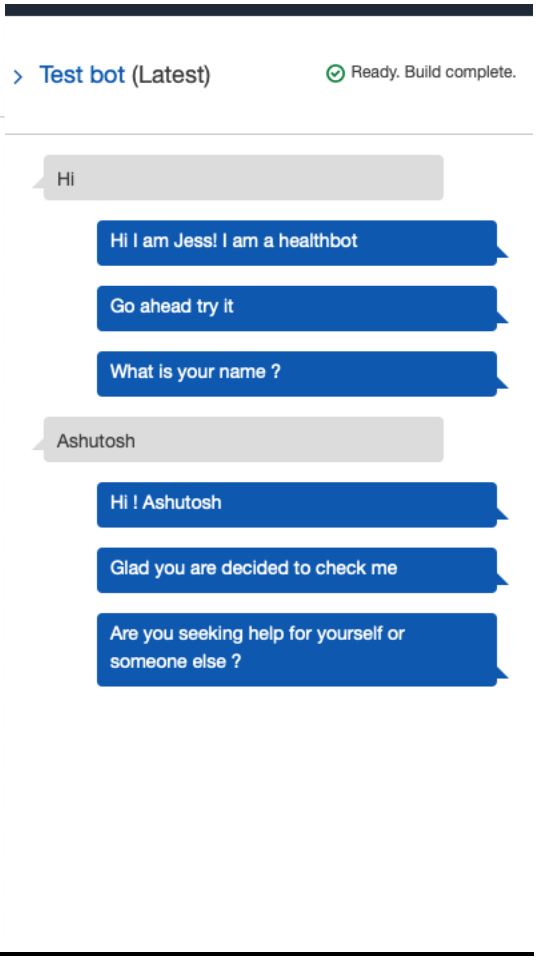
NLP Techniques used in building the bot

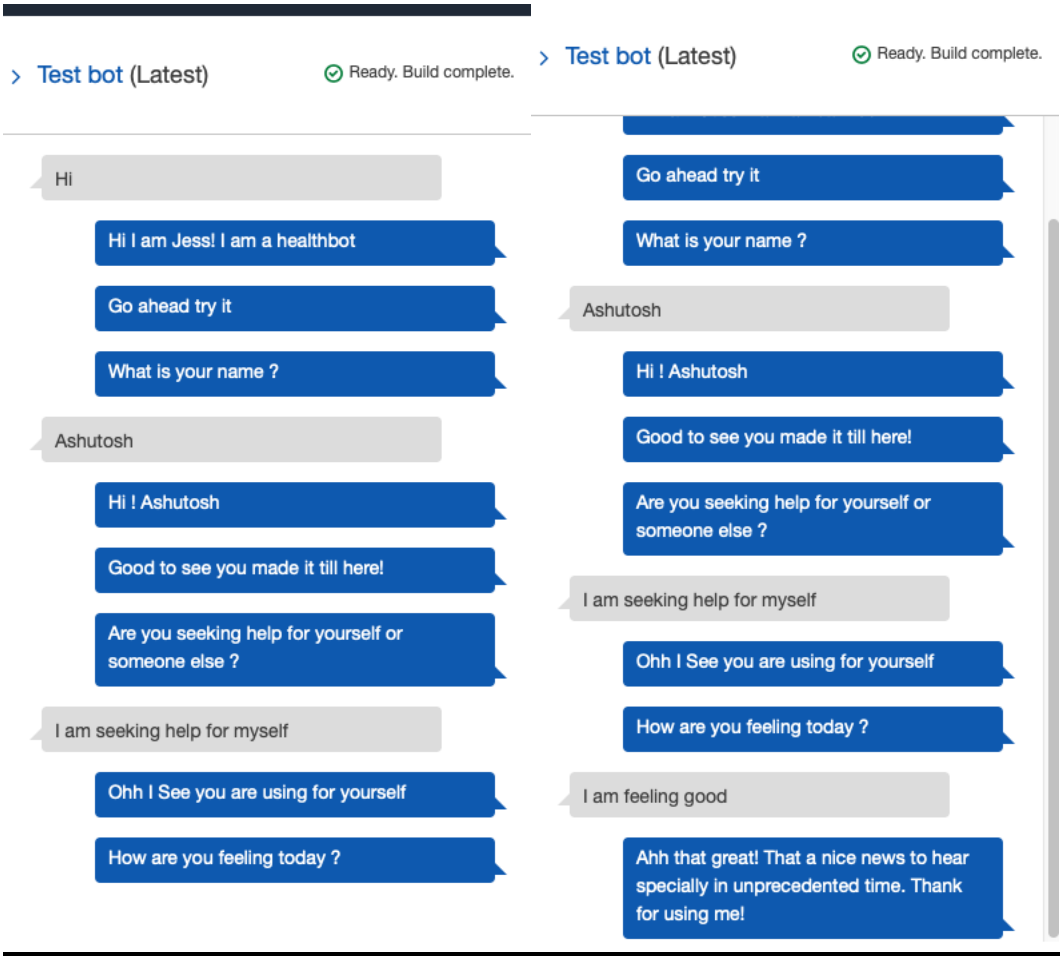
Amazon Lex heavily uses the amazon's Alexa deep learning and natural language processing. The user interacts with the Lex platform and all the user data is saved in the form of slots and utterances. Utterances helps in training the bot what questions users may ask. The more utterance a Lex bot app it's better for the Lex to respond. Utterance can be also be considered as some sample phrases which are needed by Lex to understand the nature of bot.

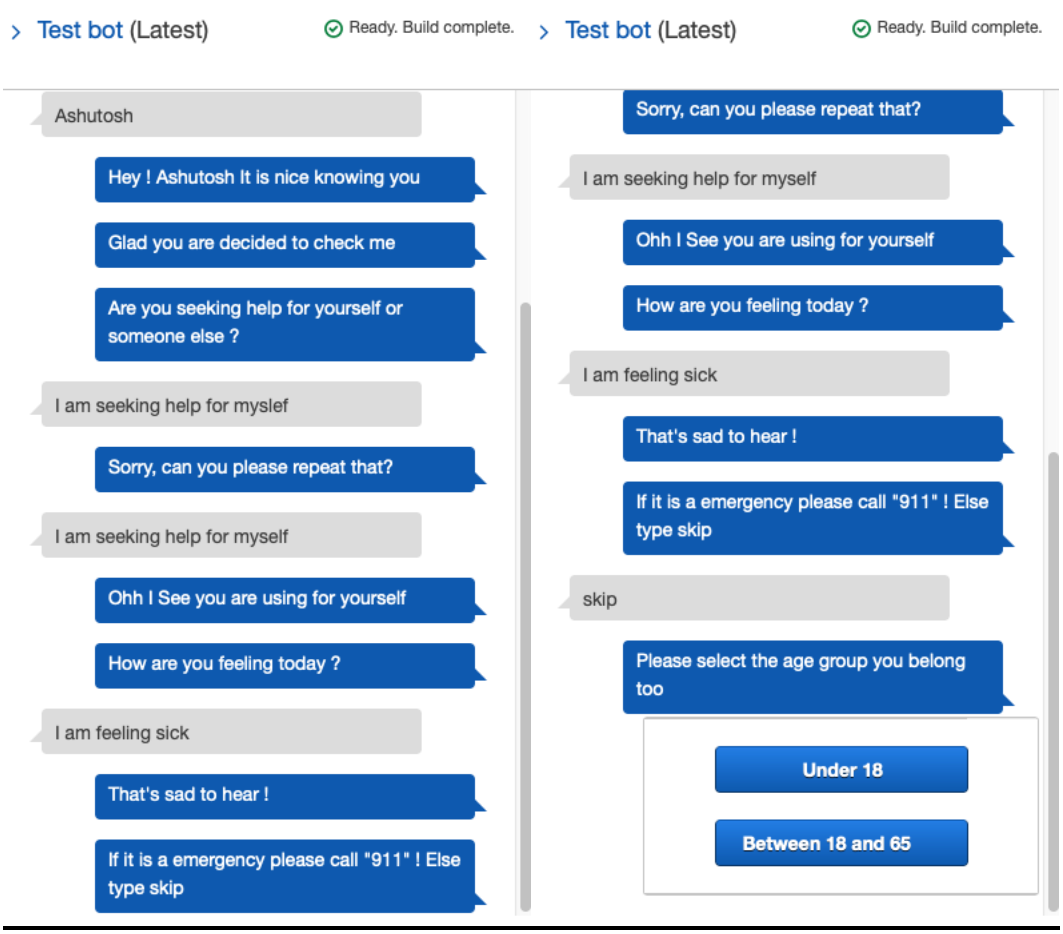
To develop the logic and provide branching amazon lambda is used in the background. The user text is sent to amazon server where it is analyzed and processed. The user text is then matched to a pool of words to closely identifies the meaning of the words the entire process helps Lex to be more conversational and provide a more personalized response to the user. The information is then sent back from amazon server.

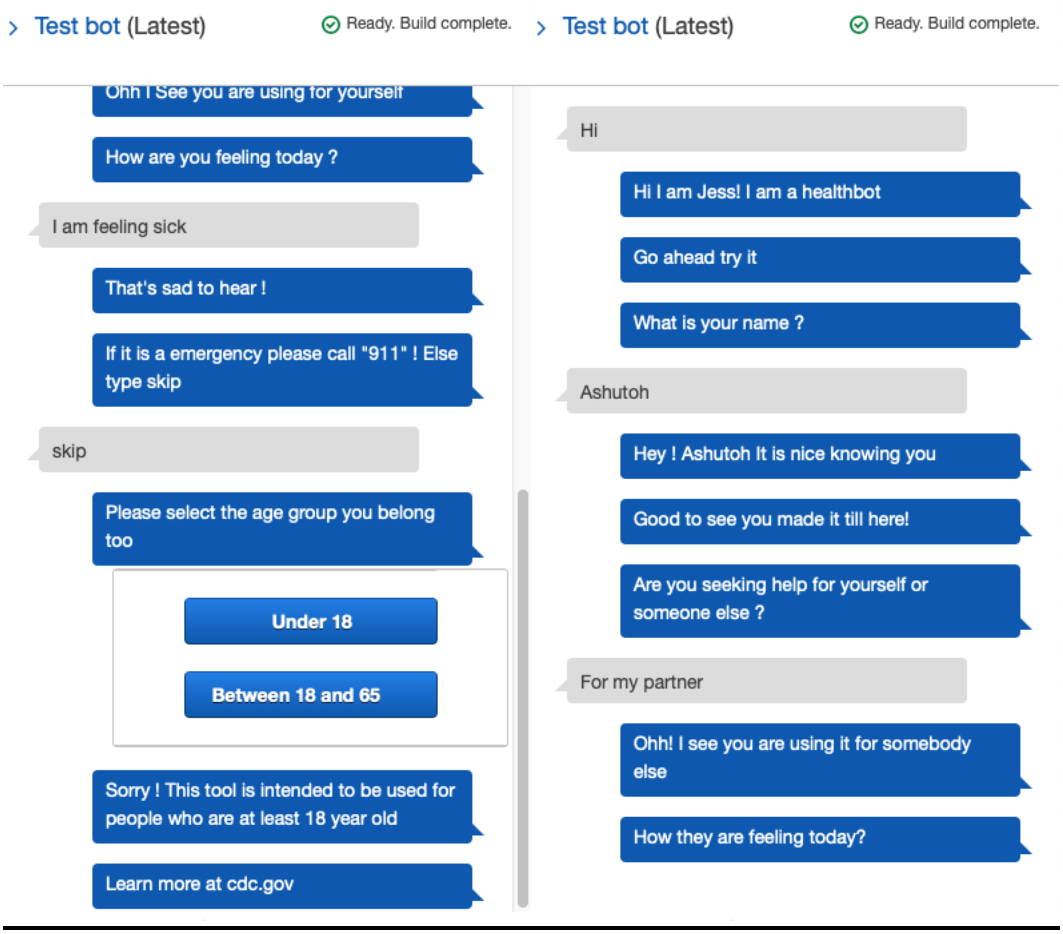
Interpretation of the result (With the help of Screenshots)

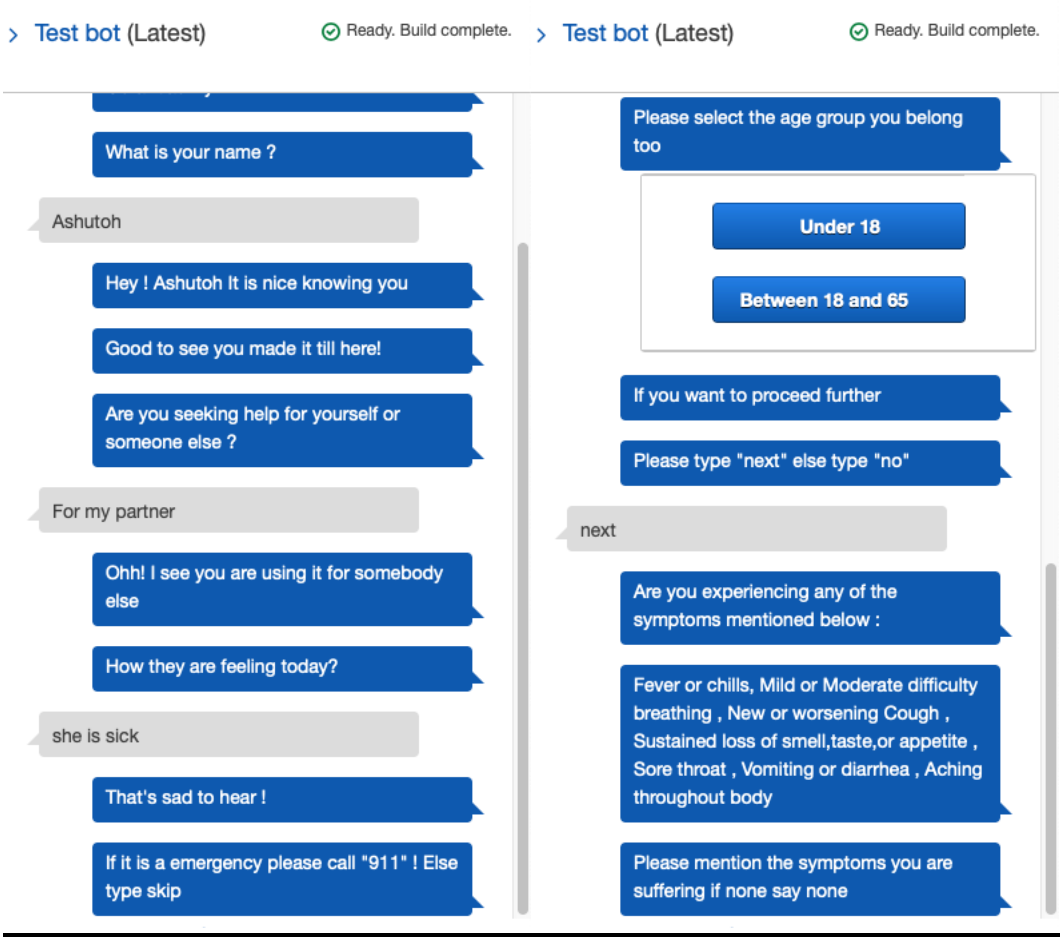

Test bot (Latest)
Ready. Build complete.
Hi
Hi I am Jess! I am a healthbot
Go ahead try it
What is your name ?

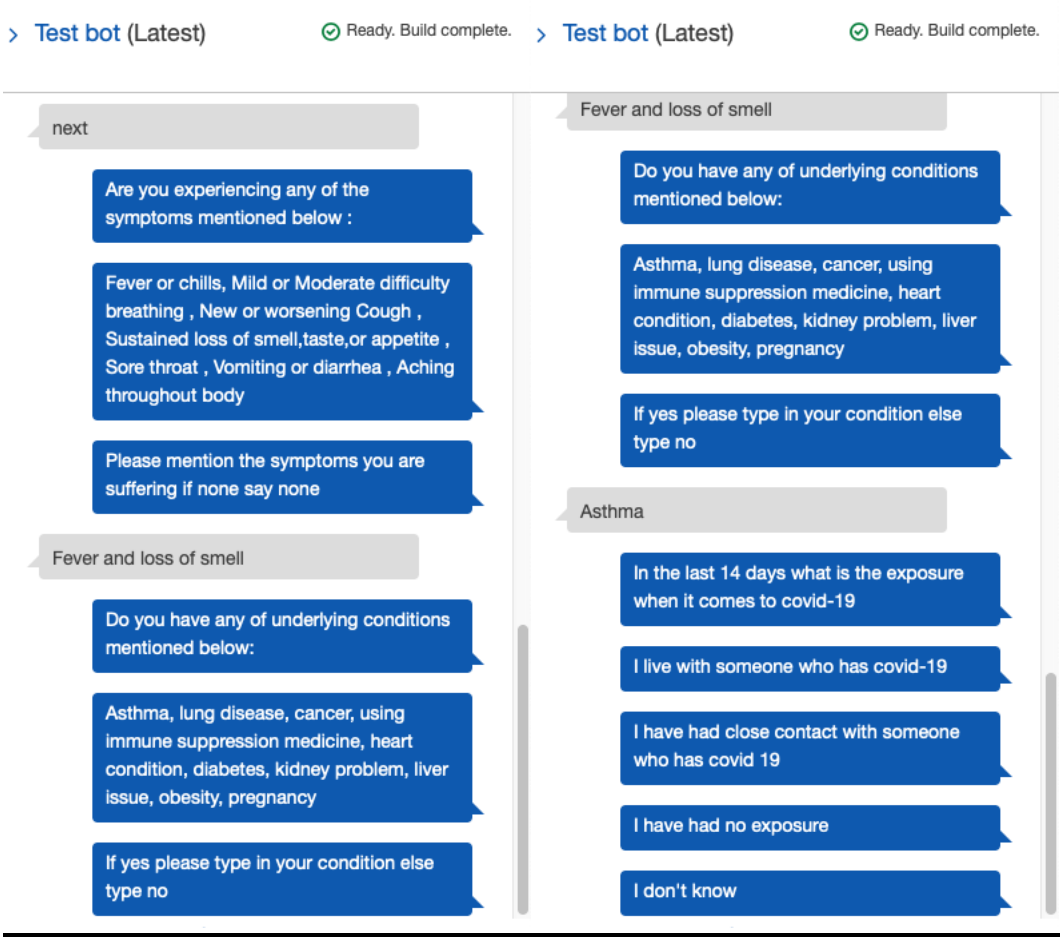

Test bot (Latest)
Ready. Build complete.
Hi
Hi I am Jess! I am a healthbot
Go ahead try it
What is your name ?
Ashutosh
Hi ! Ashutosh
Glad you are decided to check me
Are you seeking help for yourself or someone else ?

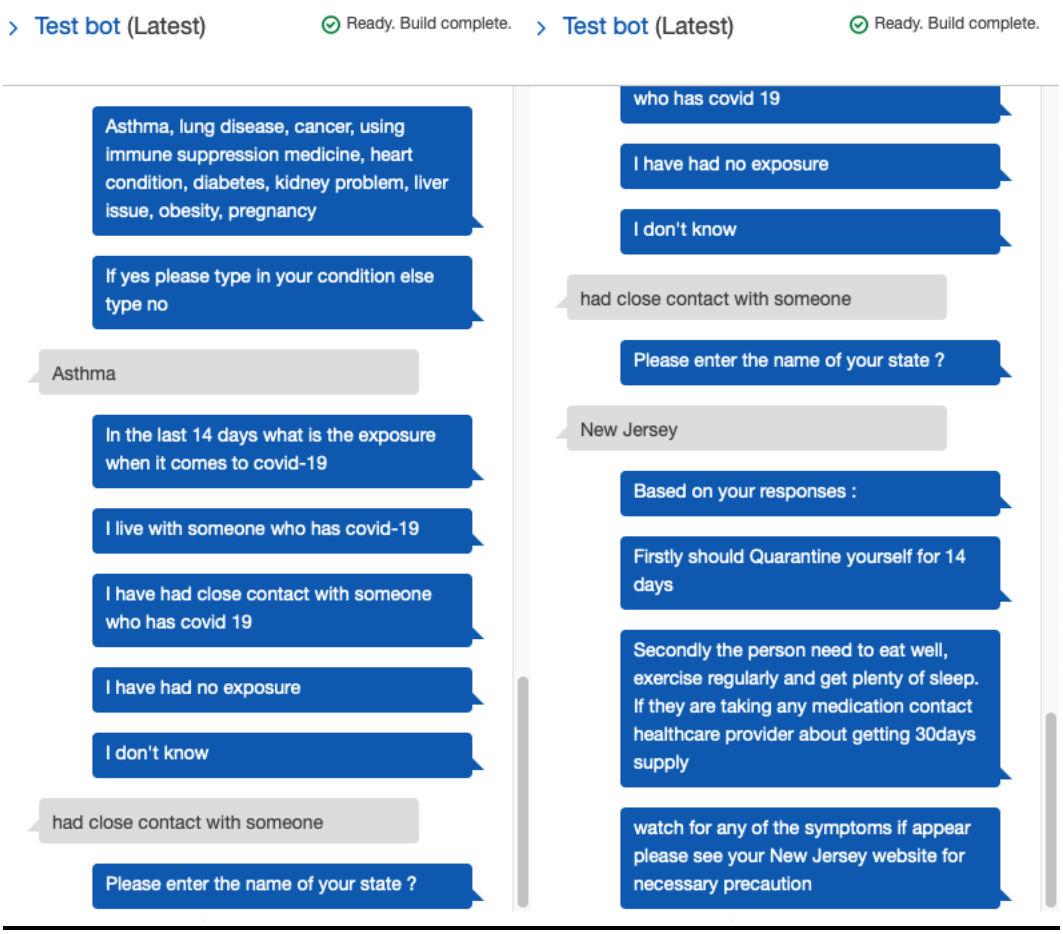

Test bot (Latest)
Ready. Build complete.
Hi
Hi I am Jess! I am a healthbot
Go ahead try it
What is your name ?
Ashutosh
Hi ! Ashutosh
Good to see you made it till here!
Are you seeking help for yourself or someone else ?
I am seeking help for myself
Ohh I See you are using for yourself
How are you feeling today ?
Test bot (Latest)
Ready. Build complete.
Go ahead try it
What is your name ?
Ashutosh
Hi ! Ashutosh
Good to see you made it till here!
Are you seeking help for yourself or someone else ?
I am seeking help for myself
Ohh I See you are using for yourself
How are you feeling today ?
I am feeling good
Ahh that great! That a nice news to hear specially in unprecedented time. Thank for using me!


Test bot (Latest)
Ready. Build complete.
Ashutosh
Hey ! Ashutosh It is nice knowing you
Glad you are decided to check me
Are you seeking help for yourself or someone else ?
I am seeking help for myslef
Sorry, can you please repeat that?
I am seeking help for myself
Ohh I See you are using for yourself
How are you feeling today ?
I am feeling sick
That's sad to hear !
If it is a emergency please call "911" ! Else type skip
Test bot (Latest)
Ready. Build complete.
Sorry, can you please repeat that?
I am seeking help for myself
Ohh I See you are using for yourself
How are you feeling today ?
I am feeling sick
That's sad to hear !
If it is a emergency please call "911" ! Else type skip
skip
Please select the age group you belong too
Under 18
Between 18 and 65


Test bot (Latest)
Ready. Build complete.
Ohh I See you are using for yourself
How are you feeling today ?
I am feeling sick
That's sad to hear !
If it is a emergency please call "911" ! Else type skip
skip
Please select the age group you belong too
Under 18
Between 18 and 65
Sorry ! This tool is intended to be used for people who are at least 18 year old
Learn more at cdc.gov
Test bot (Latest)
Ready. Build complete.
Hi
Hi I am Jess! I am a healthbot
Go ahead try it
What is your name ?
Ashutoh
Hey ! Ashutoh It is nice knowing you
Good to see you made it till here!
Are you seeking help for yourself or someone else ?
For my partner
Ohh! I see you are using it for somebody else
How they are feeling today?


Test bot (Latest)
Ready. Build complete.
What is your name ?
Ashutoh
Hey ! Ashutoh It is nice knowing you
Good to see you made it till here!
Are you seeking help for yourself or someone else ?
For my partner
Ohh! I see you are using it for somebody else
How they are feeling today?
she is sick
That's sad to hear !
If it is a emergency please call "911" ! Else type skip
Test bot (Latest)
Ready. Build complete.
Please select the age group you belong too
Under 18
Between 18 and 65
If you want to proceed further
Please type "next" else type "no"
next
Are you experiencing any of the symptoms mentioned below :
Fever or chills, Mild or Moderate difficulty breathing , New or worsening Cough , Sustained loss of smell,taste,or appetite , Sore throat , Vomiting or diarrhea , Aching throughout body
Please mention the symptoms you are suffering if none say none


Test bot (Latest)
Ready. Build complete.
next
Are you experiencing any of the symptoms mentioned below :
Fever or chills, Mild or Moderate difficulty breathing , New or worsening Cough , Sustained loss of smell,taste,or appetite , Sore throat , Vomiting or diarrhea , Aching throughout body
Please mention the symptoms you are suffering if none say none
Fever and loss of smell
Do you have any of underlying conditions mentioned below:
Asthma, lung disease, cancer, using immune suppression medicine, heart condition, diabetes, kidney problem, liver issue, obesity, pregnancy
If yes please type in your condition else type no
Test bot (Latest)
Ready. Build complete.
Fever and loss of smell
Do you have any of underlying conditions mentioned below:
Asthma, lung disease, cancer, using immune suppression medicine, heart condition, diabetes, kidney problem, liver issue, obesity, pregnancy
If yes please type in your condition else type no
Asthma
In the last 14 days what is the exposure when it comes to covid-19
I live with someone who has covid-19
I have had close contact with someone who has covid 19
I have had no exposure
I don't know



Potential Application of your solution

With the opening of the college, universities and offices around the world, the bots like jess can be deployed among the students and employee to get a quick and reliable information about the covid-19 specially when the internet is filled with so many spam links and false and misleading information.

Since the bot is developed in amazon Lex so it will take minutes to deploy the bot to the mobile platform (iOS and Android) with the help of SDK given on amazon AWS.
I see potentially three benefits to this:

1) If a student/ employee has any symptoms they can use the application to diagnose them further avoiding physical contact and taking necessary required actions.
2) Since the data will be stored by company and universities so it will be secured.
3) Thirdly with the availability of government contact tracing application, jess (Healthbot) can be Integrated into it to expand the application capabilities by further providing personalized feedback and responses to the users.

The bot can be exported in the form of json file,so json is zipped and attached.