Open PyLIBBES Xpert AI Expert System Shell

Introduction

Python Expert System Shell is Expert System Programming Development Using Python. The components of fuzzy expert system; It is necessary to understand the components of Expert system. The Expert System contains knowledge base (rule based), Interference engine, Working memory, Explanation subsystem, User interference, knowledge question, Uncertainty factor.

Python Import Statement

```
Import string
Import math
```

Knowledge Acquisition

Question Answering

```
fact1=input('What is fact1 name?\n')
print fact1
fact2=input('What is fact2 name?\n')
print fact2
fact3=input('What is fact3 name?\n')
print fact3
conclusion=input('What is fact4 name?\n')
print conclusion
```

Knowledge Base

Facts collection

```
fact1=’fact1’
fact2=’fact2’
fact n=fact n
```

Meta facts

```
fact1=input('What is fact1 name?\n')
fact2=input('What is fact2 name?\n')
factn=input('What is factn name?\n')
```

Rules collection

```
if (condition) {
  //  block of code to be executed if the condition is true
} else {
  //  block of code to be executed if the condition is false
}
```

```
if fact1 in facts:
   print fact1
if fact2 in facts :
      print fact2

if  fact3 in facts:
         print fact3
         print("if fact1 and fact2 and fact3 then",'conclusion')
else:
   print('Rule not satisfied')
```

Meta rules

```
    if  s1== "y" && s5== "y"  :print('rule satisfied',f)
```

```
 if fact1==”y”:
if fact2==”y” :
if  fact3==”y”:
         print fact3
         print("if fact1 and fact2 and fact3 then",'conclusion')
else:
   print('Rule not satisfied')
```

User interface

Understanding

Understanding what is problem

Rule-1:If fact1 and fact2 and fact3 then conclusion.

Explanation

Explanation of Solution
Print

Fuzzy Uncertainty

Given some universe of discourse X, a fuzzy subset A of X is defined by its membership function μA taking values on unit interval [0,1] , i.e.,

$\mu_A(x) : X \square [0,1]$

Let A, B and C be the fuzzy sets. The operations on fuzzy sets are given as

Negation

If x is not A

$A' = 1 - \mu_A(x)/x$

Conjunction

x is A and x is B

$A \Lambda B = \min(\mu_A(x), \mu_B(y)\}/x$

Disjunction

x is A or x is B

$AVB = \max(\mu_A(x), \mu_B(y)\}/x$

Implication

if x is A then y is B

$A \square B = A = \{\mu_A(x)\}$

Reddy fuzzy conditional inference is give by

If x is A_1 and x is A_2 and,…, and x is A_n then x is B

$= \min \{A_1, A_2, \ldots, A_n)$

Open PyLIBBES Xpert AI Expert System

```
# if fact1 and fact2 and fact3 then conclusion
import string
rule=input('rule: ')
print rule
facts =rule.split()
print facts
fact1=input('What is fact1 name?\n')
print fact1
fact2=input('What is fact2 name?\n')
print fact2
fact3=input('What is fact3 name?\n')
print fact3
conclusion=input('What is fact4 name?\n')
print conclusion

if fact1 in facts:
   print fact1
if fact2 in facts :
       print fact2

if  fact3 in facts:
          print fact3
          print("if fact1 and fact2 and fact3 then",'conclusion')
else:
   print('Rule not satisfied')
```

Outcome

```
rule: 'if fact1 and fact2 and fact3 then conclusion'
if fact1 and fact2 and fact3 then conclusion
['if', 'fact1', 'and', 'fact2', 'and', 'fact3', 'then', 'conclusion']
What is fact1 name?
'fact1'
fact1
What is fact2 name?
'fact2'
fact2
What is fact3 name?
'fact3'
fact3
What is fact4 name?
'conclusion'
```

conclusion
('if fact1 and fact2 and fact3 then', 'conclusion')

Open PyLIBBES Xpert AI Fuzzy Expert System Shell

```
 # Blackboard Python XpertAI
# Rule-1:If  fact1 and fact2 and  fact3 and... then  conclusion.
import string
import math
frule=input('rule: ')
print frule
facts=frule.split()
print facts
fact1=str(input('What is fact1 name?\n'))
print fact1
fact2=input('What is fact2 name?\n')
print fact2
fact3=input('What is fact3 name?\n')
print fact3
#More facts continue
conclusion=input('What is fact4 name?\n')
print conclusion
f1 = float(input("fuzziness of  fact1: "))
f2 = float(input("fuzziness of  fact2: "))
f3 = float(input("fuzziness of  fact3: "))
#More facts continue
#More f's add in min function
f=min(f1,f2,f3)
if fact1 in facts:
   print fact1
if fact2 in facts :
       print fact2

if  fact3 in facts:
          print fact3
          print("if fact1 and fact2 and fact3 then",'conclusion',f)
else:
   print('Rule is not satisfied')
```

Outcome

```
rule: 'If  fact1 and fact2 and  fact3 then  conclusion'
If  fact1 and fact2 and  fact3 then  conclusion
['If', 'fact1', 'and', 'fact2', 'and', 'fact3', 'then', 'conclusion']
What is fact1 name?
```

'fact1'
fact1
What is fact2 name?
'fact2'
fact2
What is fact3 name?
'fact3'
fact3
What is fact4 name?
'conclusion'
conclusion
fuzzy fact1: 0.9
fuzzy fact2: 0.8
fuzzy fact3: 0.7
('conclusion', 0.7)