**ЛАБОРАТОРНА РОБОТА № 6**

**Наївний Байєс в Python**

***Мета:*** набути навичок працювати з даними і опонувати роботу у Python з використанням теореми Байэса.

**Хід роботи:**

**Завдання 1:** Ретельно опрацювати теоретичні відомості.

**Завдання 2:**



Лістинг коду:

import pandas as pd  
  
def calculate\_likelihood(dataframe, feature, feature\_value):  
 positive\_likelihood = len(  
 dataframe[(dataframe[feature] == feature\_value) & (dataframe["Play"] == "Yes")]  
 ) / len(dataframe[dataframe["Play"] == "Yes"])  
  
 negative\_likelihood = len(  
 dataframe[(dataframe[feature] == feature\_value) & (dataframe["Play"] == "No")]  
 ) / len(dataframe[dataframe["Play"] == "No"])  
  
 return positive\_likelihood, negative\_likelihood  
  
def calculate\_combined\_probability(\*probabilities):  
 combined\_probability = 1  
 for probability in probabilities:  
 combined\_probability \*= probability  
  
 return combined\_probability  
  
data = pd.DataFrame(  
 {  
 "Day": [  
 "D1", "D2", "D3", "D4", "D5", "D6", "D7", "D8", "D9", "D10", "D11", "D12", "D13", "D14",  
 ],  
 "Outlook": [  
 "Sunny", "Sunny", "Overcast", "Rain", "Rain", "Rain", "Overcast", "Sunny", "Sunny", "Rain", "Sunny", "Overcast", "Overcast", "Rain",

],  
 "Humidity": [  
 "High", "High", "High", "High", "Normal", "Normal", "Normal", "High", "Normal", "Normal", "Normal", "High", "Normal", "High",  
 ],  
 "Wind": [  
 "Weak", "Strong", "Weak", "Weak", "Weak", "Strong", "Strong", "Weak", "Weak", "Weak", "Strong", "Strong", "Weak", "Strong",  
 ],  
 "Play": [  
 "No", "No", "Yes", "Yes", "Yes", "No", "Yes", "No", "Yes", "Yes", "Yes", "Yes", "Yes", "No",  
 ],  
 }  
)  
  
selected\_outlook = "Sunny"  
selected\_humidity = "High"  
selected\_wind = "Weak"  
  
outlook\_yes\_likelihood, outlook\_no\_likelihood = calculate\_likelihood(data, "Outlook", selected\_outlook)  
humidity\_yes\_likelihood, humidity\_no\_likelihood = calculate\_likelihood(data, "Humidity", selected\_humidity)  
wind\_yes\_likelihood, wind\_no\_likelihood = calculate\_likelihood(data, "Wind", selected\_wind)  
  
positive\_probability = calculate\_combined\_probability(  
 outlook\_yes\_likelihood,  
 humidity\_yes\_likelihood,  
 wind\_yes\_likelihood,  
)  
negative\_probability = calculate\_combined\_probability(  
 outlook\_no\_likelihood,  
 humidity\_no\_likelihood,  
 wind\_no\_likelihood,  
)  
  
total\_probability = positive\_probability + negative\_probability  
probability\_yes = positive\_probability / total\_probability  
probability\_no = negative\_probability / total\_probability  
  
print(f"Match WILL happen: {probability\_yes:.2f};")  
print(f"Match will NOT happen: {probability\_no:.2f};")

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Рис. 1. Результат виконання програми

Посилання на репозиторій на GitHub: <https://github.com/vladyslavgeyna/artificial-intelligence-systems/tree/main/lab6>.

***Висновки:*** в ході виконання лабораторної роботи минабули навичок працювати з даними і опонували роботу у Python з використанням теореми Байэса.