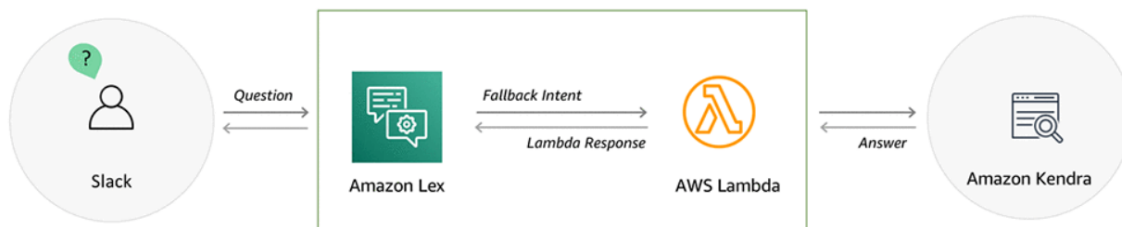


COVID-19 Student Chat-Bot using Amazon Lex, AWS Lambda and Amazon Kendra

Cloud Computing

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1. Problem statement:

During these challenging COVID-19 times, information is the key to provide students with answers to their questions. And the way the information is currently available to students is via the FAQs that are available on University's website and a phone hotline/customer service. We see that there is a missing link of presenting information to students via a chatbot that students can connect with to get the information they are looking for.

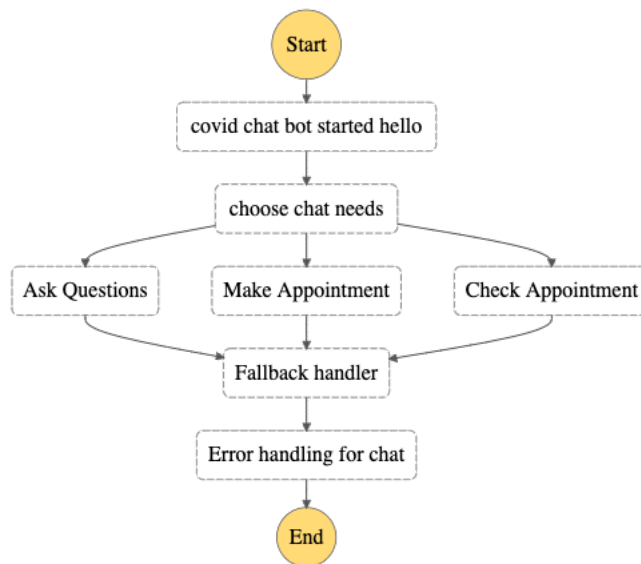
The website on our school can give us a lot of information, but we need to take the time to seek what exactly questions and other information we need, and a chatbot can help students easily and fast get the information they want.

2. Cloud service:

- Amazon Lex: Amazon Lex is a service for building conversational interfaces into any application using voice and text.
- Lambda: AWS Lambda is a serverless compute service that runs your code in response to events and automatically manages the underlying compute resources for you.
- Amazon Kendra: Highly accurate intelligent search service powered by machine learning.
- S3: Amazon Simple Storage Service

3. What is the covid chatbot do:

- User/Students can ask covid questions related to campus and medical. (This data from the S3 data/documents we upload, controlled/connected by lambda)
- User/Students can make and check appointments with the school health center for a flu shot or get sick. (This managed by the lex, controlled/connected by lambda)



4. Code:

Python:

```
lambda_function.py # procedure for lex  
config.py          # slot value  
helpers.py         # help function support lex bot
```

json:

```
covid_bot_Export.json  
lex bot intents: we can export from the lex or make a json import to lex.
```

5. Steps to build chatbot:

Amazon Lex bot and Lambda.

1. In the AWS Lambda console, <https://us-west-2.console.aws.amazon.com/lambda/home?region=us-west-2#/functions> choose Create function.
2. Enter the function name `covid_bot_handler`; Choose Python 3.8.
3. For Permissions, choose Create a new role with basic Lambda permissions.

4. Choose Create function.
5. Once your new Lambda function is available, in the Function code section, choose Upload a zip file, upload the `covid_bot_lambda_handler.zip`, Save.
6. In the Amazon Lex console <https://us-west-2.console.aws.amazon.com/lex/home?region=us-west-2>, choose Actions, Import. Upload the file `covid_bot.zip`.
7. Choose the Lex bot `covid_bot` in the Amazon Lex console.
8. For each of the intents, choose AWS Lambda function in the Fulfillment section, and select the `covid_bot_handler` function. (This is the step connect the lambda and lex)
9. Once all of the intents have been updated, choose Build.

Amazon Kendra index.

Create a Kendra index for S3 documents/data storage.

1. On the Amazon Kendra console <https://us-west-2.console.aws.amazon.com/kendra/home?region=us-west-2#indexes>, choose Launch Amazon Kendra; Create index.
2. Enter an Index name and optional Description.
3. For IAM role, choose “Create a new role” to create a role and enter a name. Choose Create.

While Amazon Kendra creates new index, we need to upload our “ask question data” to an S3 bucket.

1. On the Amazon S3 console, <https://s3.console.aws.amazon.com/s3/buckets/kendra-covid-help-docs?region=us-west-2&tab=objects> create a new bucket(Keep the default settings).
2. Upload the `covid-faq.csv`, `covid-glossary.pdf`, and `covid-medical-info.pdf`.

When new Kendra index has been created, we can connect the S3 with Kendra.

1. On the Amazon Kendra console, choose FAQs, and Add FAQ.
2. Enter name and Description. For S3, browse S3 to find bucket we created, and select the `covid-faq.csv` file.
3. For IAM role, choose “Create a new role” to allow Amazon Kendra to access your S3 bucket. Enter role name and choose Add.
4. After success add. On the Amazon Kendra console, choose Data sources, and under the S3 option, Add connector.
5. Enter a data source name and description, choose next.
6. For Enter the data source location, choose Browse S3, and select S3 bucket we created.
7. For IAM role, choose “Create a new role”. Enter a role name.
8. For Set sync run schedule, select “Run on demand”.
9. Choose Next, and then choose Create. Once your data source has been created, choose Sync now.

10. Once data source is synchronized, we can try some searches on the Kendra Search console. Ask some question from our `covid-faq.csv` file.

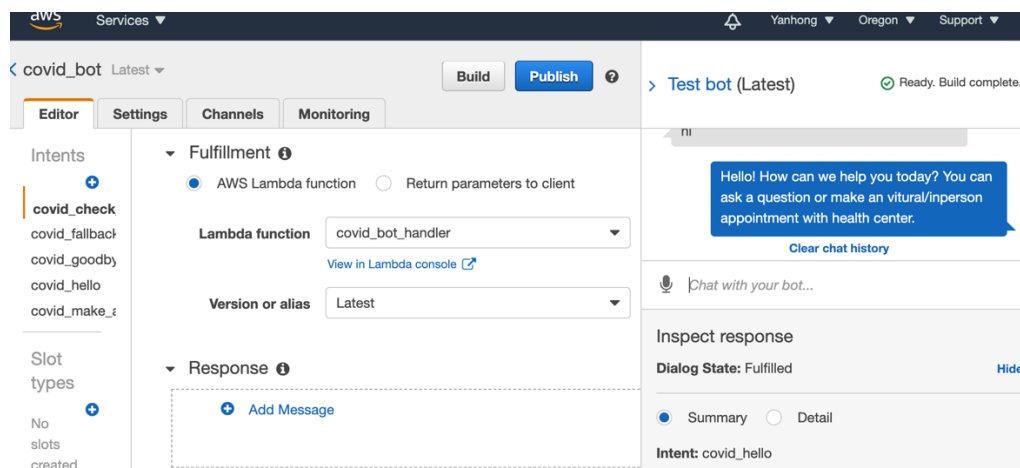
Connect the Kendra index lambda, and lex by index.

1. On the Amazon Kendra console, navigate to your new index.
2. Copy the Index ID
3. On the AWS Lambda console, choose the `covid_bot_handler` function.
4. In Environment variables, choose Edit, and Add environment variable.
5. For Key, enter “`KENDRA_INDEX`”.
6. For Value, paste the Kendra Index ID that you copied.
7. Choose Save.

Allow our Lambda function to query Amazon Kendra.

1. On the AWS Lambda console for your `covid_bot_handler` function, choose the Permissions tab.
2. Choose the IAM role listed under Role name.
3. Choose Add inline policy.
4. Under Service, choose “`Kendra`”.
5. Under Read, choose “`Query`”.
6. Under Resources, choose Add ARN.
7. For Region, choose Any.
8. For Index Id, paste in your Kendra index Id.
9. Choose Add.
10. Choose Review policy.
11. Enter a Name, such as “`queryKendra`”.
12. Choose Create policy.

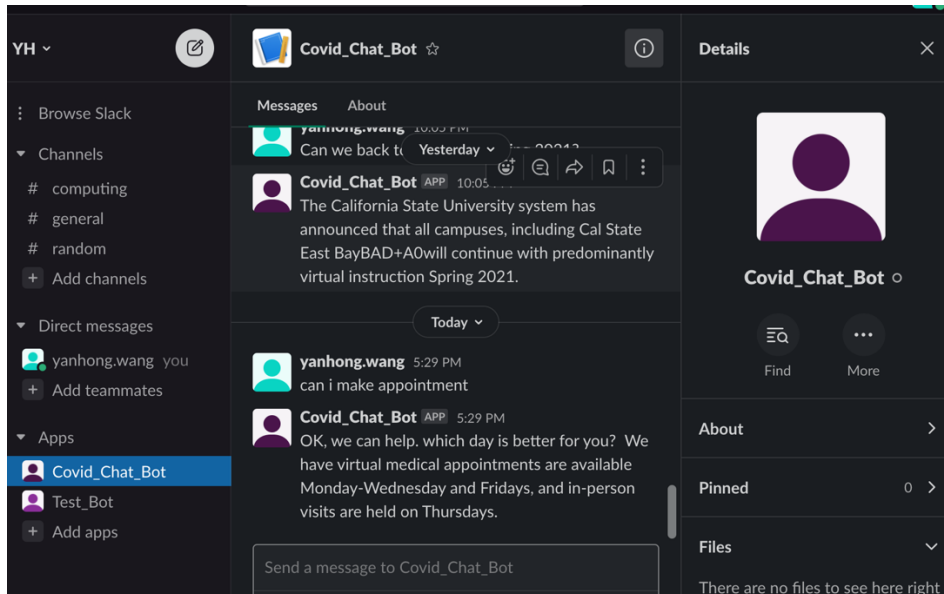
Now we can test all our bot in the lex testing console. Before test, we can build our lex again.



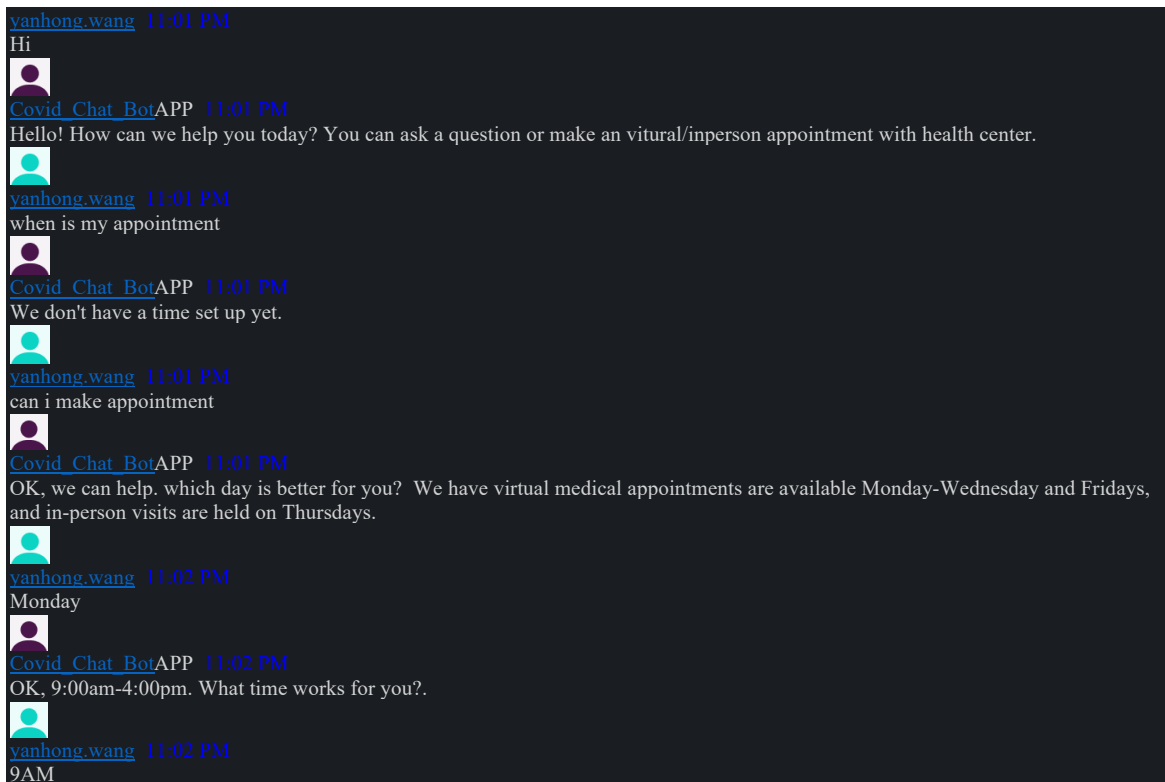
Deploying on a Slack channel


We can follow this document on the AWS to deploy the chat bot with slack:


<https://docs.aws.amazon.com/lex/latest/dg/slack-bot-association.html>





6. Interact chat bot from slack (Example)





 Covid Chat BotAPP 11:02 PM
Yes, what is the issue you are having?


 yanhong.wang 11:02 PM
I want get a flu shot


 Covid Chat BotAPP 11:02 PM
Got it, we'll see you to take care of your flu shot.


 yanhong.wang 11:02 PM
what time are we meeting again


 Covid Chat BotAPP 11:02 PM
Hi, we will see you at 09:00 on Monday to check your flu shot.


 yanhong.wang 11:02 PM
Thanks


 Covid Chat BotAPP 11:02 PM
Thanks! Have a great rest of your day.


 yanhong.wang 11:03 PM
hi


 Covid Chat BotAPP 11:03 PM
Hello! How can we help you today? You can ask a question or make an vitural/inperson appointment with health center.


 yanhong.wang 11:03 PM
Is it safe to travel now ?


 Covid Chat BotAPP 11:03 PM
Traveling increases the chance of getting and spreading COVID-19. Staying home is the best way to protect yourself and others.


 yanhong.wang 11:04 PM
What should I do if I need to come to campus?


 Covid Chat BotAPP 11:04 PM
Please follow the instruction here: <https://www.csueastbay.edu/coronavirus-information/return-to-campus/coming-to-campus.html> (edited)

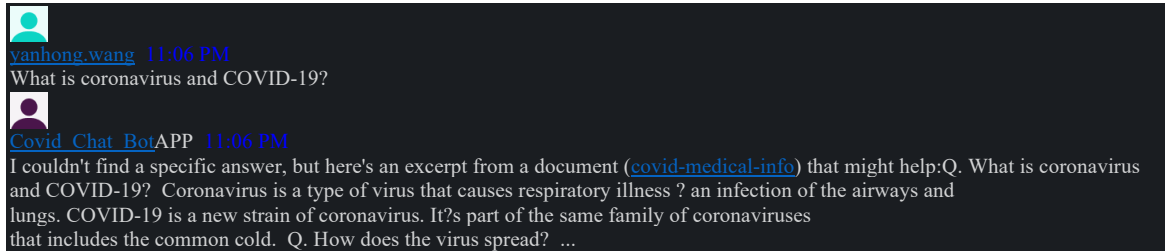
 csueastbay.edu
[Coming to Campus - COVID-19 | CSUEB](#)
Information about safely coming to the Cal State East Bay campuses during the COVID-19 pandemic.

 yanhong.wang 11:05 PM
Where is the student health located?

 Covid Chat BotAPP 11:05 PM
25800 Carlos Bee Blvd., SHCS 1000, Hayward, CA 94542

 yanhong.wang 11:05 PM
what is the Social distancing

 Covid Chat BotAPP 11:05 PM
I couldn't find a specific answer, but here's an excerpt from a document ([covid-glossary](#)) that might help:Q: Social distancing
Social distancing refers to various methods used to keep people from being in close quarters so the spread of the disease can be reduced. Social distancing measures can include limiting large gatherings, providing farther speaking distance, and staying at least an arm's lengt...



7. Improvements:

- Add more data for FAQ to cover the student's questions.
- If deploy or public, we should connect with our health department office.

8. GitHub Link:

<https://github.com/yanhong-tech/student-covid---Chatbot>

9. Resources:

1. <https://aws.amazon.com/blogs/machine-learning/smarter-faq-bots-with-amazon-kendra/>
2. <https://cevo.com.au/post/intro-amazon-lex-chatbot/>