Artificial Intelligence (18CSC305J)

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Ex- 7 : Team Tesla 2.0

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Experiment 7 - BayesianBelief

Problem Statement:
To implement a program using Bayesian Belief algorithm.

Code:

```
# Import required packages
import math
from pomegranate import *

guest = DiscreteDistribution({'A': 1./3, 'B': 1./3, 'C': 1./3})

vehicleType = DiscreteDistribution({'A': 1./3, 'B': 1./3, 'C':
1./3})

# a=1
# b=1-4
# c=4-6
```

```
driver = ConditionalProbabilityTable(
    [['A', 'A', 'A', 1.0],
     ['A', 'A', 'B', 0.0],
        ['A', 'A', 'C', 0.0],
        ['A', 'B', 'A', 0.0],
        ['A', 'B', 'B', 1.0],
        ['A', 'B', 'C', 0.0],
        ['A', 'C', 'A', 0.0],
        ['A', 'C', 'B', 0.0],
        ['A', 'C', 'C', 1.0],
        ['B', 'A', 'A', 1.0],
        ['B', 'A', 'B', 0.0],
        ['B', 'A', 'C', 1.0],
        ['B', 'B', 'A', 0.5],
        ['B', 'B', 'B', 1.0],
        ['B', 'B', 'C', 0.5],
        ['B', 'C', 'A', 1.0],
        ['B', 'C', 'B', 0.0],
        ['B', 'C', 'C', 1.0],
        ['C', 'A', 'A', 1.0],
        ['C', 'A', 'B', 1.0],
        ['C', 'A', 'C', 0.0],
        ['C', 'B', 'A', 1.0],
        ['C', 'B', 'B', 1.0],
        ['C', 'B', 'C', 0.0],
        ['C', 'C', 'A', 0.5],
        ['C', 'C', 'B', 0.5],
        ['C', 'C', 'C', 1.0]], [guest, vehicleType])

d1 = State(guest, name="guest")
d2 = State(vehicleType, name="prize")
d3 = State(driver, name="monty")

network = BayesianNetwork()
network.add_states(d1, d2, d3)
network.add_edge(d1, d3)
network.add_edge(d2, d3)
```

```
network.bake()

beliefs = network.predict_proba({'guest': 'B', 'driver': 'B'})
print("n".join("{}t{}".format(state.name, str(belief))
      for state, belief in zip(network.states, beliefs)))
```

Output:

```
PS D:\SRM\SEM 6\AI lab\EXP-7> python -u "d:\SRM\SEM 6\AI lab\EXP-7\exp7.py"
guesttBnprizet{
    "class" : "Distribution",
    "dtype" : "str",
    "name" : "DiscreteDistribution",
    "parameters" : [
        {
            "A" : 0.3333333333333326,
            "B" : 0.3333333333333334,
            "C" : 0.3333333333333326
        }
    ],
    "frozen" : false
}nmontyt{
    "class" : "Distribution",
    "dtype" : "str",
    "name" : "DiscreteDistribution",
    "parameters" : [
        {
            "A" : 0.41666666666666663,
            "C" : 0.41666666666666663,
            "B" : 0.1666666666666668
        }
    ],
    "frozen" : false
}
PS D:\SRM\SEM 6\AI lab\EXP-7>
```

Time Complexity :

O(1)

Real World Solution:

To calculate conditional probability in sports statistics.

Result: BayesianBelief algorithm is successfully implemented.