

# AIR Mini Project

## Medical Expert System

Code:

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from experta import *

diseases_list = []
diseases_symptoms = []
symptom_map = {}
d_desc_map = {}
d_treatment_map = {}

def preprocess():
    global
    diseases_list, diseases_symptoms, symptom_map, d_desc_map, d_treatment_map
    diseases = open("D:\Study\BE\LP1\Mini Project\AIR\diseases.txt")
    diseases_t = diseases.read()
    diseases_list = diseases_t.split("\n")
    diseases.close()
    for disease in diseases_list:
        disease_s_file = open("D://Study/BE/LP1/Mini Project/AIR/Disease
symptoms/" + disease + ".txt")
        disease_s_data = disease_s_file.read()
        s_list = disease_s_data.split("\n")
        diseases_symptoms.append(s_list)
        symptom_map[str(s_list)] = disease
        disease_s_file.close()
        disease_s_file = open("D://Study/BE/LP1/Mini Project/AIR/Disease
descriptions/" + disease + ".txt")
        disease_s_data = disease_s_file.read()
        d_desc_map[disease] = disease_s_data
        disease_s_file.close()
        disease_s_file = open("D://Study/BE/LP1/Mini Project/AIR/Disease
treatments/" + disease + ".txt")
        disease_s_data = disease_s_file.read()
        d_treatment_map[disease] = disease_s_data
        disease_s_file.close()

def identify_disease(*arguments):
    symptom_list = []
    for symptom in arguments:
        symptom_list.append(symptom)
    # Handle key error
    return symptom_map[str(symptom_list)]
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def get_details(disease):
    return d_desc_map[disease]

def get_treatments(disease):
    return d_treatment_map[disease]

def if_not_matched(disease):
    print("")
    id_disease = disease
    disease_details = get_details(id_disease)
    treatments = get_treatments(id_disease)
    print("")
    print("The most probable disease that you have is %s\n" %(id_disease))
    print("A short description of the disease is given below :\n")
    print(disease_details+"\n")
    print("The common medications and procedures suggested by other real
doctors are: \n")
    print(treatments+"\n")

# @my_decorator is just a way of saying just_some_function =
my_decorator(just_some_function)
#def identify_disease(headache, back_pain, chest_pain, cough, fainting,
sore_throat, fatigue, restlessness, low_body_temp ,fever, sunken_eyes):
class Greetings(KnowledgeEngine):
    @DefFacts()
    def _initial_action(self):
        print("")
        print("Hi! I am Dr.Yar, I am here to help you make your health
better.")
        print("For that you'll have to answer a few questions about your
conditions")
        print("Do you feel any of the following symptoms:")
        print("")
        yield Fact(action="find_disease")

    @Rule(Fact(action='find_disease'), NOT(Fact(headache=W()))), salience = 1)
    def symptom_0(self):
        self.declare(Fact(headache=input("headache: ")))

    @Rule(Fact(action='find_disease'), NOT(Fact(back_pain=W()))), salience = 1)
    def symptom_1(self):
        self.declare(Fact(back_pain=input("back pain: ")))

    @Rule(Fact(action='find_disease'), NOT(Fact(chest_pain=W()))), salience = 1)
    def symptom_2(self):
        self.declare(Fact(chest_pain=input("chest pain: ")))

    @Rule(Fact(action='find_disease'), NOT(Fact(cough=W()))), salience = 1)

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def symptom_3(self):
    self.declare(Fact(cough=input("cough: ")))

@Rule(Fact(action='find_disease'), NOT(Fact(fainting=W()))),salience = 1)
def symptom_4(self):
    self.declare(Fact(fainting=input("fainting: ")))

@Rule(Fact(action='find_disease'), NOT(Fact(fatigue=W()))),salience = 1)
def symptom_5(self):
    self.declare(Fact(fatigue=input("fatigue: ")))

@Rule(Fact(action='find_disease'), NOT(Fact(sunken_eyes=W()))),salience =
1)
def symptom_6(self):
    self.declare(Fact(sunken_eyes=input("sunken eyes: ")))

@Rule(Fact(action='find_disease'), NOT(Fact(low_body_temp=W()))),salience =
1)
def symptom_7(self):
    self.declare(Fact(low_body_temp=input("low body temperature: ")))

@Rule(Fact(action='find_disease'), NOT(Fact(restlessness=W()))),salience =
1)
def symptom_8(self):
    self.declare(Fact(restlessness=input("restlessness: ")))

@Rule(Fact(action='find_disease'), NOT(Fact(sore_throat=W()))),salience =
1)
def symptom_9(self):
    self.declare(Fact(sore_throat=input("sore throat: ")))

@Rule(Fact(action='find_disease'), NOT(Fact( fever=W()))),salience = 1)
def symptom_10(self):
    self.declare(Fact( fever=input("fever: ")))

@Rule(Fact(action='find_disease'), NOT(Fact( nausea=W()))),salience = 1)
def symptom_11(self):
    self.declare(Fact( nausea=input("Nausea: ")))

@Rule(Fact(action='find_disease'), NOT(Fact( blurred_vision=W()))),salience
= 1)
def symptom_12(self):
    self.declare(Fact( blurred_vision=input("blurred_vision: ")))

@Rule(Fact(action='find_disease'),Fact(headache="no"),Fact(back_pain="no")
,Fact(chest_pain="no"),Fact(cough="no"),Fact(fainting="no"),Fact(sore_throat="
no"),Fact(fatigue="yes"),Fact(restlessness="no"),Fact(low_body_temp="no"),Fact

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(fever="yes"),Fact(sunken_eyes="no"),Fact(nausea="yes"),Fact(blurred_vision="no"))
    def disease_0(self):
        self.declare(Fact(disease="Jaundice"))

    @Rule(Fact(action='find_disease'),Fact(headache="no"),Fact(back_pain="no"),Fact(chest_pain="no"),Fact(cough="no"),Fact(fainting="no"),Fact(sore_throat="no"),Fact(fatigue="no"),Fact(restlessness="yes"),Fact(low_body_temp="no"),Fact(fever="no"),Fact(sunken_eyes="no"),Fact(nausea="no"),Fact(blurred_vision="no"))
    def disease_1(self):
        self.declare(Fact(disease="Alzheimers"))

    @Rule(Fact(action='find_disease'),Fact(headache="no"),Fact(back_pain="yes"),Fact(chest_pain="no"),Fact(cough="no"),Fact(fainting="no"),Fact(sore_throat="no"),Fact(fatigue="yes"),Fact(restlessness="no"),Fact(low_body_temp="no"),Fact(fever="no"),Fact(sunken_eyes="no"),Fact(nausea="no"),Fact(blurred_vision="no"))
    def disease_2(self):
        self.declare(Fact(disease="Arthritis"))

    @Rule(Fact(action='find_disease'),Fact(headache="no"),Fact(back_pain="no"),Fact(chest_pain="yes"),Fact(cough="yes"),Fact(fainting="no"),Fact(sore_throat="no"),Fact(fatigue="no"),Fact(restlessness="no"),Fact(low_body_temp="no"),Fact(fever="yes"),Fact(sunken_eyes="no"),Fact(nausea="no"),Fact(blurred_vision="no"))
    def disease_3(self):
        self.declare(Fact(disease="Tuberculosis"))

    @Rule(Fact(action='find_disease'),Fact(headache="no"),Fact(back_pain="no"),Fact(chest_pain="yes"),Fact(cough="yes"),Fact(fainting="no"),Fact(sore_throat="no"),Fact(fatigue="no"),Fact(restlessness="yes"),Fact(low_body_temp="no"),Fact(fever="no"),Fact(sunken_eyes="no"),Fact(nausea="no"),Fact(blurred_vision="no"))
    def disease_4(self):
        self.declare(Fact(disease="Asthma"))

    @Rule(Fact(action='find_disease'),Fact(headache="yes"),Fact(back_pain="no"),Fact(chest_pain="no"),Fact(cough="yes"),Fact(fainting="no"),Fact(sore_throat="yes"),Fact(fatigue="no"),Fact(restlessness="no"),Fact(low_body_temp="no"),Fact(fever="yes"),Fact(sunken_eyes="no"),Fact(nausea="no"),Fact(blurred_vision="no"))
    def disease_5(self):
        self.declare(Fact(disease="Sinusitis"))

    @Rule(Fact(action='find_disease'),Fact(headache="no"),Fact(back_pain="no"),Fact(chest_pain="no"),Fact(cough="no"),Fact(fainting="no"),Fact(sore_throat="no"),Fact(fatigue="yes"),Fact(restlessness="no"),Fact(low_body_temp="no"),Fact

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(fever="no"),Fact(sunken_eyes="no"),Fact(nausea="no"),Fact(blurred_vision="no"
))
    def disease_6(self):
        self.declare(Fact(disease="Epilepsy"))

    @Rule(Fact(action='find_disease'),Fact(headache="no"),Fact(back_pain="no")
,Fact(chest_pain="yes"),Fact(cough="no"),Fact(fainting="no"),Fact(sore_throat=
"no"),Fact(fatigue="no"),Fact(restlessness="no"),Fact(low_body_temp="no"),Fact
(fever="no"),Fact(sunken_eyes="no"),Fact(nausea="yes"),Fact(blurred_vision="no
"))
    def disease_7(self):
        self.declare(Fact(disease="Heart Disease"))

    @Rule(Fact(action='find_disease'),Fact(headache="no"),Fact(back_pain="no")
,Fact(chest_pain="no"),Fact(cough="no"),Fact(fainting="no"),Fact(sore_throat="
no"),Fact(fatigue="yes"),Fact(restlessness="no"),Fact(low_body_temp="no"),Fact
(fever="no"),Fact(sunken_eyes="no"),Fact(nausea="yes"),Fact(blurred_vision="ye
s"))
    def disease_8(self):
        self.declare(Fact(disease="Diabetes"))

    @Rule(Fact(action='find_disease'),Fact(headache="yes"),Fact(back_pain="no"
),Fact(chest_pain="no"),Fact(cough="no"),Fact(fainting="no"),Fact(sore_throat=
"no"),Fact(fatigue="no"),Fact(restlessness="no"),Fact(low_body_temp="no"),Fact
(fever="no"),Fact(sunken_eyes="no"),Fact(nausea="yes"),Fact(blurred_vision="ye
s"))
    def disease_9(self):
        self.declare(Fact(disease="Glaucoma"))

    @Rule(Fact(action='find_disease'),Fact(headache="no"),Fact(back_pain="no")
,Fact(chest_pain="no"),Fact(cough="no"),Fact(fainting="no"),Fact(sore_throat="
no"),Fact(fatigue="yes"),Fact(restlessness="no"),Fact(low_body_temp="no"),Fact
(fever="no"),Fact(sunken_eyes="no"),Fact(nausea="yes"),Fact(blurred_vision="no
"))
    def disease_10(self):
        self.declare(Fact(disease="Hyperthyroidism"))

    @Rule(Fact(action='find_disease'),Fact(headache="yes"),Fact(back_pain="no"
),Fact(chest_pain="no"),Fact(cough="no"),Fact(fainting="no"),Fact(sore_throat=
"no"),Fact(fatigue="no"),Fact(restlessness="no"),Fact(low_body_temp="no"),Fact
(fever="yes"),Fact(sunken_eyes="no"),Fact(nausea="yes"),Fact(blurred_vision="n
o"))
    def disease_11(self):
        self.declare(Fact(disease="Heat Stroke"))

    @Rule(Fact(action='find_disease'),Fact(headache="no"),Fact(back_pain="no")
,Fact(chest_pain="no"),Fact(cough="no"),Fact(fainting="yes"),Fact(sore_throat=
"no"),Fact(fatigue="no"),Fact(restlessness="no"),Fact(low_body_temp="yes"),Fac

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t(fever="no"),Fact(sunken_eyes="no"),Fact(nausea="no"),Fact(blurred_vision="no
"))
    def disease_12(self):
        self.declare(Fact(disease="Hypothermia"))

    @Rule(Fact(action='find_disease'),Fact(disease=MATCH.disease),salience = -
998)
    def disease(self, disease):
        print("")
        id_disease = disease
        disease_details = get_details(id_disease)
        treatments = get_treatments(id_disease)
        print("")
        print("The most probable disease that you have is %s\n" %(id_disease))
        print("A short description of the disease is given below :\n")
        print(disease_details+"\n")
        print("The common medications and procedures suggested by other real
doctors are: \n")
        print(treatments+"\n")

    @Rule(Fact(action='find_disease'),
        Fact(headache=MATCH.headache),
        Fact(back_pain=MATCH.back_pain),
        Fact(chest_pain=MATCH.chest_pain),
        Fact(cough=MATCH.cough),
        Fact(fainting=MATCH.fainting),
        Fact(sore_throat=MATCH.sore_throat),
        Fact(fatigue=MATCH.fatigue),
        Fact(low_body_temp=MATCH.low_body_temp),
        Fact(restlessness=MATCH.restlessness),
        Fact(fever=MATCH.fever),
        Fact(sunken_eyes=MATCH.sunken_eyes),
        Fact(nausea=MATCH.nausea),
        Fact(blurred_vision=MATCH.blurred_vision),NOT(Fact(disease=MATCH.dis
ease))),salience = -999)

    def not_matched(self,headache, back_pain, chest_pain, cough, fainting,
sore_throat, fatigue, restlessness,low_body_temp ,fever ,sunken_eyes ,nausea
,blurred_vision):
        print("\nDid not find any disease that matches your exact symptoms")
        lis = [headache, back_pain, chest_pain, cough, fainting, sore_throat,
fatigue, restlessness,low_body_temp ,fever ,sunken_eyes ,nausea
,blurred_vision]
        max_count = 0
        max_disease = ""
        for key,val in symptom_map.items():
            count = 0
            temp_list = eval(key)

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        for j in range(0,len(lis)):
            if(temp_list[j] == lis[j] and lis[j] == "yes"):
                count = count + 1
            if count > max_count:
                max_count = count
                max_disease = val
        if_not_matched(max_disease)

if __name__ == "__main__":
    preprocess()
    engine = Greetings()
    while(1):
        engine.reset() # Prepare the engine for the execution.
        engine.run() # Run it!
        print("Would you like to diagnose some other symptoms?")
        if input() == "no":
            exit()
        #print(engine.facts)

```

## Output:

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For that you'll have to answer a few questions about your conditions
Do you feel any of the following symptoms:

Nausea: yes
fatigue: yes
fever: no
chest pain: yes
restlessness: yes
blurred vision: no
sunken eyes: yes
low body temperature: no
headache: yes
back pain: no
sore throat: yes
fainting: no
cough: yes

Did not find any disease that matches your exact symptoms

The most probable disease that you have is Asthma

A short description of the disease is given below :

Asthma is a common long-term inflammatory disease of the airways of the lungs.
It is characterized by variable and recurring symptoms, reversible airflow obstruction, and bronchospasm.

Asthma is thought to be caused by a combination of genetic and environmental factors.
Environmental factors include exposure to air pollution and allergens.

Other potential triggers include medications such as aspirin and beta blockers.

Diagnosis:
Diagnosis is usually based on the pattern of symptoms, response to therapy over time, and spirometry.

Asthma is classified according to the frequency of symptoms, forced expiratory volume in one second (FEV1), and peak expiratory flow rate.

It may also be classified as atopic or non-atopic, where atopy refers to a predisposition toward developing a type 1 hypersensitivity reaction.

The common medications and procedures suggested by other real doctors are:

There is no cure for asthma.

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