

IMPLEMENTATION OF A FUZZY INFERENCE SYSTEM

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PROGRAM

```
import numpy as np
import skfuzzy as fuzz from
skfuzzy import control as ctrl

# Define fuzzy variables experience = ctrl.Antecedent(np.arange(0,
21, 1), 'experience') success_rate = ctrl.Antecedent(np.arange(0,
101, 1), 'success_rate') performance = ctrl.Consequent(np.arange(0,
101, 1), 'performance')

# Define fuzzy membership functions experience['low'] =
fuzz.trimf(experience.universe, [0, 0, 10]) experience['medium'] =
fuzz.trimf(experience.universe, [5, 10, 15]) experience['high'] =
fuzz.trimf(experience.universe, [10, 20, 20])
```

```
success_rate['low'] = fuzz.trimf(success_rate.universe, [0, 0, 50])
success_rate['medium'] = fuzz.trimf(success_rate.universe, [25, 50, 75])
success_rate['high'] = fuzz.trimf(success_rate.universe, [50, 100, 100])
```

```
performance['poor'] = fuzz.trimf(performance.universe, [0, 0, 50])
performance['average'] = fuzz.trimf(performance.universe, [25, 50, 75])
performance['excellent'] = fuzz.trimf(performance.universe, [50, 100, 100])
```

Define fuzzy rules

```
rule1 = ctrl.Rule(experience['low'] & success_rate['low'],
performance['poor'])

rule2 = ctrl.Rule(experience['medium'] | success_rate['medium'],
performance['average'])

rule3 = ctrl.Rule(experience['high'] & success_rate['high'],
performance['excellent'])
```

```
# Create FIS control system performance_ctrl =
ctrl.ControlSystem([rule1, rule2, rule3]) performance_sim =
ctrl.ControlSystemSimulation(performance_ctrl)
```

Provide input values

```
performance_sim.input['experience'] = 12 # Example: 12 years of  
experience
```

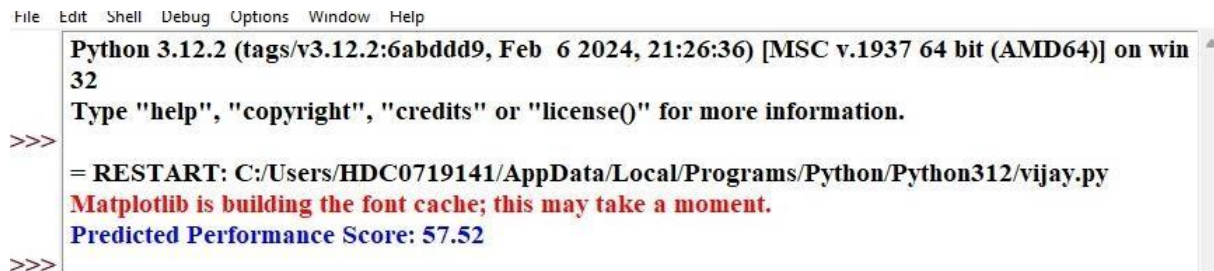
```
performance_sim.input['success_rate'] = 70 # Example: 70% success  
rate
```

Compute fuzzy inference performance_sim.compute()

Print the output

```
print(f"Predicted Performance Score:  
{performance_sim.output['performance']:.2f}")
```

OUTPUT



```
File Edit Shell Debug Options Window Help
Python 3.12.2 (tags/v3.12.2:6abddd9, Feb 6 2024, 21:26:36) [MSC v.1937 64 bit (AMD64)] on win
32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:/Users/HDC0719141/AppData/Local/Programs/Python/Python312/vijay.py
Matplotlib is building the font cache; this may take a moment.
Predicted Performance Score: 57.52
>>>
```

