Assignment 5

Create a NL interface for your electives advisory system

The task is to build natural language interface for electives advisory system. Firstly, the welcome note is printed and then the user is prompted for the specialization. For the specialization choosing, the user can write any sentence which contains his/ her specialization stated clearly but he is free to write any sentence. To take specialization “AI” he can write following sentences like:

- I have planned to take Artificial intelligence
- Really like artificial intelligence so will go for it
- Artificial intelligence
- I will take artificial intelligence
- I really like AI and I am amazed by it, so will take Artificial Intelligence

Now, from sentence, after tokenization, the stemming is done where the specialization is identified from any sort of sentence that clearly states specialization.

The code for the same is shown below.

```
# printing welcome note
print('------------------------------------------------------------------------
-------------------------')
print('Welcome to Avvisare 2.0: Elective Advisory System')
print('------------------------------------------------------------------------
-------------------------')
print('Are you confused about which all electives to take as per career you
want to pursue in future?')
print('If yes, you are at right place, I will help you out.')
print('If no, nevertheless I would help you to validate your electives
choice.')
print('By the way, My name is Avvisare. What\'s your name? (Nickname will
also work) ')
Name = input()
print('\nHi, {}. Let\'s together explore the choices for
electives.'.format(Name))
print('What\'s the specialization that you have planned for?')
print('-> Artificial Intelligence')
print('-> Data Engineering')
print('-> Information Security')
spl = input()

# tokenizing and stemming the specialization
ps = PorterStemmer()
splinput = word_tokenize(spl)
splinput_stem = []
```

```
for i in splinput:
    splinput_stem.append(ps.stem(i))

# checking for artificial intelligence
if 'artifici' in splinput_stem:
    if 'intellig' in splinput_stem:
        spl = 'ai'

# checking for data engineering
if 'data' in splinput_stem:
    if 'engin' in splinput_stem:
        spl = 'de'

# checking for information security
if 'inform' in splinput_stem:
    if 'secur' in splinput_stem:
        spl = 'is'
```

Similarly, the user is then prompted to tell his level of interest in various things that will finally help to decide his/her electives. The user can write any sentence that clearly states his/her interest as “no” interest, “low” interest, “medium” interest, “high” interest, “very high” interest or “really high” interest. The words in double quotes must be in sentence, rest sentence can be formed in any way. For example, person can write the sentence in following ways.

- Ummm… I don’t like it so call it no interest
- I love it and wanna explore it, I have really high interest in it.
- No, low interest in it

Now, as per the sentence the words stating the interest are captured via tokenizing and stemming and then they are mapped with numbers as 0, 1, 2, 3, 4 for as “no” interest, “low” interest, “medium” interest, “high” interest, “very high” interest or “really high” interest respectively. The function for the same is shown below.

```
# function to map interest in english to a number
def eng_interest_to_number(x):
    x = word_tokenize(x)  # tokenizing
    ps = PorterStemmer()  # for stemming
    l = []                # list to have words after stemming
    for i in x:
        l.append(ps.stem(i))
    if 'no' in l:
        return 0
    elif 'low' in l:
        return 1
    elif 'medium' in l:
        return 2
    elif 'high' in l:
        if 'veri' in l:
```

```
            return 4
        elif 'realli' in l:
            return 4
        else:
            return 3
```

Now, these interest levels are asserted as facts in file ‘temp.pl’ The facts are written via the code given below.

```
# writing facts in file
f = open("temp.pl", 'w')

# asking questions based on specialization
if spl == 'ai':
    x = input("Level of interest in developing supervised and unsupervised
ML models? ")
    x = eng_interest_to_number(x)
    f.write("interest('ML',{}).\n".format(x))
    x =  input("Level of interest in logic, reasoning, and knowledge
representation? ")
    x = eng_interest_to_number(x)
    f.write("interest('AI',{}).\n".format(x))
    x =  input("Level of interest in designing of algorithms and checking
correctness? ")
    x = eng_interest_to_number(x)
    f.write("interest('GA',{}).\n".format(x))
    x =  input("Level of interest in looking into data and catching
insights? ")
    x = eng_interest_to_number(x)
    f.write("interest('DMG',{}).\n".format(x))
    x =  input("Level of interest in processing of natural language text and
processing it? ")
    x = eng_interest_to_number(x)
    f.write("interest('NLP',{}).\n".format(x))
    x =  input("Level of interest in deep learning? ")
    x = eng_interest_to_number(x)
    f.write("interest('DL',{}).\n".format(x))
    f.close()
elif spl == 'de':
    x =  input("Level of interest in developing supervised and unsupervised
ML models? ")
    x = eng_interest_to_number(x)
    f.write("interest('ML',{}).\n".format(x))
    x =  input("Level of interest in databases and their internals? ")
    x = eng_interest_to_number(x)
    f.write("interest('DBSI',{}).\n".format(x))
    x =  input("Level of interest in designing of algorithms and checking
correctness? ")
```

```
    x = eng_interest_to_number(x)
    f.write("interest('GA',{}).\n".format(x))
    x =  input("Level of interest in looking into data and catching
insights? ")
    x = eng_interest_to_number(x)
    f.write("interest('DMG',{}).\n".format(x))
    x =  input("Level of interest in processing of natural language text and
processing it? ")
    x = eng_interest_to_number(x)
    f.write("interest('NLP',{}).\n".format(x))
    x =  input("Level of interest in collecting and managing data from
varied sources to provide meaningful business insights? ")
    x = eng_interest_to_number(x)
    f.write("interest('DW',{}).\n".format(x))
    f.close()
else:
    x =  input("Level of interest in knowing about theoretical aspects of
cryptograhic algorithms like the one that secures Zoom? ")
    x = eng_interest_to_number(x)
    f.write("interest('TMC',{}).\n".format(x))
    x =  input("Level of interest in computer networks and network security?
")
    x = eng_interest_to_number(x)
    f.write("interest('NSC',{}).\n".format(x))
    x =  input("Level of interest in knowing practical aspects of
cryptographic algorithms? ")
    x = eng_interest_to_number(x)
    f.write("interest('AC',{}).\n".format(x))
    x =  input("Level of interest in software vulnerabilities, access
control primitives? ")
    x = eng_interest_to_number(x)
    f.write("interest('SE',{}).\n".format(x))
    f.close()
```

After asserting the facts, ‘temp.pl’ looks like as shown below.

temp.pl

```
1   interest('ML',4).
2   interest('AI',2).
3   interest('GA',0).
4   interest('DMG',2).
5   interest('NLP',3).
6   interest('DL',0).
```

Now, finally ‘electives.pl’ is consulted and query is made for electives that user can take. Any elective that user can take is decided by condition given below. (Not full screenshot, but some important lines)

```
can_take_elective(X):-
    interest(X,InterestLevel),
    InterestLevel >= 2.

elective('ML'):-
    can_take_elective('ML'),
    nl,
    write('------------------------------------------------------------------
-----'),nl,
    format('MACHINE LEARNING
    COURSE CODE: CSE543
    COURSE DETAILS:
http://techtree.iiitd.edu.in/viewDescription/filename?=CSE343
    Feedback or Suggestion from Seniors:
    The course is really awesome, but only theoretical concepts are covered
    but you can take help of TAs for practical aspects. It goes indepth in
theory.
    It is a little heavy course in terms of workload, so be consistent.
    This course is helpful in placements for AI role.'),nl,
    write('------------------------------------------------------------------
-----').

should_take(X):-
    consult("temp.pl"),
    elective(X).
```

The python query that makes the above possible is shown below.

```
# consulting file
swipl = Prolog()
swipl.consult("elective.pl")
elective_list = list(swipl.query("should_take(X)"))
print(elective_list)
```

That’s it for the code and it’s explanation. The comments are also added in code file to talk about what is happening around. See the output on next page.

LET'S SEE AVVISARE IN ACTION (THE OUTPUT)

NOTE: Inputs are shown in blue

Welcome to Avvisare 2.0: Elective Advisory System

Are you confused about which all electives to take as per career you want to pursue in future?
If yes, you are at right place, I will help you out.
If no, nevertheless I would help you to validate your electives choice.
By the way, My name is Avvisare. What's your name? (Nickname will also work)
Simran

Hi, Simran. Let's together explore the choices for electives.
What's the specialization that you have planned for?
-> Artificial Intelligence
-> Data Engineering
-> Information Security
Well, I really like artificial intelligence so I have planned for it

Sure, great choice. You will surely do well in AI.
Let's try to find the electives which you can take.
For that, now you have to answer a few questions concerning yourself.
Kindly respond about your interest in electives as:
No interest
Low interest
Medium interest
High interest
Very high interest/ Really high interest

Level of interest in developing supervised and unsupervised ML models? I really have high interest into it
Level of interest in logic, reasoning, and knowledge representation? ummm... medium interest I can say
Level of interest in designing of algorithms and checking correctness? Seriously no interest
Level of interest in looking into data and catching insights? I like it so call it medium interest
Level of interest in processing of natural language text and processing it? For this, I have high interest
Level of interest in deep learning? nopes, no interest

****
HERE IS THE LIST OF ELECTIVES SPECIALLY FOR YOU BASED ON YOUR INTEREST
****

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ARTIFICIAL INTELLIGENCE
COURSE CODE: CSE643
COURSE DETAILS: http://techtree.iiitd.edu.in/viewDescription/filename?=CSE643
Feedback or Suggestion from Seniors:
It really goes deep into AI. The three main aspects are covered
Logic, Reasoning and Knowledge Representation. The course is okay in terms of workload
Assignments really require much efforts but they enhance skills.

DATA MINING
COURSE CODE: CSE506
COURSE DETAILS: http://techtree.iiitd.edu.in/viewDescription/filename?=CSE506
Feedback or Suggestion from Seniors:
This course is okay in terms of workload and quite practical
It gives you good hands on practice. The marking is really tight.
It is tough to get good grade because almost everyone performs well.

NATURAL LANGUAGE PROCESSING
COURSE CODE: CSE556
COURSE DETAILS: http://techtree.iiitd.edu.in/viewDescription/filename?=CSE556
Feedback or Suggestion from Seniors:
Those who love text processing and working with text data would love this course.
It is really heavy in terms of workload. But when you do this course
you would really feel power in your hands to make full fleged system.
[{'X': 'ML'}, {'X': 'AI'}, {'X': 'DMG'}, {'X': 'NLP'}]

I really hope that my suggestions were valuable.
Have a great time at IIITD.

SCREENSHOT

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL
9.exe "c:/Users/Simran/Downloads/Subjects/AI/Assignment/Assignment 5/AI-A5-Simran-MT21146/code/nl_interface.py"
--------------------------------------------------------------------------------------------------
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----------------------------------------------------------------------
        I really hope that my suggestions were valuable.
        Have a great time at IIITD.
----------------------------------------------------------------------
----------------------------------------------------------------------
PS C:\Users\Simran\Downloads\Subjects\AI\Assignment\Assignment 5\AI-A5-Simran-MT21146\code>
```