

AI Exp- 7 Uncertain Problem (Bayesian Belief Network)

Team- Automata lab

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Problem chosen: Monty Hall Problem

Problem statement: This is the Monty Hall problem. There are 3 doors in front of you, and there is a prize behind one of them. Once you select a door, I will open one of the two you had not selected which does not have a prize behind it. You will then have the opportunity to switch from the door you originally selected to an alternate door..

Code & Output:

```
import random
```

```
A = "A"
```

```
B = "B"
```

```
C = "C"
```

```
doors = ["A", "B", "C"]
```

```
prize = random.choice(doors)
```

```

selection = input("Select door 'A', 'B', or 'C': ")
print ("""
This problem relies on conditional probabilities.
It is suggested that you switch doors, you will have a higher probability
of winning if you do.""")
if selection == prize:
    remaining = list(set(doors) - set(prize))
    open_door = random.choice(list(set(doors) -
    set(random.choice(remaining))))
    alternate = random.choice(list(set(doors) - set(open_door) -
    set(prize)))
else:
    open_door = random.choice(list(set(doors) - set(selection) -
    set(prize)))
    alternate = random.choice(list(set(doors) - set(open_door) -
    set(selection)))
print ("""
The door I will now open is: %r
""") % open_door)
second_chance = input("Would you like to select the third door? Type 'Yes' or 'No': ")
if second_chance == "Yes":
    print ("""
The door you will switch to is: %r """) % alternate)
    if alternate == prize:

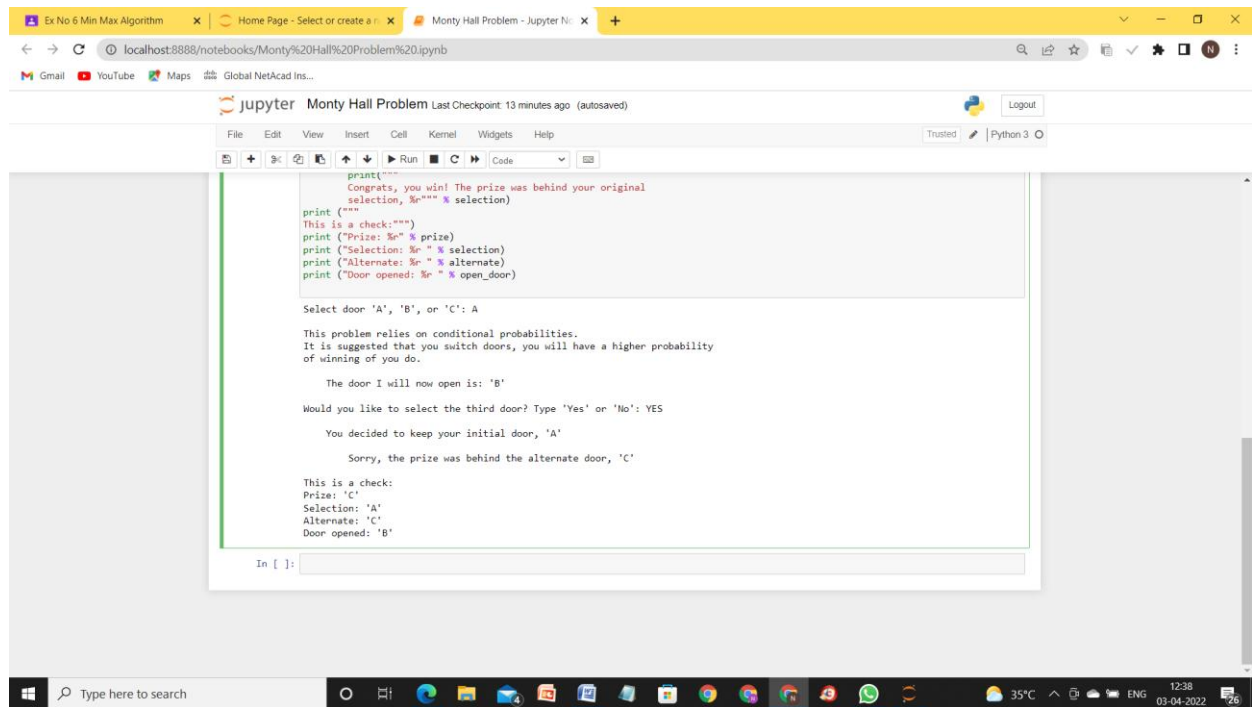
```

```
    print (""
    Congrats, you win! The prize was behind the alternate, %r"" % alternate)
else:
    print (""
    Sorry, the prize was behind the original door %r"" % prize)
if second_chance != "Yes":
    print (""
    You decided to keep your initial door, %r"" % selection)
    if selection != prize:
        print (""
        Sorry, the prize was behind the alternate door, %r"" % prize)
    else:
        print (""
        Congrats, you win! The prize was behind your original
        selection, %r"" % selection)
print (""
This is a check: "")
print ("Prize: %r" % prize)
print ("Selection: %r " % selection)
print ("Alternate: %r " % alternate)
print ("Door opened: %r " % open_door)
```

The screenshot shows a Jupyter Notebook titled "Monty Hall Problem" in a web browser. The notebook contains a single code cell with the following Python code:

```
In [8]: import random
A = "A"
B = "B"
C = "C"
doors = ["A", "B", "C"]
prize = random.choice(doors)
selection = input("Select door 'A', 'B', or 'C': ")
print ("")
This problem relies on conditional probabilities.
It is suggested that you switch doors, you will have a higher probability
of winning if you do.
if selection == prize:
    remaining = list(set(doors) - set(prize))
    open_door = random.choice(list(set(doors) -
set(random.choice(remaining))))
    alternate = random.choice(list(set(doors) - set(open_door) -
set(prize)))
else:
    open_door = random.choice(list(set(doors) - set(selection) -
set(prize)))
    alternate = random.choice(list(set(doors) - set(open_door) -
set(selection)))
    print ("")
    The door I will now open is: %r
    "" % open_door
    second_chance = input("Would you like to select the third door? Type 'Yes' or 'No': ")
    if second_chance == "Yes":
        print ("")
        The door you will switch to is: %r "" % alternate
        if alternate == prize:
            print ("")
            Congrats, you win! The prize was behind the alternate, %r"" % alternate)
        else:
            print ("")
            Sorry, the prize was behind the original door %r"" % prize)
    if second_chance != "Yes":
        print ("")
        You decided to keep your initial door. %r"" % selection)
```

The code simulates the Monty Hall problem, allowing the user to choose a door, and then either switch to the alternate door or stay with the initial choice based on a second prompt.



The screenshot shows a web browser window with a Jupyter Notebook interface. The browser's address bar shows the URL `localhost:8888/notebooks/Monty%20Hall%20Problem%20.ipynb`. The Jupyter Notebook has a menu bar with 'File', 'Edit', 'View', 'Insert', 'Cell', 'Kernel', 'Widgets', and 'Help'. Below the menu bar is a toolbar with icons for file operations, running, and code execution. The notebook contains a single code cell with the following Python code:

```
print("""
Congrats, you win! The prize was behind your original
selection, %r""" % selection)

print("""
This is a check:
Prize: %r % prize
Selection: %r % selection
Alternate: %r % alternate
Door opened: %r % open_door

Select door 'A', 'B', or 'C': A

This problem relies on conditional probabilities.
It is suggested that you switch doors, you will have a higher probability
of winning if you do.

The door I will now open is: 'B'

Would you like to select the third door? Type 'Yes' or 'No': YES

You decided to keep your initial door, 'A'

Sorry, the prize was behind the alternate door, 'C'

This is a check:
Prize: 'C'
Selection: 'A'
Alternate: 'C'
Door opened: 'B'
""")
```

The output of the code is displayed in the notebook's output area, showing the same text as the code cell. The bottom of the image shows a Windows taskbar with various application icons and a system tray displaying the temperature (35°C), time (12:38), and date (03-04-2022).

Result:

The problem statement for Uncertain Problem - Bayesian Belief Network(Monty Hall Problem)is solved.