Artificial Intelligence - Assignment 1

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Short Description:

This is a report for elective advisory system for **IIIT-D MTech CSE Courses**, which will suggest you the electives with its intelligence and reasoning based on CGPA and the specialization selected.

If you are an extraordinary student then it will suggest you slightly tougher subjects and for the mediocre students, it will suggest slightly easy courses.! Although there is nothing easy in IIIT-D but still...!!! For the students just admitted to IIITD, there won't be any CGPA so for them it will give you different courses based on the interest and learning in BTech Courses.

There is folder named **"Ass1_AI"** and there are 2 files in it => **main.pl** and **temporary.pl**

In main.pl, the entire logic is present and temporary.pl is the temporary database which stores the dynamic facts based on the input.

At first we will consult main.pl and will write 'advice.' on the screen.

```
% c:/Users/HP/Desktop/Prolog/Ass1_AI/main.pl compiled 0.00 sec, 2 clauses
?- advice.
```

Work Flow:

Initially we will start with typing **'?-advice.**' After that it will asks us various inputs like Name, CGPA, etc. We will enter all the inputs in the string format but because CGPA should be a number we will convert it to number using **atom_number(x,y)** function. This advisory system is designed for MTech courses in which a student can be of first as well as second year. So, if the student is not a fresher then it will definitely have a CGPA but if it a fresher i.e., **first year** then for such students they have to enter **CGPA = 0** as input in the form of string. Later it will be converted to number.

Lets see some cases on a border perspective:-

Case A) After entering CGPA, it will ask in which specialization you are interested. There are 4 different Specialization that I have offered.

1. General CSE.
2. Artificial Intelligence.
3. Information Security.
4. Data Engineering.

After taking input for this it will call the **check(Cgpa,Ans):-** Rule and in that it will check for the range of the Cgpa and Based on the specialization chosen, it will call the rule **choice_med/high:-**

. We have stored our facts in the form of 'list' in the knowledge base. As soon as we map our function to the appropriate list **it iterates over list using recursion** and prints all the related output.

The output vary according to the CGPA of the student.

Case B) If the student is fresher and then it will enter zero and after that **fresher:-** rule is called. In that rule it will ask for its CGPA in BTech, What is the most favorite subject of BTech. The subjects which I have provided are:-

1. Maths.
2. DBMS.
3. CN.

It will asks some question related to chosen subject and he/she has to enter it in the form of ratings on the scale of 0-4. Based on the input given it will **assert** all the inputs into our **temporary.pl** file. It has all the inputs entered dynamically. Every time we start our system it will clear all the past entries using **clear:-** rule and start from fresh. With the help of assert we store things in our database but to make it permanently we will save this into temporary.pl file using **save:-** rule. Later when all the input taking is done, we need to type **eligible(X).** Then it will start searching for all the X's which are above the threshold value which is here set as '2'. It will traverse all the possible subjects and which fites bests, it will return those subjects.

SAMPLE SS

Case A.a) Input: Higher CGPA and AI Specialization

```
System: Please Enter your name:
Note: Please Enter text in the form of string(single apostrophe) with a full stop.
You: 'Ritisha'.

System: Hello Ritisha!!
System: This is an advisory system which will suggest you the electives based on the cgpa you have and Specialization you choose.

System: What is the current CGPA going on?
If first sem student then enter 0)
Note: Please Enter CGPA in the form of string(single apostrophe) with a full stop.
You: |: '8.9'.


System: We offer different courses and specialisations.
System: What are you interested in.?
Note: Please enter input as specified in [] square braces in the form of string(single apostrophe) with a full stop.
1) General degree [General]
2) Artificial Intelligence specialisation [AI]
3) Information Security specialisation [IS]
4) Data Engineering specialisation [DE]
|: 'AI'.

System: Based on the Cgpa and specialisation choosen, these subjects are appropraite to take:
Advanced Computer Vision
Natural Language Processing (CSE556)
Bayesian Machine Learning
Image Analysis
Advanced Biometrics


true .

?-
```

Case A.b) Input: Slighly Lower CGPA and AI Specialization

```
System: Please Enter your name:
Note: Please Enter text in the form of string(single apostrophe) with a full stop.
You: 'Pranoy'.

System: Hello Pranoy!!
System: This is an advisory system which will suggest you the electives based on the cgpa you have and Specialization

System: What is the current CGPA going on?
If first sem student then enter 0)
Note: Please Enter CGPA in the form of string(single apostrophe) with a full stop.
You: |: '7.2'.


System: We offer different courses and specialisations.
System: What are you interested in.?
Note: Please enter input as specified in [] square braces in the form of string(single apostrophe) with a full stop.
1) General degree [General]
2) Artificial Intelligence specialisation [AI]
3) Information Security specialisation [IS]
4) Data Engineering specialisation [DE]
|: 'AI'.

System: Based on the Cgpa and specialisation choosen:-
These subjects are appropraite to take:

Robotics
Computer Vision
Probability and Random Processes
Information Retrievel
Data Mining


true .

?-
```

Case B) If the student is of MTech First year then it doesn't have the CGPA hence we will suggest subjects based on its interest of BTech Subjects.

```
System: Please Enter your name:
Note: Please Enter text in the form of string(single apostrophe) with a full stop.
You: 'Sakshi'.

System: Hello Sakshi!!
System: This is an advisory system which will suggest you the electives based on the cgpa yo

System: What is the current CGPA going on?
If first sem student then enter 0)
Note: Please Enter CGPA in the form of string(single apostrophe) with a full stop.
You: |: '0'.


System: Lets explore courses together for you.
Note: Please Enter every entry in the form of string(single apostrophe) with a full stop.
System: What was your Cgpa in Btech?
You: |: '8.7'.


System: From below listed subjects of Btech, which captures your interest more?
1) Mathematics. [Maths]
2) Database Management System. [DBMS]
3) Computer Networks. [CN]
Note: Please enter input as specified in [] square braces in the form of string(single apost:
You:  |: 'Maths'.


System: Rate yourself from 0 to 4.

0 => no knowledge/interest
1 => low knowledge/interest
2 => med knowledge/interest
3 => high knowledge/interest
4 => proficiency knowledge/interest
```

```
Note: Please enter in the form of number followed by a full stop.

Please answer the following questions:
Want to learn basic security concepts?:
|: 3.
Have interest in ethical hacking?:
|: 1.
Want to work on securing the perwsonal privacy?:
|: 2.
System: To check the suggested electives type eligible(X) as next command.
true.

?- eligible(X).

FCS
X = 'Foundations to Computer Security (CSE545)' ;

Network Anonymity and Privacy
X = 'Network Anonymity and Privacy (CSE749)'.

?-
```

CODE: main.pl

```
cls :- write('\33\[2J').

% defining facts.
listAIchoicehigh(['Advanced Computer Vision','Natural Language Processing
(CSE556)','Bayesian Machine Learning','Image Analysis','Advanced Biometrics']).
listAIchoicemedd(['Robotics','Computer Vision','Probability and Random
Processes','Information Retrievel','Data Mining']).
listDEchoicehigh(['Statistical Machine Learning (CSE542)','Probabilistic
Graphical Models (CSE561 )','Distributed Data Mining','Mining Large Networks
(CSE559)','Natural Language Processing (CSE556)']).
listDEchoicemedd(['Data Mining (CSE506)','Information Retrieval (CSE508)','Cloud
Computing (CSE569)','  Machine Learning (CSE543)','Database System Implementation
(CES507)']).
listISchoicehigh(['Distributed Systems Security (CSE530)','Network Protocol
Security (CSE649)','Ethical Hacking (CSE798A)','Mobile and Cellular Network
Security (CSE647)','Ethical Hacking (CSE798A)']).
listISchoicemedd(['Foundations to Computer Security (CSE545)','Network Security
(CSE550)','Security Engineering (CSE552)','Theory of Modern Cryptography
(CSE524)']).
listGenchoicehigh(['Modern Algorithm Design(CSE519)','Mobile Computing
(CSE535)','Compiler (CSE601)','Randomized Algorithms (CSE523)']).
listGenchoicemedd(['Graduate Algorithms (CSE525)','Wireless Networks (CSE638
)','Information Retrieval (CSE508)','Program Analysis (CSE503)']).

% starting of the code. First we will type the command "advice.".
advice:-
    reconsult('C:/Users/HP/Desktop/Prolog/Ass1_AI/temporary.pl'),nl,
```

```
    cls,
    write('System: Please Enter your name: '),nl,
    write('Note: Please Enter text in the form of string(single apostrophe) with
a full stop.'),nl,
    write('You: '),read(Name),nl,
    write('System: Hello '),write(Name),write('!!'),nl,
    write('System: This is an advisory system which will suggest you the
electives based on the cgpa you have and Specialization you choose.'),nl,nl,
    write('System: What is the current CGPA going on?'),nl,write('If first sem
student then enter 0)'),nl,
    write('Note: Please Enter CGPA in the form of string(single apostrophe) with
a full stop.'),nl,
    write('You: '),
    read(Cgpa),nl,nl,
    atom_number(Cgpa,Y),
    (Y=\=0 ->
        write('System: We offer different courses and
specialisations.'),nl,write('System: What are you interested in.?'),nl,
        write('Note: Please enter input as specified in [] square braces in the
form of string(single apostrophe) with a full stop.'),nl,
        write('1) General degree [General]'),nl,
        write('2) Artificial Intelligence specialisation [AI]'),nl,
        write('3) Information Security specialisation [IS]'),nl,
        write('4) Data Engineering specialisation [DE]'),nl,
        read(Ans),nl,
        check(Cgpa,Ans),
        true
    ;
    freshers()).


check(Cgpa,Ans):-
    % write('inside check'),nl,
    atom_number(Cgpa,X),            % convert to integer

    (X>=8->                         % depending on cgpa we will suggest subjects.
        % write('hi >8'),
        choice_high(Ans),
        true
    ;
    (X<8->
        choice_medium(Ans),
        true
    )).
```

```
iterate_list([]).                   % base case
iterate_list([H|T]):- write(H),nl,iterate_list(T).

choice_high('AI'):-                 % cgpa>=8.
    write('System: Based on the Cgpa and specialisation choosen, these subjects
are appropraite to take: '),nl,
    listAIchoicehigh(X),
    (iterate_list(X);true),nl,nl.

choice_high('General'):-
    write('System: Based on the Cgpa and specialisation choosen:-
'),nl,write('These subjects are appropraite to take: '),nl,nl,
    listGenchoicehigh(X),
    (iterate_list(X);true),nl,nl.


choice_high('DE'):-
    write('System: Based on the Cgpa and specialisation choosen:-
'),nl,write('These subjects are appropraite to take: '),nl,nl,
    listDEchoicehigh(X),
    (iterate_list(X);true),nl,nl.

choice_high('IS'):-
    write('System: Based on the Cgpa and specialisation choosen:-
'),nl,write('These subjects are appropraite to take: '),nl,nl,
    listISchoicehigh(X),
    (iterate_list(X);true),nl,nl.

choice_medium('AI'):-               % cgpa<8.
    write('System: Based on the Cgpa and specialisation choosen:-
'),nl,write('These subjects are appropraite to take: '),nl,nl,
    listAIchoicemedd(X),
    (iterate_list(X);true),nl,nl.

choice_medium('DE'):-
    write('System: Based on the Cgpa and specialisation choosen:-
'),nl,write('These subjects are appropraite to take: '),nl,nl,
    listDEchoicemedd(X),
    (iterate_list(X);true),nl,nl.

choice_medium('IS'):-
    write('System: Based on the Cgpa and specialisation choosen:-
'),nl,write('These subjects are appropraite to take: '),nl,nl,
    listISchoicemedd(X),
    (iterate_list(X);true),nl,nl.
```

```
choice_medium('General'):-
    write('System: Based on the Cgpa and specialisation choosen:-
'),nl,write('These subjects are appropraite to take: '),nl,nl,
    listGenchoicemedd(X),
    (iterate_list(X);true),nl,nl.

freshers():-
    % maths strong? database strong? cn strong?
    write('System: Lets explore courses together for you.'),nl,
    write('Note: Please Enter every entry in the form of string(single
apostrophe) with a full stop.'),nl,
    write('System: What was your Cgpa in Btech?'),nl,
    write('You: '),read(Btechcg),nl,nl,
    % write('System: Are you gate/non gate stuudent?'),
    % read(Status),nl,
    write('System: From below listed subjects of Btech, which captures your
interest more?'),nl,
    write('1) Mathematics. [Maths]'),nl,
    write('2) Database Management System. [DBMS]'),nl,
    write('3) Computer Networks. [CN]'),nl,
    % write('4) Opearing Syatem [OS]') ,nl,
    write('Note: Please enter input as specified in [] square braces in the form
of string(single apostrophe) with a full stop.'),nl,
    write('You:  '),read(Subj),nl,
    domain(Subj).


domain('DBMS'):-
    instruction_menu,
    dbms_list,
    write('System: To check the suggested electives type eligible(X) as next
command.').

domain('CN'):-
    instruction_menu,
    cn_list,
    write('System: To check the suggested electives type eligible(X) as next
command.').

domain('Maths'):-
    instruction_menu,
    maths_list,
    write('System: To check the suggested electives type eligible(X) as next
command.').
```

```
instruction_menu:-
    nl,
    write('System: Rate yourself from 0 to 4.'),nl,nl,
    write('0 => no knowledge/interest'),nl,
    write('1 => low knowledge/interest'),nl,
    write('2 => med knowledge/interest'),nl,
    write('3 => high knowledge/interest'),nl,
    write('4 => proficiency knowledge/interest'),nl,nl,
    write('Note: Please enter in the form of number followed by a full
stop.'),nl.


% questions asked iff it has interest in dbms.
dbms_list:-
    clear,nl,
    write('Please answer the following questions:'),nl,
    levelofinterest('Database System Implementation (CES507)',"Designing and
developing databases?"),
    levelofinterest('Database Methods in Information Retrieval',"Retrieving data
from a database management system?"),
    levelofinterest('Information Integration and Application (CSE656)',"Compiling
data from multiple sources into a single data repository.?"),
    save.       % save the fact in file.

maths_list:-
    clear,nl,
    write('Please answer the following questions:'),nl,
    levelofinterest('Bayesian Machine Learning (BML)',"Interested in constructing
statistical models based on Baye's Theorem"),
    levelofinterest('Statistical Machine Learning (CSE542)',"Interest in
Statistics on the scale of ?"),
    levelofinterest('Probability and Random Processes (ECE501)',"Interest in
Probablity on the scale of?"),
    levelofinterest('Data Mining (CSE506)',"Aspiring to work on large
datasets?"),
    save.

cn_list:-
    clear,nl,
    write('Please answer the following questions:'),nl,
    levelofinterest('Foundations to Computer Security (CSE545)',"Want to learn
basic security concepts?"),
    levelofinterest('Ethical Hacking (CSE798A)',"Have interest in ethical
hacking?"),
```

```
    levelofinterest('Network Anonymity and Privacy (CSE749)',"Want to work on
securing the perwsonal privacy?"),
    save.

% to clear all temporary data from temporary file.
clear:-
    abolish(interest/2),
    tell('C:/Users/HP/Desktop/Prolog/Ass1_AI/temporary.pl'),
    told.


% assert is used to store in memory.
levelofinterest(Subject,Ques):-
    write(Ques),write(': '),nl,
    read(Level),
    assert(interest(Subject,Level)).


save:-                  % saves into temporary.pl
    tell('C:/Users/HP/Desktop/Prolog/Ass1_AI/temporary.pl'),
    listing(interest),
    told.


eligible(X):-
    subject(X).

checking(X):-
    interest(X,Level),
    Level >=2.

subject('Bayesian Machine Learning (BML)'):-
    checking('Bayesian Machine Learning (BML)'),
    nl,
    write('BML'),nl.

subject('Statistical Machine Learning (CSE542)'):-
    checking('Statistical Machine Learning (CSE542)'),
    nl,
    write('SML'),nl.

subject('Probability and Random Processes (ECE501)'):-
    checking('Probability and Random Processes (ECE501)'),
    nl,
    write('Probability and Random Processes'),nl.
```

```
subject('Data Mining (CSE506)'):-
    checking('Data Mining (CSE506)'),
    nl,
    write('DM'),nl.

subject('Database System Implementation (CES507)'):-
    checking('Database System Implementation (CES507)'),
    nl,
    write('Database System Implementation'),nl.

subject('Database Methods in Information Retrieval'):-
    checking('Database Methods in Information Retrieval'),
    nl,
    write('Database Methods in Information Retrieval'),nl.

subject('Information Integration and Application (CSE656)'):-
    checking('Information Integration and Application (CSE656)'),
    nl,
    write('IIA'),nl.

subject('Foundations to Computer Security (CSE545)'):-
    checking('Foundations to Computer Security (CSE545)'),
    nl,
    write('FCS'),nl.

subject('Ethical Hacking (CSE798A)'):-
    checking('Ethical Hacking (CSE798A)'),
    nl,
    write('Ethical Hacking'),nl.

subject('Network Anonymity and Privacy (CSE749)'):-
    checking('Network Anonymity and Privacy (CSE749)'),
    nl,
    write('Network Anonymity and Privacy'),nl.
```

Temporary.pl

```
:- dynamic interest/2.

interest('Foundations to Computer Security (CSE545)', 3).
interest('Ethical Hacking (CSE798A)', 1).
interest('Network Anonymity and Privacy (CSE749)', 2).
```