
A project for:
LT2319 Dialogue Systems 2 course

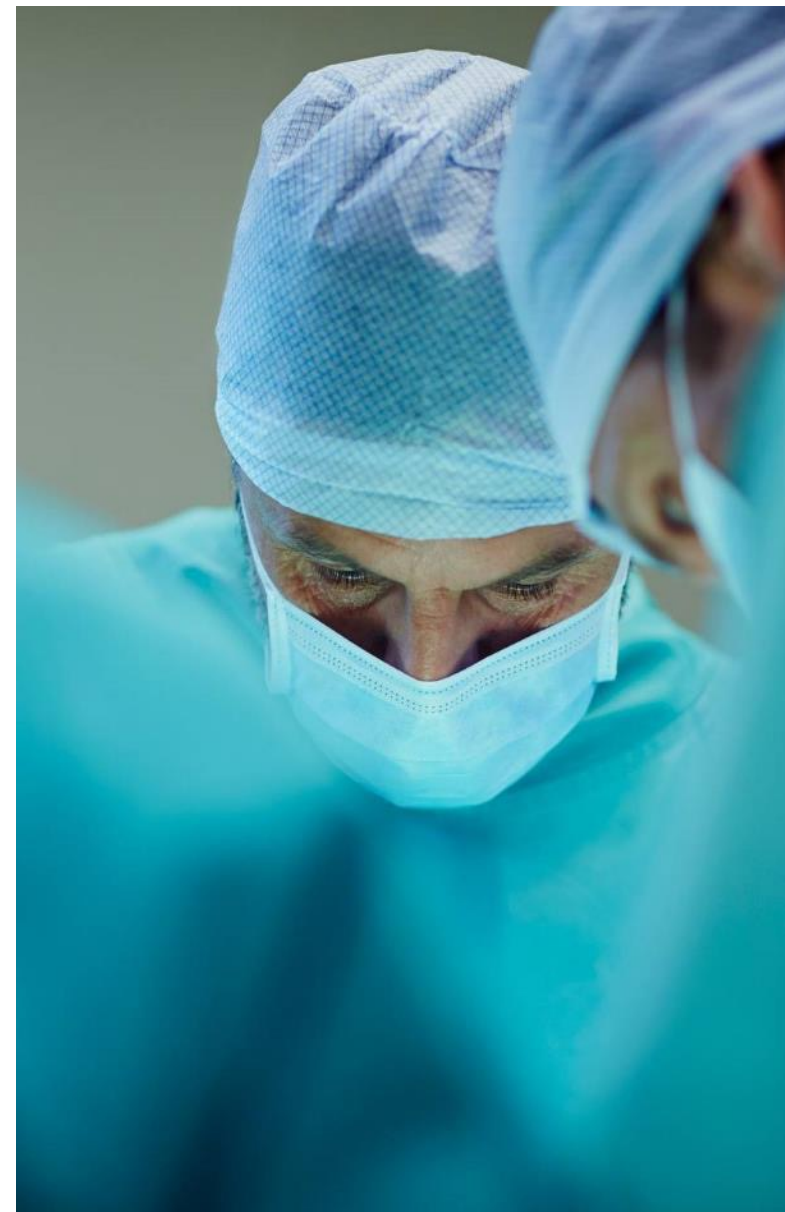
PLEASE, HELP ME DOCTOR!

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AGENDA

- ❖ Introduction
- ❖ Data Collection
- ❖ Sample Dialogue
- ❖ Discussion
- ❖ Future work
- ❖ Demo



INTRODUCTION

WHY?

- Getting an appointment requires patience
- Quick diagnosis or advices are needed to not aggravate the situation
- Could detect emergencies
- Could help reduce the increasing pressure on healthcare systems → which itself will help reducing the waiting time for other patients



USED API:

I have used a fake API as a json file which has all the information needed to give diagnosis, advices and medications if applicable

A sneak peak at medical_conditions.json →

DATA COLLECTION:

Scenario:

A patient seeks help from the _doctor DDD to diagnose his medical condition and return the diagnosis and advices and medications required to get better by examining the symptoms he is having and eliminating other possible diagnosis by asking the right questions

Collected Material:

3 original conversations which were introduced in the first lab and added to it three branches, one of each original conversations to illustrate how two medical conditions can have common symptoms and but one symptom will have the final say in the diagnosis

Distillation and Analysis results:

The distillation process was already done in the first lab and it was mostly modifying the human dialogues to be handled by the system but kept the same coherence and order as it is fundamental to arrive at diagnosis.

```
ddd > http-service > {} medical_conditions.json > {} Drug-induced diarrhea > [Mac] advices
You, 10 hours ago | 1 author (You)

1  {
2    "Hypertension": {
3      "symptoms": ["headache", "shortBreaths"],
4      "inform": "you have Hypertension but it's not too severe.",
5      "advices": "avoid stress, salty food and spices, smoking and Alcohol while it's recommended to do some T",
6      "prescriptions": "For Emergencies, during the seizure, take Captopril 25mg, but not when your blood pres
7    },
8    "Migrain": {
9      "symptoms": ["headache", "agitated", "one_sided", "eye_face_pain"],
10     "inform": "you have a condition we call Head Migraine.",
11     "advices": "avoid stress, smoking, alcohol, and caffeine in small amounts, while it's recommended to do
12     "prescriptions": "For Emergencies, during the seizure, take Sumatriptan 100mg. If still there is no rel
13   }
```



DISTILLED DIALOGUES

S> Hello! What is the problem?
U> Hello! I am fatigued and exhausted!
S> What are you suffering from?
U> Nausea and diarrhea
S> And since when are you feeling this way?
U> Since yesterday
S> How many times you defecated?
U> About 6 times
S> Is the texture watery or loose and what colour is it?
U> Watery and the colour is normal light brown
S> Also, is there any stomachache?
U> Just a little, when I need to defecate
S> Have you eaten fast food or outside lately?
U> Yes yesterday
S> Do you have any appetite for food?
U> Not really
S> What you have, according to your symptoms, is called bowel inflammation. You need to follow a strict diet by increasing your intake of water and fluids, in addition to f/iber which you can find in vegetables and fruits, for at least 3 to 4 days to compensate the loss.
Then, if the condition persists, we urge you to return for a check up.No medications required.
U> Alright! Thanks a million!

S> Hello, what seems to be the problem?
U> Hello, I have been having a severe headache for some time
S> Since when?
U> About 6 months
S> How old you are?
U> I'm 36
S> what do you do for a living?
U> I am an accountant
S> Is the headache agitated by any specific stimulants, loud sound or bright light?
U> No
S> Do you have any neck pains?
U> No
S> Do you have any eye or sight problems?
U> Yes, but I have checked with my ophthalmologist, nothing new.
S> Any other symptoms lately?
U> Yes, lately I am having short breaths like my chest is being closed during the headache
S> Ok you need to do an ECG and measure your blood pressure and your blood oxygen saturation then upload or send them to me.
U> Sure! Just a minute
U> And done!
S> There is on your ECG a few abnormalities, the first is a high voltage QRS and the second is a wide P wave.
Your blood pressure is measured to be 145/95 while your oxygen saturation levels are normal.
U> ok!
S> Are there any hypertension conditions in your family history?
U> Well, yes actually my father had hypertension.
S> According to the tests and your symptoms, you have Hypertension but it's not too severe.
U> ok!
S> All you need to do is avoid stress, salty food and spices, smoking and Alcohol while it's recommended to do some light sports or jogging, eat healthy, measure your blood pressure gradually, especially during the seizure. alright?
U> Yes!
S> For Emergencies, during the seizure, take Captopril 25mg, but not when your blood pressure is below 160/110.
U> Perfect, Thank you so much!

IMPLEMENTATION

- Ask patient about his main symptom
- Between the main symptom (out of 3) will lead us to perform a main action which has two roads(two other actions), each will arrive at a single diagnosis
- In the main action we have the symptoms of which two medical conditions have in common and it will **jump to** the final action once a certain symptom differs between both conditions
- The symptoms will be passed as parameters for an invoke query which will allow us to access our API and pick the medical condition that has the symptoms we collected from the patient and then give us back the diagnosis and advices.
- Before the dialogue end the user will be able to ask about medications after the diagnosis is given and it will also use an invoke query to go to the API and fetch the prescribed medications



A SAMPLE DIALOGUE HANDLED BY MY SYSTEM

Hello! What are you suffering from?

U> I have been having a severe headache for some time

S> How old are you?

U> 32

S> What do you do for a living?

U> I am an accountant

S> Is the headache agitated by any specific stimulants, loud sound or bright light?

U> yes

S> Are the lights in your workplace brighter than normal? or does it annoy you when you are home when the children are playing or yelling?

U> yes

S> Is your headache one-sided or does it spread randomly?

U> it is one sided

S> Could you describe any pain you feel during the seizure?

U> there is a clear pain in the left eye and left side of my face

S> Do you have any neck pains?

U> no

S> Do you wear pre-scripted glasses or do you have any eye or sight problems?

U> yes

S> Any other symptoms?

U> no

S> According to your symptoms you have a condition we call Head Migraine.

U> is there any medications that could help easing the pain

S> as for the medications, For Emergencies, during the seizure, take Sumatriptan 100mg. If still there is no relief after 2 hours you can take another dose.

U> done

S> According to your symptoms you have a condition we call Head Migraine.

U> done

S> All you need to do is avoid stress, smoking, alcohol, and caffeine in small amounts, while it's recommended to do some light sports or jogging, and eat healthy. Finding a calm environment, dark quiet rooms, and applying hot or cold compresses on your head and neck are recommended

U> done



DISCUSSION

It can collect information about the patient's health habits and history, and symptoms from the user and make a final diagnosis.

Capabilities

Can not read the vital signs from another device e.g., a smart watch instead of asking the user to do all the work, which he may not be able to do sometimes

Limitation

Some diagnosis require to do an ECG measure the oxygen saturation or even take a blood sample to get an accurate result, and here that is not possible

Limitation

If a patient has problem with his skin, it might be also good to upload a picture or check it by camera, but that too was not possible

Limitation

Access the journals on I177 to check the medical history of the patient and save a lot of time and questions to make a more precise diagnosis

Limitation

FUTURE WORK

Educational Tool

- This tool for now is an instructional tool but would love for it to be used for educational purposes especially in surgeries
- Use cameras to guide the user through the steps with a better judgement based on what the camera is catching
- The ability to also show videos to the user to do a specific process (e.g., how to measure blood pressure)

Enhancements

- Give access to the 1177 journals to view medical history
- Get the blood pressure, ECG and oxygen saturation by access a smart watch vital signs or upload documents or even measure it using the system itself
- Taking urine and blood samples provided by the user and test it by the system for a specific purpose.



AND NOW
A LIVE DEMO

THANK YOU FOR
YOUR ATTENTION

Sarab Youssef

