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Project: HealthCare ChatBot

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#using the concept of decision-tree

import pandas as pd
import numpy as np
import random
from sklearn import preprocessing
from sklearn.tree import DecisionTreeClassifier,_tree
from sklearn.cross_validation import train_test_split
from sklearn import cross_validation
#for ignoring the warnings
import warnings
warnings.filterwarnings("ignore", category=DeprecationWarning)
import matplotlib.pyplot as plt

# Importing the dataset
training = pd.read_csv('Training.csv')
testing  = pd.read_csv('Testing.csv')
# saving the information of columns
cols     = training.columns
cols     = cols[:-1]
# Slicing and Dicing the dataset to separate features from predictions
x       = training[cols]
y       = training['prognosis']
y1      = y

# dimensionality Reduction for removing redundancies
reduced_data = training.groupby(training['prognosis']).max()

# encoding/mapping String values to integer constants
le = preprocessing.LabelEncoder()
le.fit(y)
y = le.transform(y)

# Splitting-the-dataset-into-training-set-and-test set
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.33, random_state=42)
# print(x_test)
testx    = testing[cols]
testy    = testing['prognosis']
testy    = le.transform(testy)
#greetings
GREETING_INPUTS = ("hello", "hi", "greetings", "sup", "what's up","hey",)
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GREETING_RESPONSES = ["hi", "hey", "*nods*", "hi there", "hello", "I am glad! You are
talking to me"]

#implement the Decision-Tree-Classifier
clf1  = DecisionTreeClassifier()
clf = clf1.fit(x_train,y_train)
# checking the Important features
importances = clf.feature_importances_
indices = np.argsort(importances)[::-1]
features = cols

def greeting(sentence):
    """If user's input is a greeting, return a greeting response"""
    for word in sentence.split():
        if word.lower() in GREETING_INPUTS:
            return random.choice(GREETING_RESPONSES)
def print_disease(node):
    node = node[0]
    val  = node.nonzero()
    disease = le.inverse_transform(val[0])
    return disease

def tree_to_code(tree, feature_names):
    tree_ = tree.tree_

    feature_name = [
        feature_names[i] if i != _tree.TREE_UNDEFINED else "undefined!"
        for i in tree_.feature
    ]
    symptoms_present = []
    def recurse(node, depth):
        indent = "  " * depth
        if tree_.feature[node] != _tree.TREE_UNDEFINED:
            name = feature_name[node]  #storing disease name from the file
            threshold = tree_.threshold[node]
#             print(threshold)
            print("Healtho: "+ name + " ?")
            ans = input()
            ans = ans.lower()
            if ans == 'yes':
                val = 1
            elif ans == 'no':
                val = 0
            else:
                print("Healtho: I am sorry! I don't understand you")
                val = 0
            if  val <= threshold:
```

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            recurse(tree_.children_left[node], depth + 1)
        else:
            symptoms_present.append(name)
            recurse(tree_.children_right[node], depth + 1)
    else:

        present_disease = print_disease(tree_.value[node])
        for di in present_disease:
            diss=di
        for i in symptoms_present:
            dis=i
        print( "Healtho: You may have " +diss)
        red_cols = reduced_data.columns
        symptoms_given = red_cols[reduced_data.loc[present_disease].values[0].nonzero()]
        print("Healtho: symptoms present " +dis)
        indexx=np.arange(1,len(symptoms_given)+1)
        data=pd.DataFrame(list(symptoms_given),index=[indexx],columns=['OTHER
SYMPTOMS'])
        print(data)
        import csv
        f=open('doc_consult.csv','r')
        read=csv.reader(f)
        consult={}
        consult_doc=[' YES','NO']

        for row in read:
            consult[row[0]]=int(row[1]) #converting csv to dictionary
        if(consult[diss]>50):
            print("Healtho: You should consult a doctor as soon as possible")
            data1=[consult[diss],0]
            plt.ylim([0,100])
            plt.bar(consult_doc,data1,align='center',color='red',width=0.15)
            plt.ylabel('Risk')
            plt.xlabel('Consult a doctor')
            plt.show()

        else:
            print("Healtho: You may consult a doctor")
            data1=[0,consult[diss]]
            plt.ylim([0,100])
            plt.bar(consult_doc,data1,align='center',color='red',width=0.15)
            plt.ylabel('Risk')
            plt.xlabel('Consult a doctor')
            plt.show()


recurse(0, 1)
```

```
flag=True
print("Healtho: My name is Healtho. I will answer your queries about your health related problem. If you want to exit, type Bye!")
while(flag==True):

    user_response=input()
    user_response=user_response.lower()

    if(user_response!='bye'):
        if(user_response=='thanks' or user_response=='thank you' ):
            flag=False
            print("Healtho: You are welcome..")

        else:
            if(greeting(user_response)!=None):
                print("Healtho: "+greeting(user_response))
                print("Healtho: Please reply Yes or No for the following symptoms")
                tree_to_code(clf,cols)
            else:
                print("Healtho: I am sorry! I don't understand you")
                flag=True

    else:
        flag=False
        print("Healtho: Bye! take care..")
```

OUTPUTS

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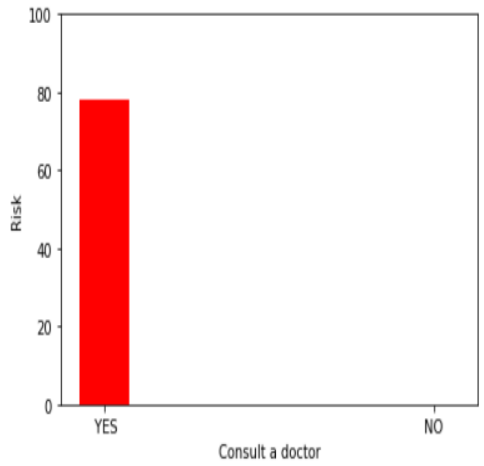
Run Code

```
Healtho: My name is Healtho. I will answer your queries about your health related problem. If you want to exit, type
Bye!
hey
Healtho: I am glad! You are talking to me
Healtho: Please reply Yes or No for the following symptoms
Healtho: throat_irritation ?
no
Healtho: internal_itching ?
no
Healtho: hip_joint_pain ?
yes
Healtho: You may have Osteoarthristis
Healtho: symptoms present hip_joint_pain
    OTHER SYMPTOMS
1       joint_pain
2        neck_pain
3        knee_pain
4   hip_joint_pain
5  swelling_joints
6  painful_walking
Healtho: You should consult a doctor as soon as possible
```




```
frtqrtf
Healtho: I am sorry! I don't understand you
thank you
Healtho: You are welcome..
```

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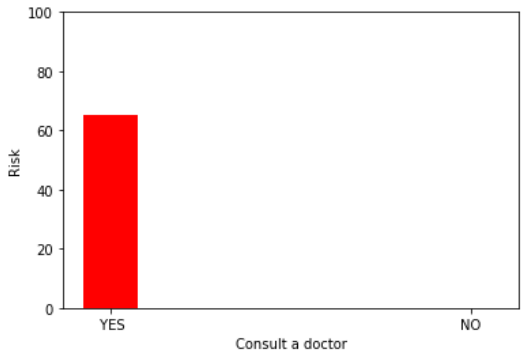
Run Code

```
Healtho: My name is Healtho. I will answer your queries about your health related problem. If you want to exit, type Bye!
hey
Healtho: hello
Healtho: Please reply Yes or No for the following symptoms
Healtho: runny_nose ?
no
Healtho: internal_itching ?
no
Healtho: hip_joint_pain ?
no
Healtho: polyuria ?
no
Healtho: silver_like_dusting ?
no
Healtho: enlarged_thyroid ?
yes
Healtho: You may have Hypothyroidism
Healtho: symptoms present enlarged_thyroid
          OTHER SYMPTOMS
1                 fatigue
2             weight_gain
3    cold_hands_and_feets
4             mood_swings
5                lethargy
6               dizziness
7     puffy_face_and_eyes
8        enlarged_thyroid
9           brittle_nails
10    swollen_extremeties
11             depression
12           irritability
13  abnormal_menstruation
Healtho: You should consult a doctor as soon as possible
```




```
bye
Healtho: Bye! take care..
```

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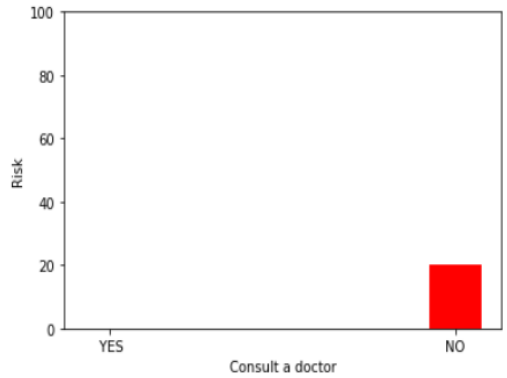
Run Code

```
Healtho: My name is Healtho. I will answer your queries about your health related problem. If you want to exit, type
Bye!
greetings
Healtho: I am glad! You are talking to me
Healtho: Please reply Yes or No for the following symptoms
Healtho: redness_of_eyes ?
yes
Healtho: You may have Common Cold
Healtho: symptoms present redness_of_eyes
         OTHER SYMPTOMS
1   continuous_sneezing
2                chills
3               fatigue
4                 cough
5           high_fever
6             headache
7   swelled_lymph_nodes
8               malaise
9                phlegm
10    throat_irritation
11      redness_of_eyes
12       sinus_pressure
13           runny_nose
14           congestion
15           chest_pain
16        loss_of_smell
17          muscle_pain
Healtho: You may consult a doctor
```




```
thank you
Healtho: You are welcome..
```