Republic of the Philippines
Laguna State Polytechnic University
Province of Laguna
College of Computer Studies

Most Preferred Network of

Bachelor of Science Information Technology Student

at Laguna State Polytechnic University

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1. Introduction

At Laguna State Polytechnic University, students studying information technology have their favorite ways to connect online. It's not just about counting which networks they use; it's about understanding why some networks are more popular than others. This project dives deep into these favorites to uncover the reasons behind their choices. By exploring what drives these preferences, we aim to reveal which networks stand out and why they're preferred. Is it about speed, ease of use, or something else? Understanding this helps us paint a clearer picture of what students really like in their online connections. Our mission is more than just discovering trends; it's about using these insights to make things even better for students who are passionate about technology. By knowing what they prefer, we can work towards improving the university's tech infrastructure. That means tailoring it to fit what students need and love, making their tech experience at the university even more awesome.

Questionnaire:

- "Which mobile network provider do you prefer for your primary SIM card in the Philippines? (Smart, Globe, TNT, Dito, TM, SUN)
- How do you primarily use your preferred mobile network SIM card? (Personal Use, For Work, For School, Others)
- Do you use a dual SIM phone? (Answerable by yes or no)
- Reason of choosing that sim?
    - Better Network Coverage
    - Promotional Offers or Discounts
    - Familiarity/Long-Time User
    - International Roaming Options
    - Customer Service Quality
    - Family/Friends
    - Security
    - Others
- "Have you encountered any problems or issues with your mobile network or SIM card in the Philippines, such as spam or unsolicited communications? Please select all that apply:
    - Spam Messages
    - Spam Calls
    - Phishing Attempts
    - Poor Internet Connectivity
    - SIM Card Compatibility Problems
    - No, I don't encounter anything
- How satisfied you are for using your preferred network? (Very Dissatisfied, Dissatisfied, Neutral, Satisfied, Very Satisfied)

2.Data

- Describe the data set in detail:
  - Number of rows - 9
  - Number of columns - 80
  - Data types of each variable – String
  - No Missing values and how they were handled

3. Visualization Technique(s)

Pie Graph - one way to visually represent the distribution or proportion of different SIM networks within your dataset. Pie charts work best when you have a small number of categories (4-6) especially that the network used in the Philippines is only 6.

Vertical Bar Graph - Effective for displaying categorical data where the emphasis is on comparing different categories or groups and allow easy comparison.

Horizontal Bar Graph - In this situation where there is limited space for displaying the graph, a horizontal may be more space-efficient, especially when dealing with a large number of categories. Data labels for each bar are typically aligned horizontally in a horizontal bar graph. This makes it easier to compare values and read precise data points since there a lot of reason to choose from

- Explain how the visual elements (e.g., color, size, shape) encode the data.

  Hue: Different colors can represent different categories or groups in the data. For example, in a bar chart comparing the network prefer, each Network may assign a by distinct color of that brand.

```
colors = {
    'TM': 'magenta',
    'Globe': 'blue',
    'Smart': 'green',
    'TNT': 'yellow',
    'DIto': 'red',
    'Sun': 'lightyellow'
```

  Intensity: Darker shades may represent higher values, while lighter shades represent lower values.

  Size:

  The size of graphical elements, such as points in a pie or bars in a bar chart my very depends on the size of all answer.

Imported libraries or package used:

- **pandas as pd**
- **numpy as np**
- **matplotlib.pyplot as plt**
- **seaborn as sns**

These libraries are often used together to analyze and visualize data efficiently in a Python environment. They provide a versatile set of tools for various data-related tasks.

4. Implementation in Google Collab

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

Libraries like Pandas, NumPy, Matplotlib, and Seaborn are imported.
This is converting your excel file into a csv

```
excel_data = pd.read_excel('Net_work.xlsx')
excel_data.to_csv('Net_work_.csv', index=False)
```

Visualization Construction

Pie chart for the prefer network of the student

```
network_split = df['Network'].str.split(', ').explode()
network_counts = network_split.value_counts()

colors = {
    'TM': 'magenta',
    'Globe': 'blue',
    'Smart': 'green',
    'TNT': 'yellow',
    'DIto': 'red',
    'Sun': 'lightyellow'
}
network_colors = [colors[network] for network in network_counts.index]
plt.figure(figsize=(6, 6))
plt.pie(network_counts, labels=network_counts.index, autopct='%1.1f%%', startangle=140, colors=network_colors)
plt.title('Prefer Primary SIM card ')
plt.axis('equal')
plt.show()
```

Vertical Bar Graph for the Primary Use of the Network

```
#Vertical Bar graph for Primaly Use of the Network
use_counts = df['Primarily Use'].value_counts()

colors = {
    'Personal Use': 'skyblue',
    'For School': 'yellow',
    'For Work': 'lightgreen',
    'Others': 'red'
}

plt.figure(figsize=(6, 6))
use_counts.plot(kind='bar', color=[colors.get(x, 'grey') for x in use_counts.index])
plt.title('Distribution of Primarily Use Categories')
plt.xlabel('Primarily Use Categories')
plt.xticks(rotation=45)
plt.show()
```

Vertical Bar Graph if using Dual Sim

```
#Bar Graph if using Dual Sim
counts = df[' Dual SIM phone'].value_counts()
plt.figure(figsize=(6, 6))
counts.plot(kind='bar', color=['skyblue', 'red'])
plt.title('Dual SIM Phone Distribution ( Yes / No)')
plt.show()
```

Horizontal Bar Graph of Reason why they choose that network

```
df = pd.DataFrame(data)

df['Reason'] = df['Reason'].str.split(', ')
df = df.explode('Reason')

plt.figure(figsize=(6, 3))
sns.countplot(data=df, y='Reason', order=df['Reason'].value_counts().index)
plt.title('Reason of Choosing the Network')
plt.ylabel('Reason')
plt.show()
```

Horizontal Bar Graph of anyissue they face in the network they choose

```
df = pd.DataFrame(data)

plt.figure(figsize=(6, 3))
sns.countplot(data=df, y='Any problems or issue')
plt.xlabel('Count')
plt.ylabel('Issue')
plt.title('Frequency of Encountered Issues')
plt.show()
```

Vertical Bar Graph Showing the Satisfaction

```
colors = {
    'Satisfied': 'lightblue',
    'Very Satisfied': 'lightgreen',
    'Very Dissatisfied': 'yellow',
    'Dissatisfied': 'lightsalmon',
    'Neutral': 'brown'
}
satisfaction_order = [
    'Very Dissatisfied', 'Dissatisfied', 'Neutral', 'Satisfied', 'Very Satisfied'
]

df['Satisfaction'] = pd.Categorical(df['Satisfaction'], categories=satisfaction_order, ordered=True)

for category in colors.keys():
    if category not in satisfaction_counts.index:
        satisfaction_counts[category] = 0

satisfaction_counts = satisfaction_counts.sort_index()

plt.figure(figsize=(6, 6))
satisfaction_counts.plot(kind='bar', color=[colors[i] for i in satisfaction_counts.index])
plt.title('Satisfaction Distribution')
plt.xlabel('Satisfaction Level')
plt.xticks(rotation=45)
plt.show()
```

Customization and Styling:

● **Color Palette:** Chosen for plots using predefined color palettes like 'red', Yellow', 'blue' and 'some pastel'.

● **Labels and Titles**: Relevant labels and titles are set using xlabel(), ylabel(), and title().

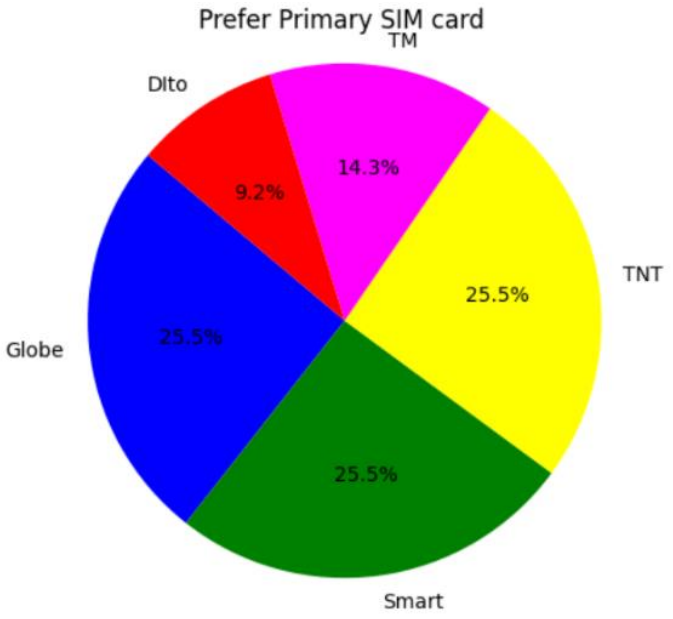
Highlight any challenges faced and how they were overcome.

Accuracy: The challenge we face is when they choose a lot of choice that apply to them so we have to manually code the dataset to have accurate result.

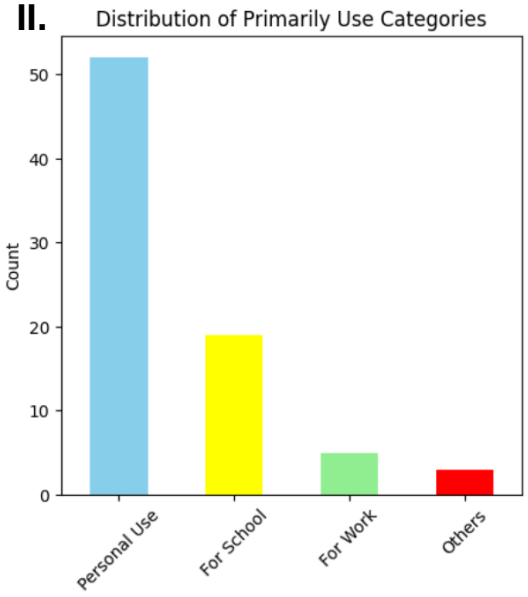
```
    'Any problems or issue': [
        'No , I don\'t encounter anything','No , I don\'t encounter anything','No , I don\'t encounter anything','Phishing Attemp
'No , I don\'t encounter anything','Spam Messages','Spam Calls','Spam Messages','Spam Calls','Poor Internet Connectivity',
'Spam Messages','Poor Internet Connectivity','No , I don\'t encounter anything','Phishing Attempts','No , I don\'t encounter anyt
'Poor Internet Connectivity',
'No , I don\'t encounter anything','Spam Messages','No , I don\'t encounter anything','Spam Messages','Spam Messages',
'Poor Internet Connectivity','Spam Messages','Spam Calls',
'Poor Internet Connectivity','Weak signal in different places','Spam Messages','Phishing Attempts','SIM Card Compatibility Proble
'Spam Messages','Phishing Attempts','Poor Internet Connectivity','Spam Messages','Spam Messages','Spam Messages','Phishing Attemp
'No , I don\'t encounter anything',
'Poor Internet Connectivity','Spam Messages','Spam Messages','Spam Messages','No , I don\'t encounter anything','Poor Internet Cc
'Spam Messages','Spam Messages','No , I don\'t encounter anything','Spam Messages','No , I don\'t encounter anything','No , I dor
'Spam Messages','Spam Calls','Spam Messages','Spam Calls','Poor Internet Connectivity','Spam Messages','Spam Messages',
'Phishing Attempts','Spam Messages','Poor Internet Connectivity','SIM Card Compatibility Problems','Spam Messages','Poor Internet
'SIM Card Compatibility Problems','No , I don\'t encounter anything','Spam Messages','Spam Messages',
'Spam Messages','Spam Messages','No , I don\'t encounter anything','Spam Messages',
'Spam Calls','No , I don\'t encounter anything','Spam Messages','No , I don\'t encounter anything','Spam Calls','Spam Messages','
'Spam Messages','Phishing Attempts','Poor Internet Connectivity',
'Poor Internet Connectivity','Spam Messages','Spam Messages','Phishing Attempts','Poor Internet Connectivity','Spam Messages','Ph
'Poor Internet Connectivity','Spam Messages','Phishing Attempts','Poor Internet Connectivity','Spam Messages','No , I don\'t encc
'No , I don\'t encounter anything','Spam Messages','Spam Messages','Poor Internet Connectivity','Spam Messages',
'Poor Internet Connectivity','Poor Internet Connectivity','No , I don\'t encounter anything','No , I don\'t encounter anything','
```

5. Results and Interpretation

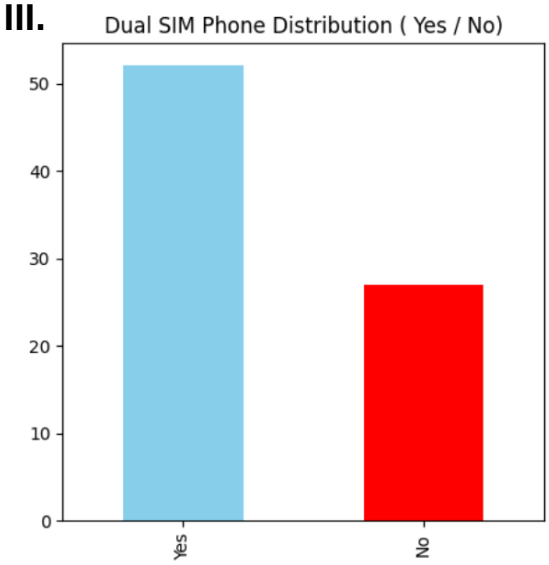
I. The pie chart illustrates the distribution of network usage among students, segmented based on their preferred network providers. In this representation **Smart, TNT, and Globe** are the prominent choices among the student population, with an equivalent share of approximately 25.5% each. This balance signifies that these networks are equally favored among students, each accounting for a quarter of the total user base. **While SUN Network,** on the other hand, shows no representation in the chart. It appears that none of the surveyed students opted for this network as their preferred choice.



II.



III.



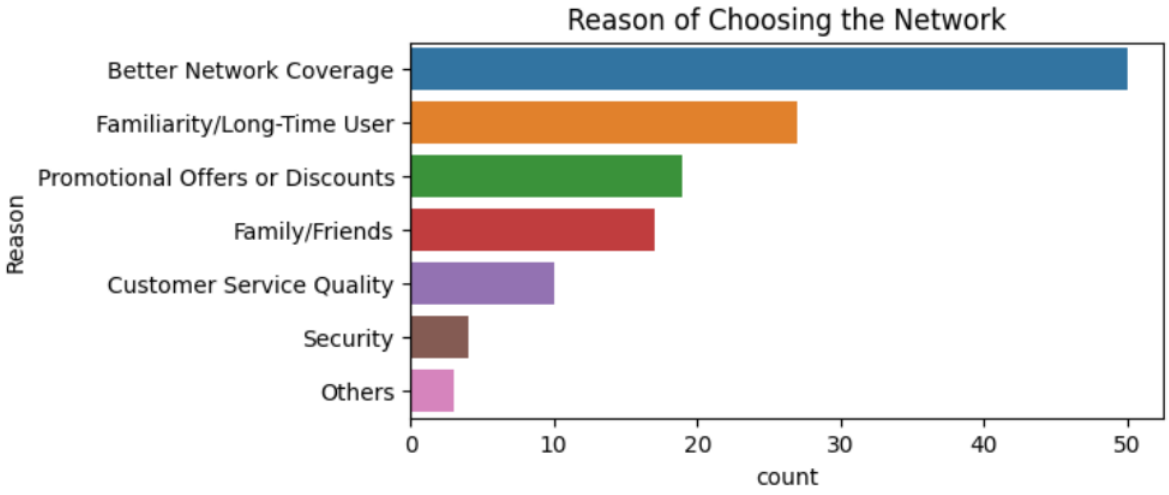
These vertical bar graphs reveal a lot about how students use their networks.

The first one tells us that most students go for personal use when using their preferred network—things like calls, texts, or using the internet for their personal needs.

The second graph is interesting because it shows that a big chunk of students has phones that can handle two SIM cards. This means they have the flexibility to use different networks simultaneously, perhaps for different purposes or convenience.

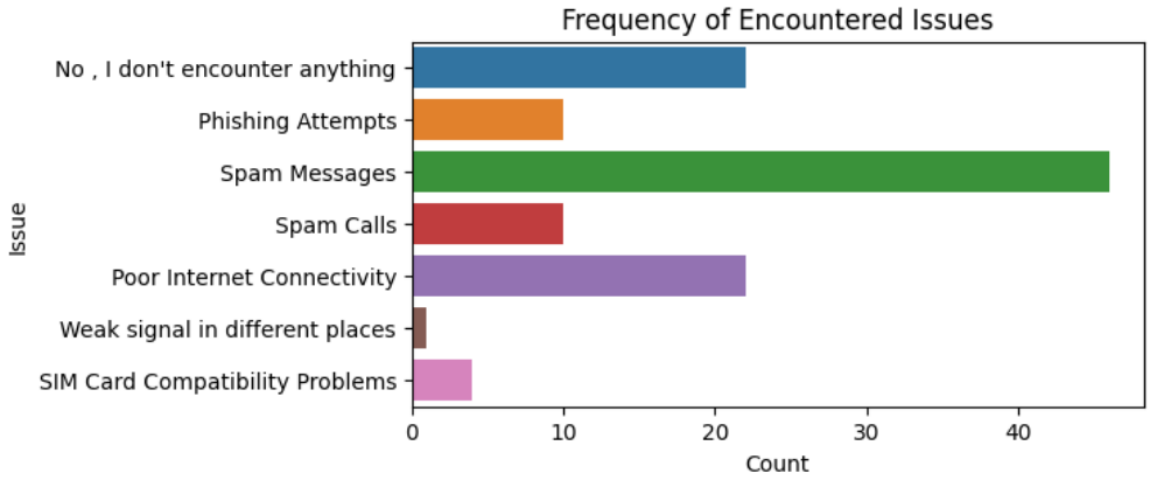
Understanding these usage patterns helps phone companies and network providers design better services or products to what students actually want. It's like peeking into their preferences and habits to create things that suit them better.

IV.



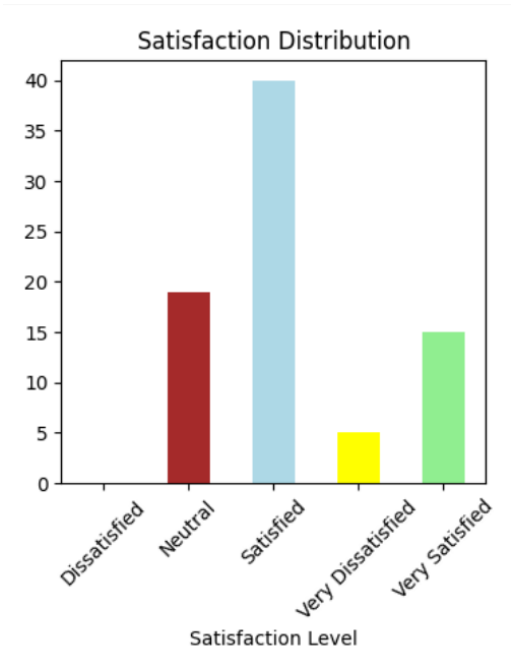
This horizontal bar graph provides a clear insight into the reasons why students choose a particular network. It's obvious that the primary motivation behind their choice, representing 50% of responses, **is better network coverage**. This aspect plays a essential role in their decision-making, emphasizing the significance of a reliable network connection in their daily lives. Following closely behind is the factor of **familiarity or being a long-time user**. This reason is so prevalent that it doesn't even warrant a question; The familiarity often breeds trust and comfort, leading many students to stick with what they know and have been using for a prolonged period.

V.



As you can see, the presence of spam messages remains a significant concern among many students who use a specific network. Despite their choice, this issue seems to persist and bother a substantial number of users. The frequency of spam messages not only disrupts their experience but also potentially affects their trust and satisfaction with the chosen network. These unwanted messages, often comprising spam or phishing attempts, could impact students' daily activities. We may observe also that some students don’t experience anything bad in their choice which is good.

VI.



This last bar graph shows how satisfied they are with the Network they choose. Even though there are some issues they encounter still satisfied but however, there's a noteworthy portion of users who remain neutral, indicating a lack of strong positive or negative sentiment towards their chosen network. Perhaps the network meets their basic needs but lacks standout features or, alternatively, presents some minor drawbacks without significantly detracting from the overall experience.

6. Conclusion

Network Preference: The equal distribution among Smart, TNT, and Globe networks highlights their popularity and equal user appeal among students. This balance suggests a competitive landscape where these networks vie for user attention.

In conclusion, these insights suggest that network providers must prioritize consistent network quality and reliability while addressing prevalent issues like spam messages. Additionally, a focus on enhancing positive user experiences and distinguishing features could help in converting neutral sentiments into satisfaction, thereby fostering a more engaged and loyal user base. Ultimately, the understanding of user preferences and experiences is crucial for network providers to adapt, evolve, and meet the dynamic needs of their user base effectively.

7. Appendix

Code for Data Cleaning and Preprocessing:

```
excel_data = pd.read_excel('Net_work.xlsx')
excel_data.to_csv('Net_work_.csv', index=False)
```

Additional visualizations and analysis

```
df = pd.read_csv('Net_work_.csv')
df.head()
```

	Timestamp	Year Level	Network	Primarily use	Dual SIM phone	Reason	Any problems or issue	Satisfaction
0	2023-12-28 22:06:04.419	BSIT 2	TM	Personal Use	No	Familiarity/Long-Time User	No , I don't encounter anything	Very Satisfied
1	2023-12-31 12:13:29.517	BSIT 1	Globe	For School	No	Family/Friends	No , I don't encounter anything	Satisfied
2	2023-12-31 12:14:05.415	BSIT 1	Smart	Personal Use	No	Better Network Coverage	No , I don't encounter anything	Satisfied
3	2023-12-31 12:33:12.658	BSIT 1	Globe	For School	Yes	Better Network Coverage	Phishing Attempts	Satisfied
4	2023-12-31 12:38:16.101	BSIT 1	TNT	For School	Yes	Family/Friends	No , I don't encounter anything	Very Dissatisfied

Data Dictionary:

NETWORK

• Description: Preferred network provider chosen by the student
• Data Type: Categorical (Smart, Globe, TNT, Dito, TM, SUN).

PRIMARY USE

• Description: Purpose or primary use of the network in the student
• Data Type: Categorical data indicating the primary purpose of using the network (Personal, School, Work, Others)

DUAL SIM PHONE

• Description: Indicates if the student uses a phone capable of holding two SIM cards simultaneously.
• Data Type: Binary (Yes/No)

REASON

• Description: Reasons influencing the selection of a specific network (e.g., network coverage, familiarity, promotions, etc.).
• Data Type: Categorical data listing reasons influencing network selection, with multiple reasons sometimes combined.

ANY PROBLEMS OR ISSUE

• Description: Any issues or problems encountered by the student with the chosen network
• Data Type: Categorical data listing reasons influencing network selection, with multiple reasons sometimes combined. (e.g., spam messages, poor connectivity, etc.).

SATISFACTION

• Description: Level of satisfaction expressed by the student with the chosen network
• Data Type: Categorical data representing the satisfaction level expressed by the student with the chosen network