chi-square-test

November 20, 2024

[7]:
```
#State the Hypotheses:

#Null Hypothesis (H0): There is no significant association between the type of␣
 ↪smart home device purchased (Smart Thermostats vs. Smart Lights) and the␣
 ↪customer satisfaction level.

#Alternative Hypothesis (H1): There is a significant association between the␣
 ↪type of smart home device purchased (Smart Thermostats vs. Smart Lights) and␣
 ↪the customer satisfaction level.
```

[8]:
```
import numpy as np
from scipy.stats import chi2_contingency,chi2

# Given data
observed = np.array([[50, 70, 120],
                     [80, 100, 180],
                     [60, 90, 150],
                     [30, 50, 80],
                     [20, 50, 70]])
```

[9]:
```
# Compute the chi-square statistic and p-value
chi2_stat, p_val, dof, expected = chi2_contingency(observed)
```

[10]:
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# Print the chi-square statistic and p-value
print("Chi-Square Statistic:", chi2_stat)
print("Degrees of Freedom:", dof)
print("P-value:", p_val)
```

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Chi-Square Statistic: 5.638227513227513
Degrees of Freedom: 8
P-value: 0.687682126979996
```

[11]:
```
# Determine the critical value
alpha = 0.05


# Make a decision
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if p_val < alpha:
    print("Reject the null hypothesis.")
    print("There is a significant association between the type of smart home␣
 ↪device purchased and the customer satisfaction level.")
else:
    print("Fail to reject the null hypothesis.")
    print("There is no significant association between the type of smart home␣
 ↪device purchased and the customer satisfaction level.")
```

```
Fail to reject the null hypothesis.
There is no significant association between the type of smart home device
purchased and the customer satisfaction level.
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