lab6

February 3, 2024

```python
[11]: # 6. Write a program to implement Fuzzy Controller(Washing Machine)

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

      # Create fuzzy variables
      dirtiness = ctrl.Antecedent(np.arange(0, 11, 1), 'dirtiness')
      stain_type = ctrl.Antecedent(np.arange(0, 11, 1), 'stain_type')
      washing_time = ctrl.Consequent(np.arange(0, 61, 1), 'washing_time')

      # Define membership functions
      dirtiness.automf(3, names=['low', 'medium', 'high'])
      stain_type.automf(3, names=['low', 'medium', 'high'])
      washing_time.automf(3, names=['short', 'medium', 'long'])

      # Define rules
      rule1 = ctrl.Rule(dirtiness['low'] & stain_type['low'], washing_time['short'])
      rule2 = ctrl.Rule(dirtiness['medium'] & stain_type['medium'],␣
       ↪washing_time['medium'])
      rule3 = ctrl.Rule(dirtiness['high'] & stain_type['high'], washing_time['long'])

      # Create control system
      washing_ctrl = ctrl.ControlSystem([rule1, rule2, rule3])
      washing_machine = ctrl.ControlSystemSimulation(washing_ctrl)

      # Example usage
      if __name__ == "__main__":
          # Set input values
          washing_machine.input['dirtiness'] = 7
          washing_machine.input['stain_type'] = 8

          # Compute the result
          washing_machine.compute()

          # Print the output
          print("Washing Time:", washing_machine.output['washing_time'])
```
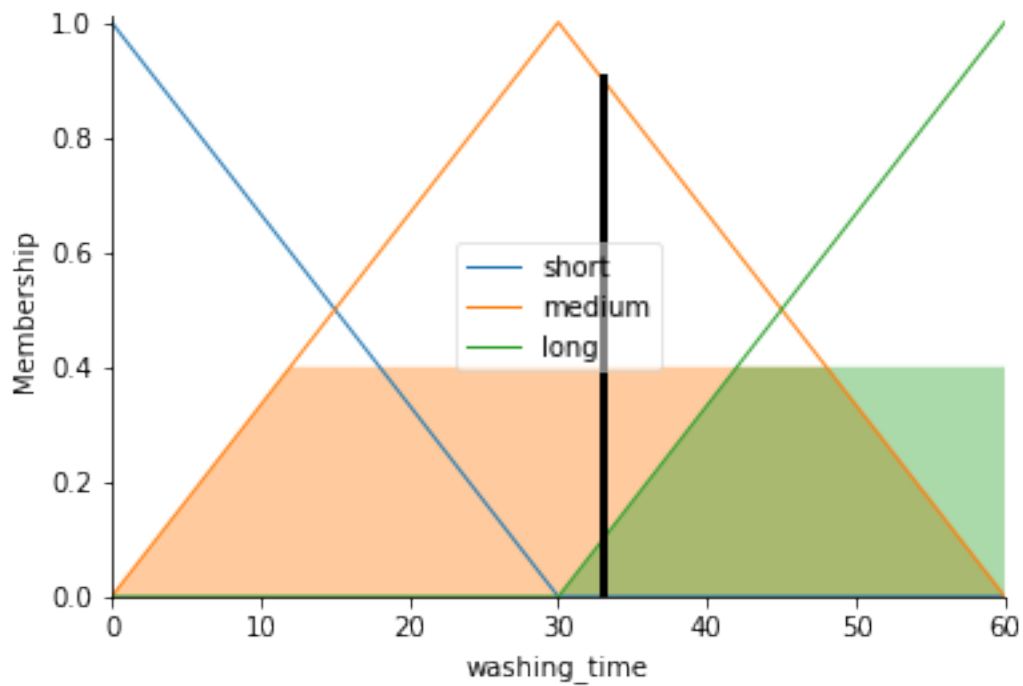
```
# Visualize the result (optional, comment if not needed)
washing_time.view(sim=washing_machine)
```

Washing Time: 32.88888888888891

/home/user/.local/lib/python3.6/site-
packages/skfuzzy/control/fuzzyvariable.py:122: UserWarning: Matplotlib is
currently using module://ipykernel.pylab.backend_inline, which is a non-GUI
backend, so cannot show the figure.
  fig.show()

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