Aerofit_Case_Study

April 18, 2024

1. Defining Problem Statement and Analysing basic metrics

Aerofit's market research team aims to understand the target audience for each treadmill type to enhance customer recommendations. Descriptive analytics and contingency tables will be used to create customer profiles and analyze customer characteristics' impact.

To enhance Aerofit's treadmill recommendations, we can consider the following key questions:

1. What are the age, gender, income, and location of customers for each treadmill type?
2. Which features (e.g., size, price, tech) are prioritized by different demographics?
3. How and where do customers prefer to buy these treadmills?
4. What is the probability of a customer buying a specific treadmill?, etc.

Dataset column info:

Product Purchased: KP281, KP481, or KP781

Age: In years

Gender: Male/Female

Education: In years

MaritalStatus: Single or partnered

Usage: The average number of times the customer plans to use the treadmill each week.

Income: Annual income (in $)

Fitness: Self-rated fitness on a 1-to-5 scale, where 1 is the poor shape and 5 is the excellent shape.

Miles: The average number of miles the customer expects to walk/run each week

[416]:
```
# Importing the necessery libraries
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

1.1 Observations on the shape of data, data types of all the attributes, conversion of categorical attributes to 'category' (If required), missing value detection, statistical summary

[417]:
```
# Loading/Reading the csv
link = "https://d2beiqkhq929f0.cloudfront.net/public_assets/assets/000/001/125/
 ↪original/aerofit_treadmill.csv?1639992749"
df = pd.read_csv(link)
df.head()
```

[417]:

	Product	Age	Gender	Education	MaritalStatus	Usage	Fitness	Income	Miles
0	KP281	18	Male	14	Single	3	4	29562	112
1	KP281	19	Male	15	Single	2	3	31836	75
2	KP281	19	Female	14	Partnered	4	3	30699	66
3	KP281	19	Male	12	Single	3	3	32973	85
4	KP281	20	Male	13	Partnered	4	2	35247	47

1. Observations on shape of data, data types of all the attributes, conversion of categorical attributes to 'category' (If required), missing value detection, statistical summary.

[418]:
```
df.shape
```

[418]:
```
(180, 9)
```

[419]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 180 entries, 0 to 179
Data columns (total 9 columns):
 #   Column         Non-Null Count  Dtype
---  ------         --------------  -----
 0   Product        180 non-null    object
 1   Age            180 non-null    int64
 2   Gender         180 non-null    object
 3   Education      180 non-null    int64
 4   MaritalStatus  180 non-null    object
 5   Usage          180 non-null    int64
 6   Fitness        180 non-null    int64
 7   Income         180 non-null    int64
 8   Miles          180 non-null    int64
dtypes: int64(6), object(3)
memory usage: 12.8+ KB
```

[420]:
```
df.describe()
```

[420]:

	Age	Education	Usage	Fitness	Income	\
count	180.000000	180.000000	180.000000	180.000000	180.000000	
mean	28.788889	15.572222	3.455556	3.311111	53719.577778	
std	6.943498	1.617055	1.084797	0.958869	16506.684226	
min	18.000000	12.000000	2.000000	1.000000	29562.000000	
25%	24.000000	14.000000	3.000000	3.000000	44058.750000	

```
50%     26.000000   16.000000    3.000000    3.000000   50596.500000
75%     33.000000   16.000000    4.000000    4.000000   58668.000000
max     50.000000   21.000000    7.000000    5.000000  104581.000000
```

```
             Miles
count  180.000000
mean   103.194444
std     51.863605
min     21.000000
25%     66.000000
50%     94.000000
75%    114.750000
max    360.000000
```

[421]:
```
df.describe(include = object)
```

[421]:
```
        Product Gender MaritalStatus
count       180    180           180
unique        3      2             2
top       KP281   Male     Partnered
freq         80    104           107
```

2. Missing Value Detection. No missing values found

[422]:
```
df.isna().sum()
```

[422]:
```
Product          0
Age              0
Gender           0
Education        0
MaritalStatus    0
Usage            0
Fitness          0
Income           0
Miles            0
dtype: int64
```

2. Non-Graphical Analysis: Value counts and unique attributes

[423]:
```
print(f"Unique counts: ", {df["MaritalStatus"].nunique()})
df["MaritalStatus"].value_counts()
```

```
Unique counts:  {2}
```

[423]:
```
MaritalStatus
Partnered    107
Single        73
Name: count, dtype: int64
```

[424]:
```
print(f"Unique counts: ", {df["Product"].nunique()})
df["Product"].value_counts()
```

```
Unique counts:  {3}
```

[424]:
```
Product
KP281    80
KP481    60
KP781    40
Name: count, dtype: int64
```

[425]:
```
print(f"Unique counts: ", {df["Gender"].nunique()})
df["Gender"].value_counts()
```

```
Unique counts:  {2}
```

[425]:
```
Gender
Male      104
Female     76
Name: count, dtype: int64
```

[426]:
```
print(f"Unique counts: ", {df["Education"].nunique()})
df["Education"].value_counts()
```

```
Unique counts:  {8}
```

[426]:
```
Education
16    85
14    55
18    23
15     5
13     5
12     3
21     3
20     1
Name: count, dtype: int64
```

[427]:
```
print(f"Unique counts: ", {df["Usage"].nunique()})
df["Usage"].value_counts()
```

```
Unique counts:  {6}
```

[427]:
```
Usage
3    69
4    52
2    33
5    17
6     7
```

```
7     2
Name: count, dtype: int64
```

[428]:
```
print(f"Unique counts: ", {df["Fitness"].nunique()})
df["Fitness"].value_counts()
```

```
Unique counts:  {5}
```

[428]:
```
Fitness
3    97
5    31
2    26
4    24
1     2
Name: count, dtype: int64
```

[429]:
```
df.nunique()
```

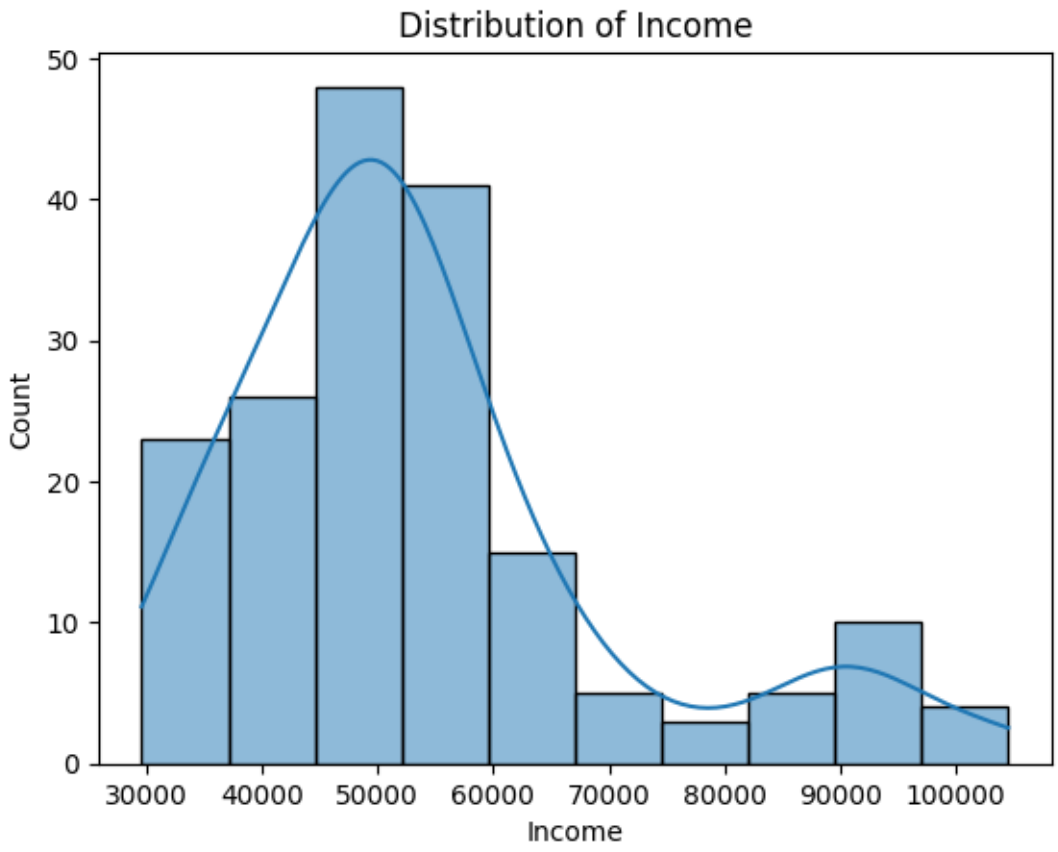
[429]:
```
Product           3
Age              32
Gender            2
Education         8
MaritalStatus     2
Usage             6
Fitness           5
Income           62
Miles            37
dtype: int64
```

3 .Visual Analysis - Univariate & Bivariate:

1. For continuous variable(s): Distplot, countplot, histogram for univariate analysis
2. For categorical variable(s): Boxplot
3. For correlation: Heatmaps, Pairplots

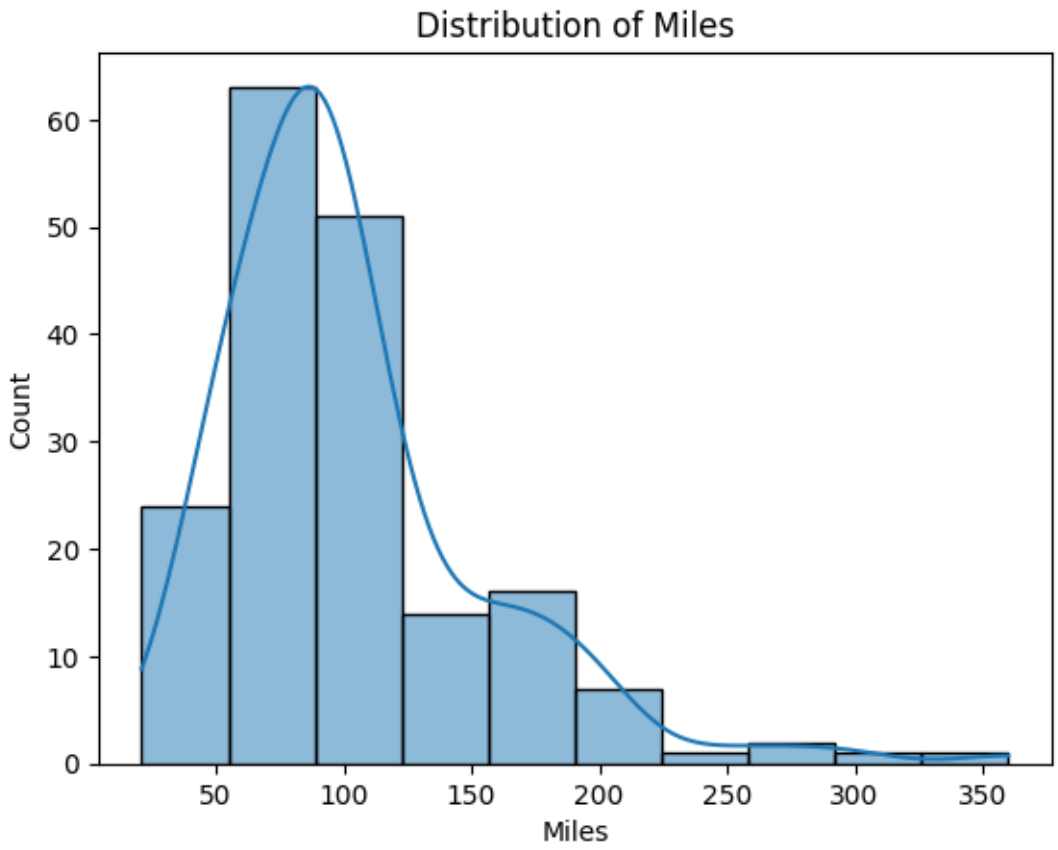
3.1 For continuous variable(s): Distplot, countplot, histogram for univariate analysis

[430]:
```
sns.histplot(data = df, x = df["Income"], kde = True, bins = 10)
plt.title("Distribution of Income")
plt.show()
```



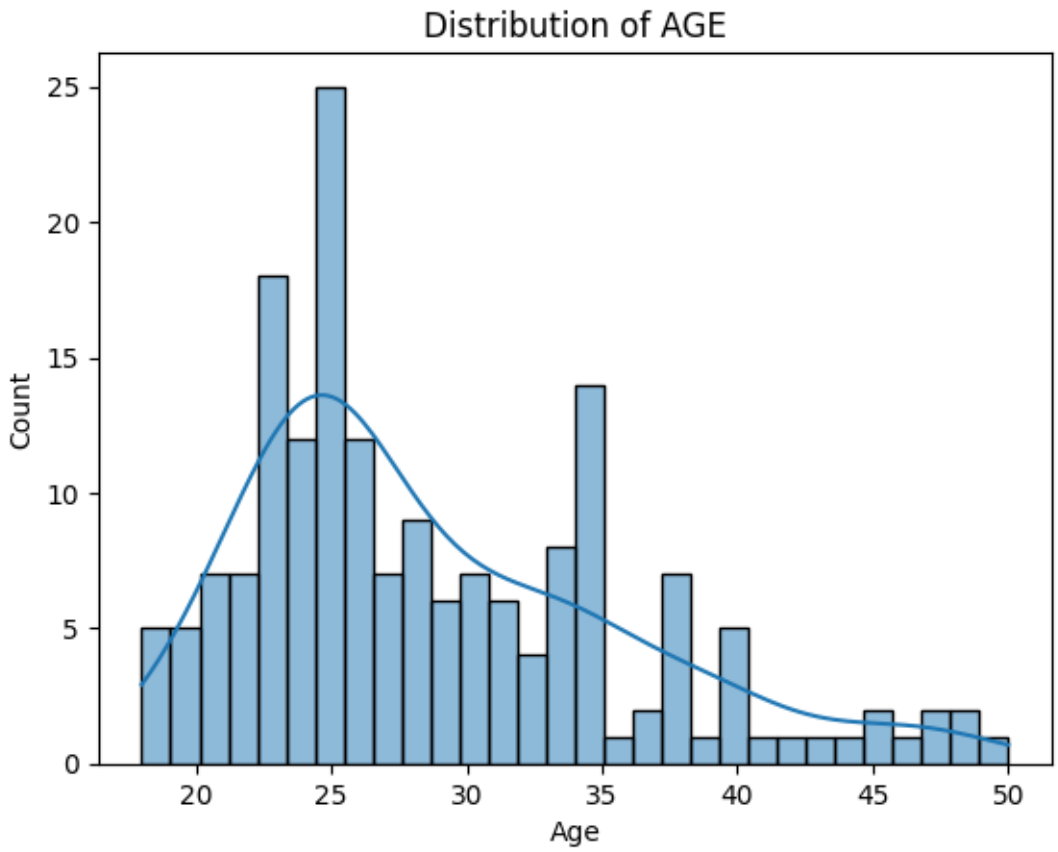
Insights = Distribution of income is right skewed most people income ranges from 30k to 60k

[431]:
```
sns.histplot(data = df, x = df["Miles"], kde = True, bins = 10)
plt.title("Distribution of Miles")
plt.show()
```



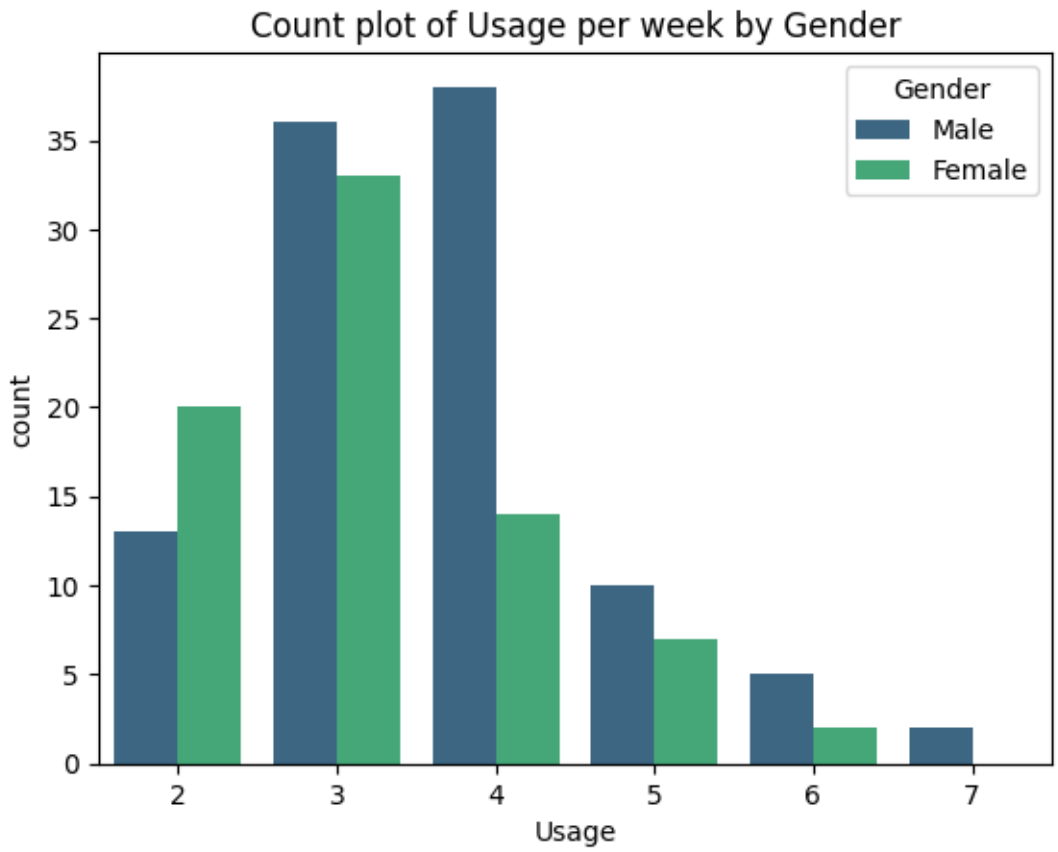
Insights: Distribution of Miles is right skewed very few people are going to use tredmill for more than 200 miles

[432]:
```
# Distribution of AGE with histplot
sns.histplot(data = df, x = df["Age"], kde = True, bins = 30)
plt.title("Distribution of AGE")
plt.show()
```



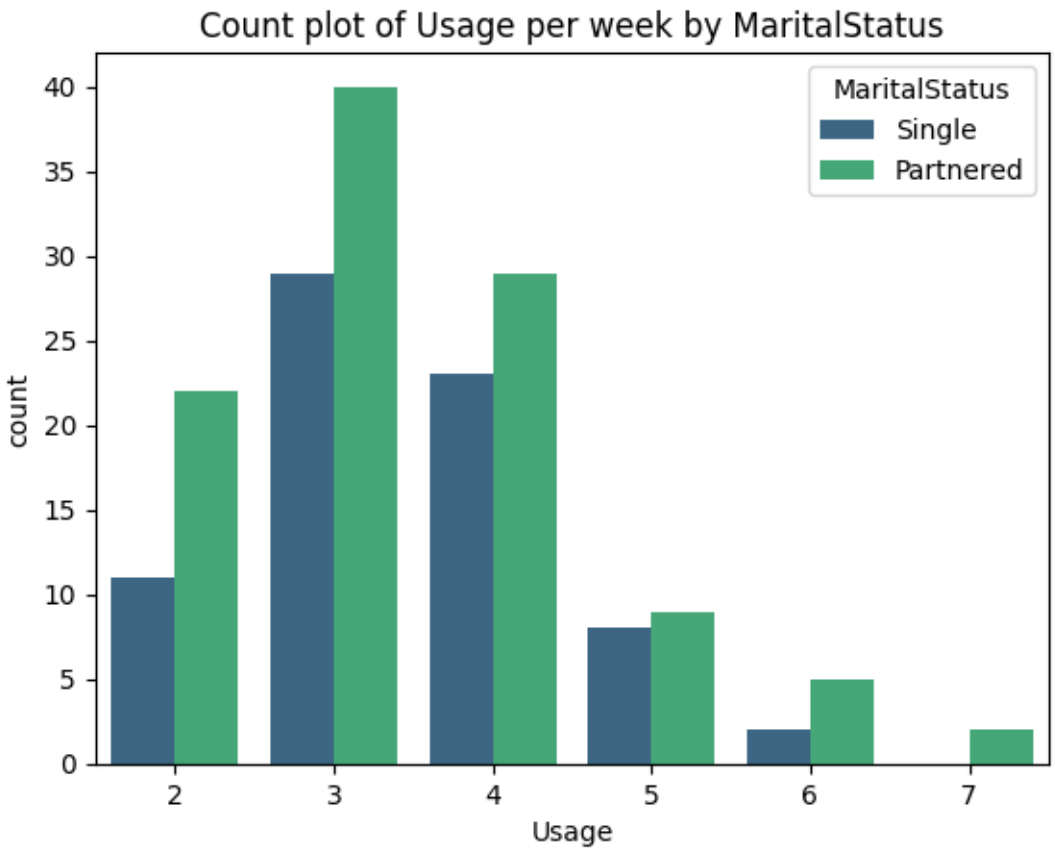
Insights: Distribution of age looks right skewed most of people in data set are of age range between 20 to 35

[433]:
```
sns.countplot(x='Usage', data=df, hue = "Gender", palette= "viridis")
plt.title('Count plot of Usage per week by Gender')
plt.show()
```



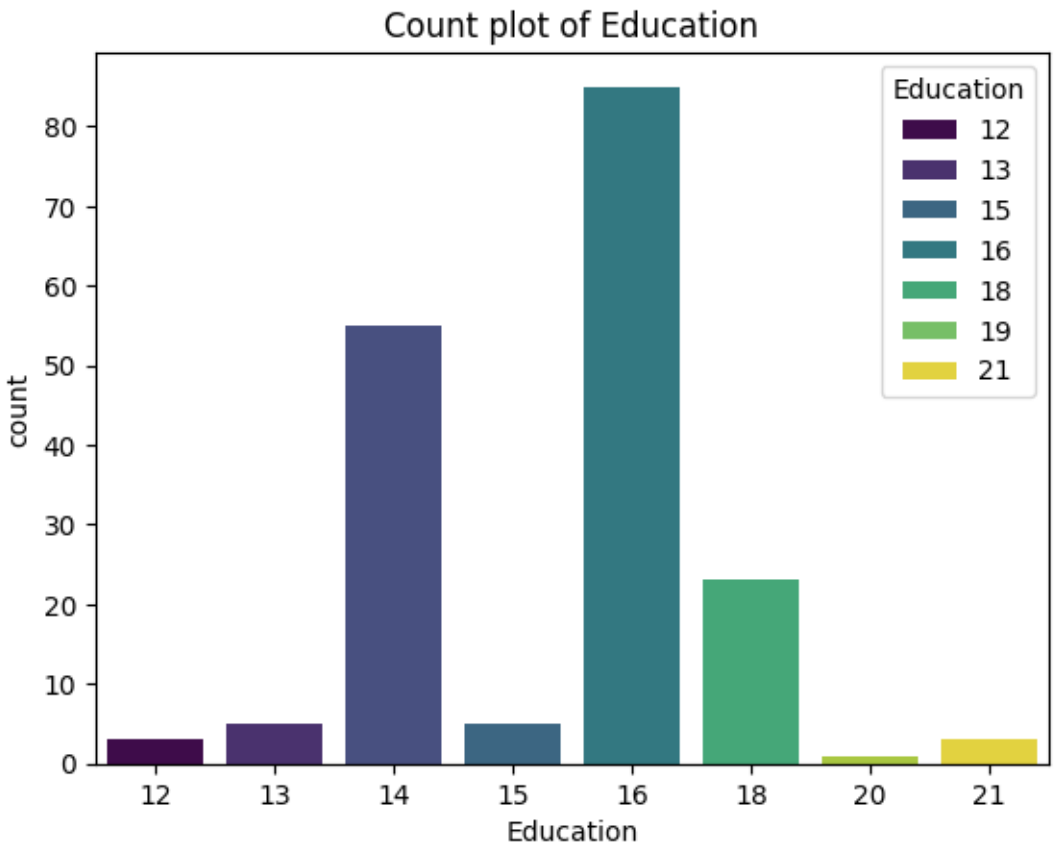
Insights:count of usage is right skewed while considering male to female ration in the data set usage are same between both gender

[434]:
```
sns.countplot(x='Usage', data=df, hue = "MaritalStatus", palette= "viridis")
plt.title('Count plot of Usage per week by MaritalStatus')
plt.show()
```



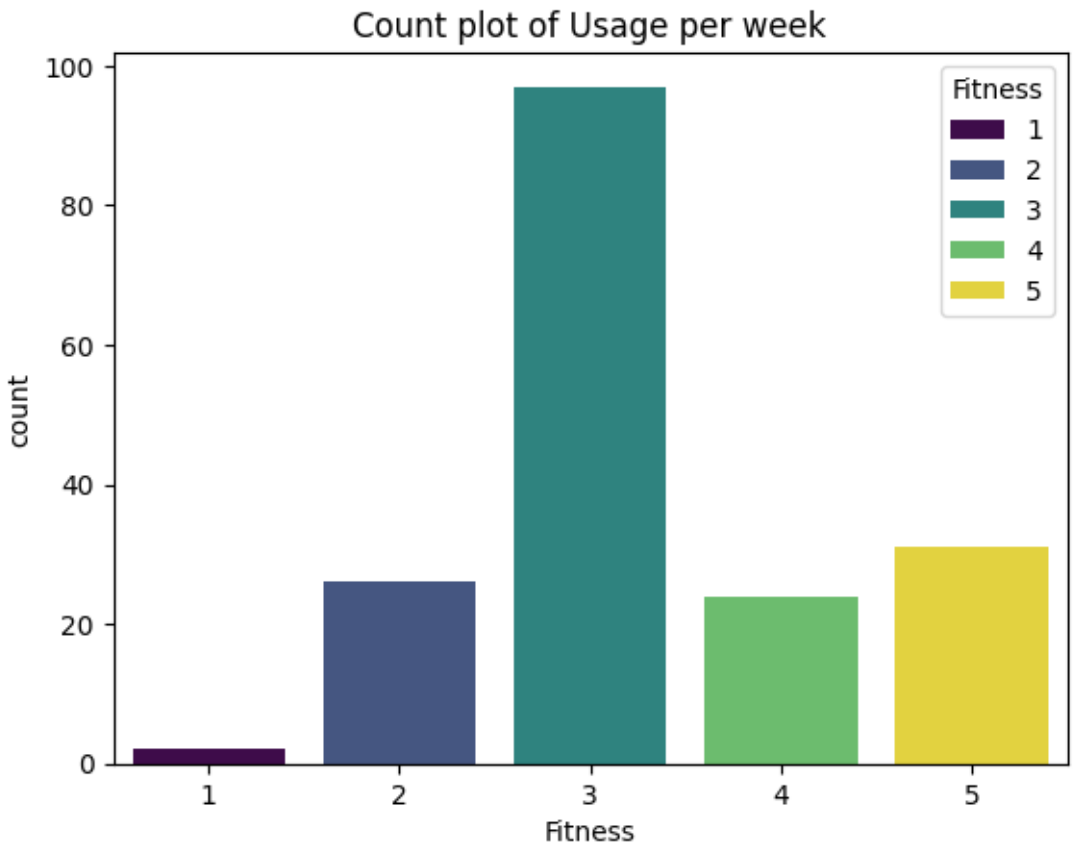
Insights: Usage by marital status looks equal considering ration of single to partenered.

[435]:
```
sns.countplot(x='Education', data=df, hue = "Education", palette= "viridis")
plt.title('Count plot of Education')
plt.show()
```



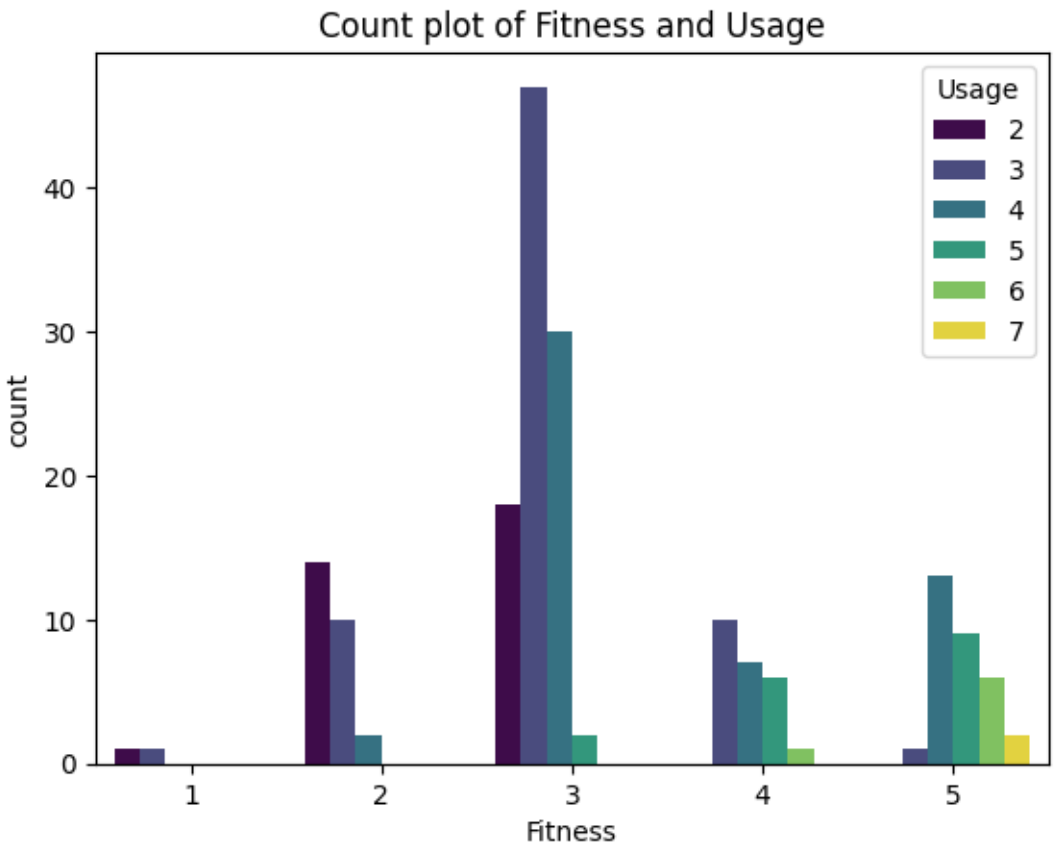
Insights: Eduction of people seems irrelenvant feature

[436]:
```
sns.countplot(x='Fitness', data=df, hue = "Fitness", palette= "viridis")
plt.title('Count plot of Usage per week')
plt.show()
```



Insights: Most of of the people prefer usage of tredmill 3 times a week.

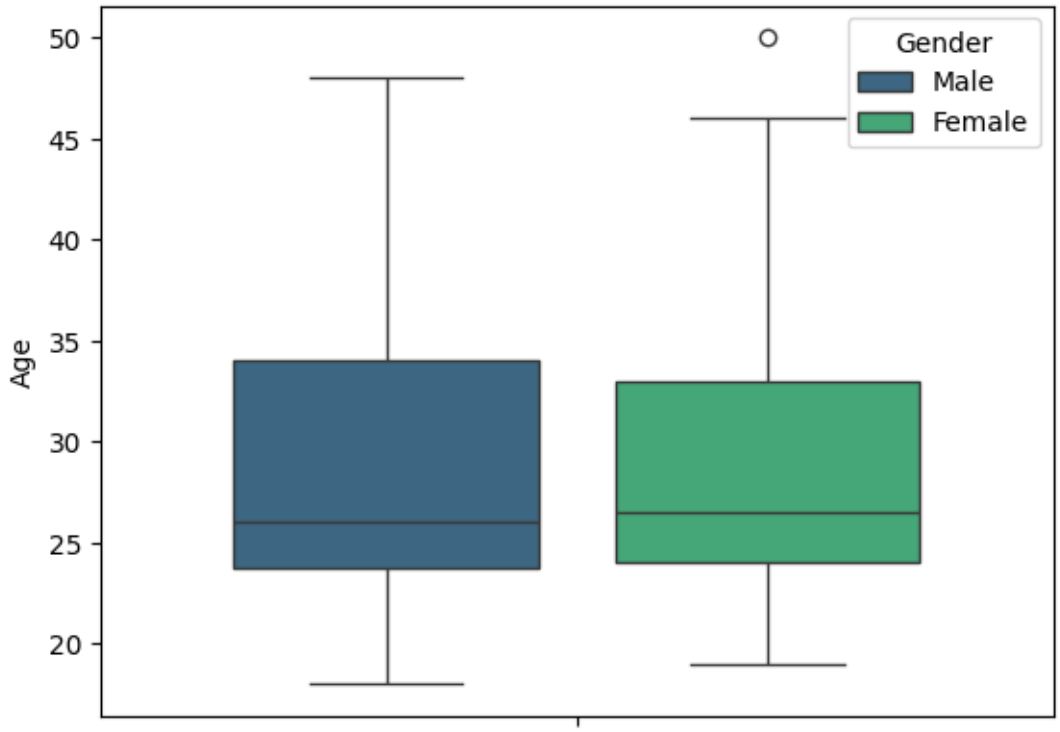
[437]:
```
sns.countplot(x='Fitness', data=df, hue = "Usage", palette= "viridis")
plt.title('Count plot of Fitness and Usage')
plt.show()
```



Insights: people who rated 5 in fitness score are only people planning to use tredmill 7 times a week.

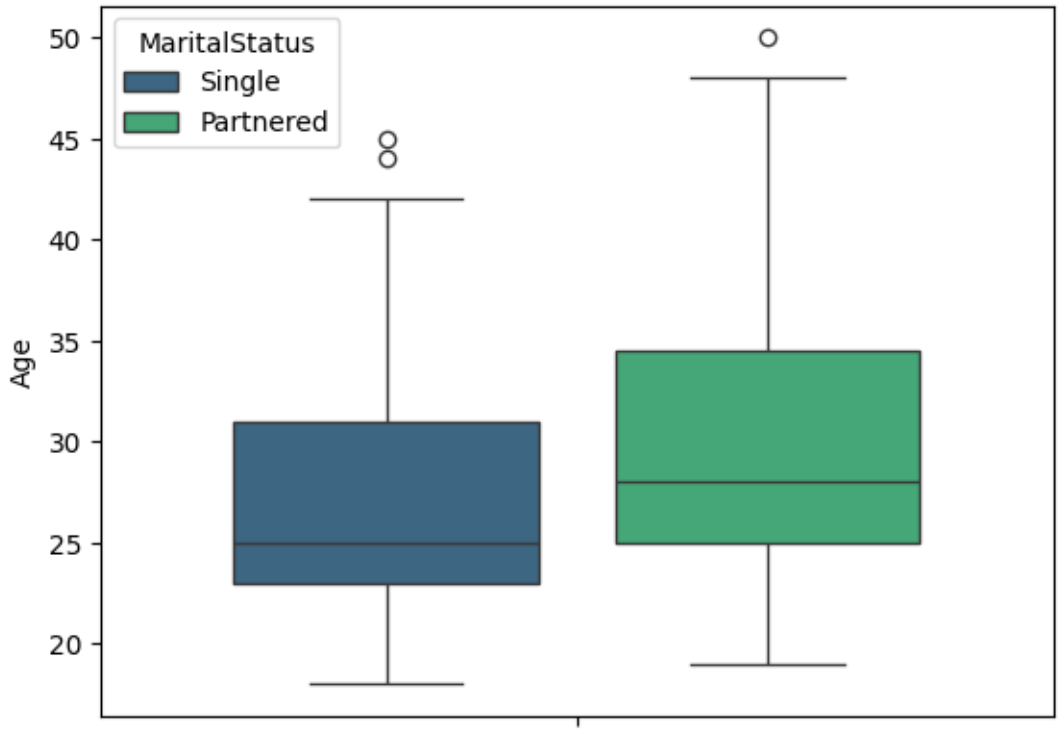
3.2 For categorical variable(s): Boxplot

[438]:
```
sns.boxplot(y = df["Age"], hue = df["Gender"], gap = 1.8,  palette= "viridis")
plt.show()
```



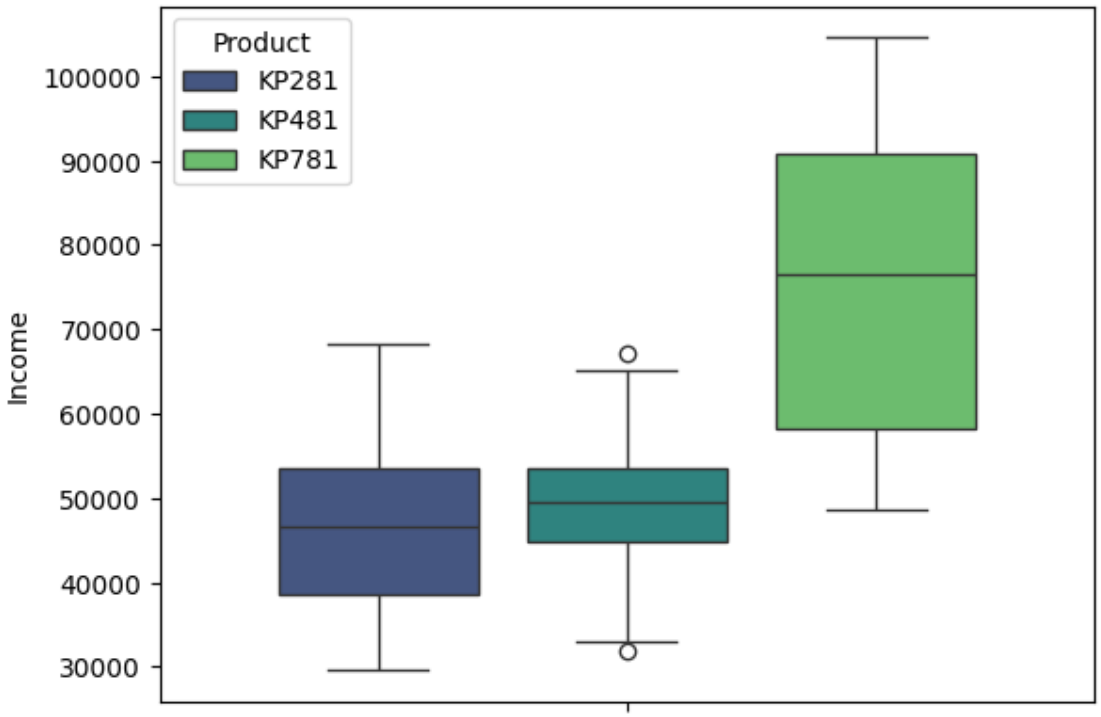
Insights: there is not significant difference between age of people and gender in data set

[439]:
```
sns.boxplot(y = df["Age"], hue = df["MaritalStatus"], gap = 1.8,  palette=␣
  ↪"viridis")
plt.show()
```



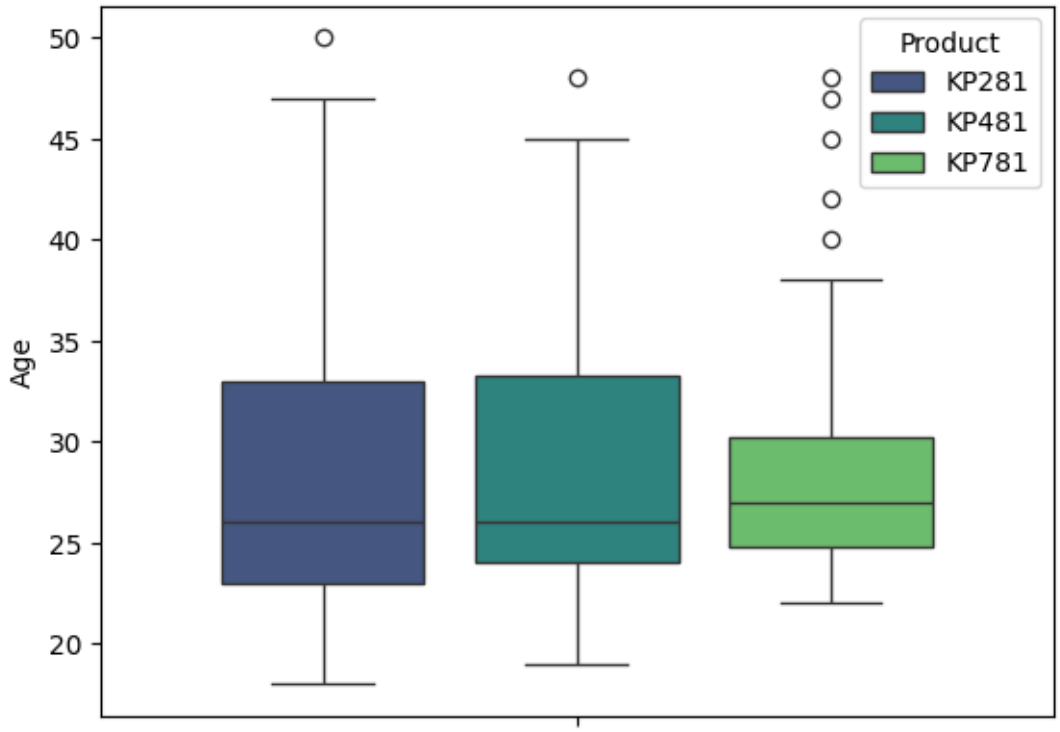
Insights: avg Age of Partnered individual is more than single indivisual

[440]:
```
sns.boxplot(y = df["Income"], hue = df["Product"], gap = 1.8,  palette=␣
 ↪"viridis")
plt.show()
```



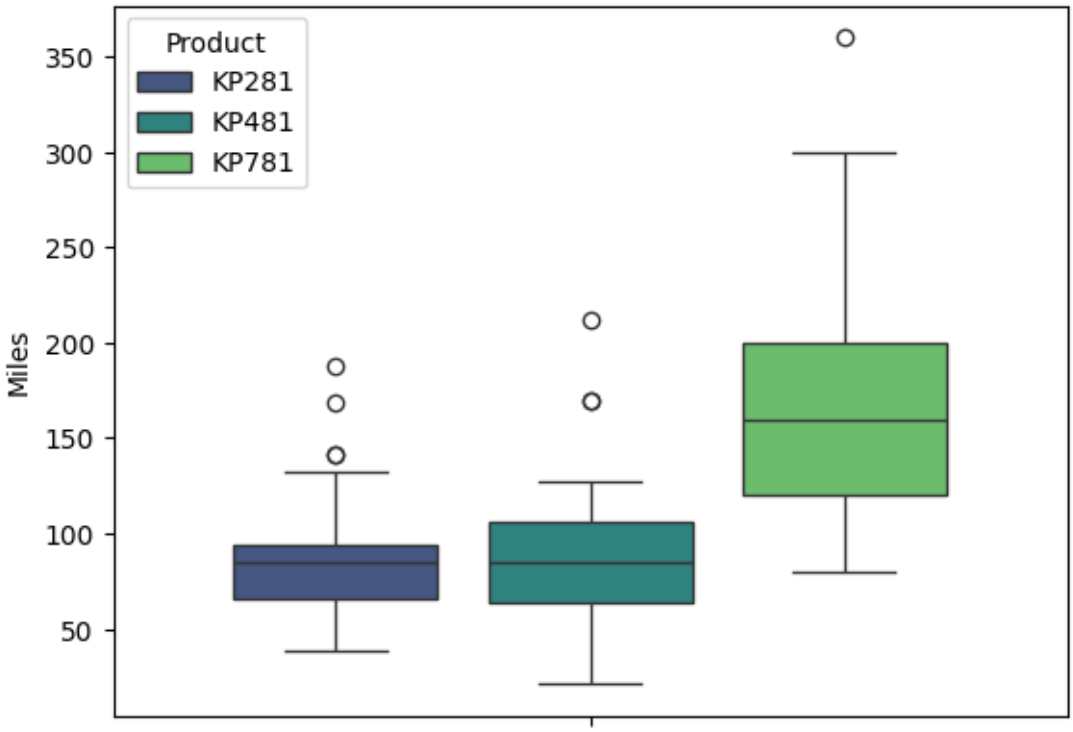
Insights: Box plot show indivisual with high income prefer buying KP781 model and indivisual with income 30 k to 70k preffer buying KP281 or KP481 with some excpetions.

[441]:
```
sns.boxplot(y = df["Age"], hue = df["Product"], gap = 1.8,  palette= "viridis")
plt.show()
```



Insights: Looking at the count of age of people and their product preferance above boxplot does not show any significant difference in purchase of product by age.

[442]:
```
sns.boxplot(y = df["Miles"], hue = df["Product"], gap = 1.8,  palette=␣
 ↪"viridis")
plt.show()
```

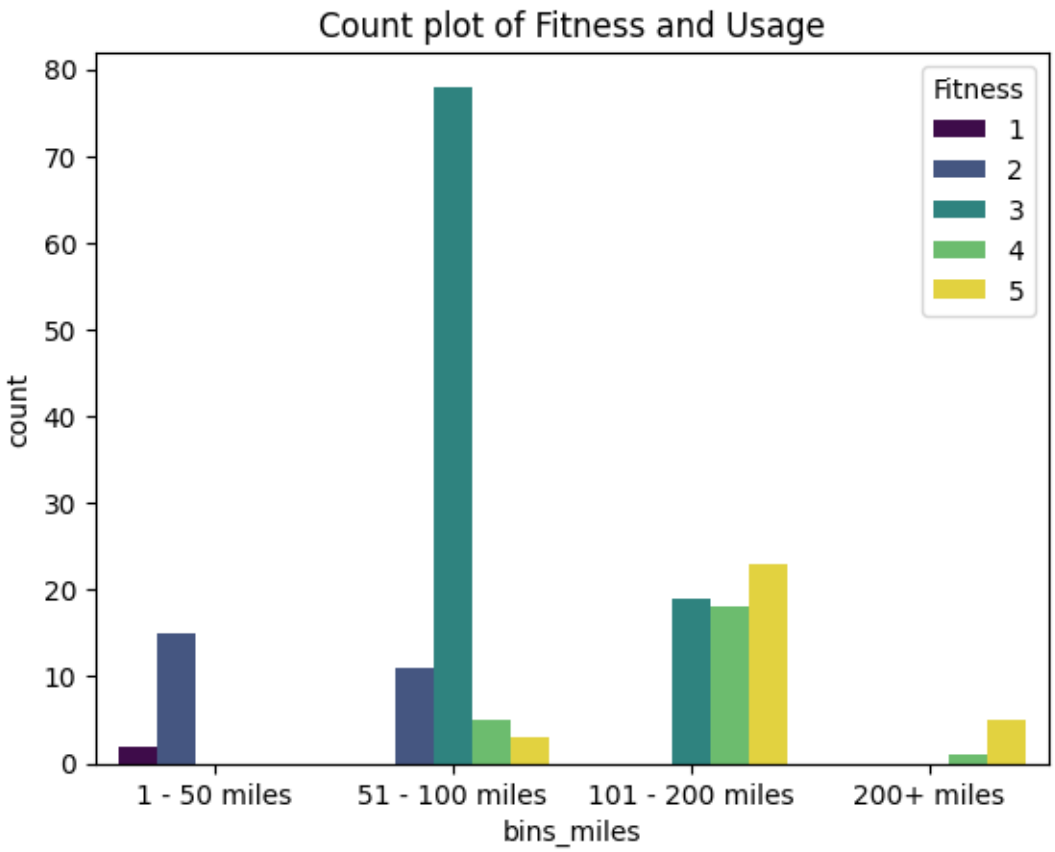


Insights: Indivisual who are planning to run avg miles greater than 150 prefer buying KP781 and people who are planning to to run avg of 80 miles per week prefer KP481 or KP281 there is no significant difference between these.

Some other plots Fitness vs Miles:

- Binning the miles columns
- Ploting against Fitness

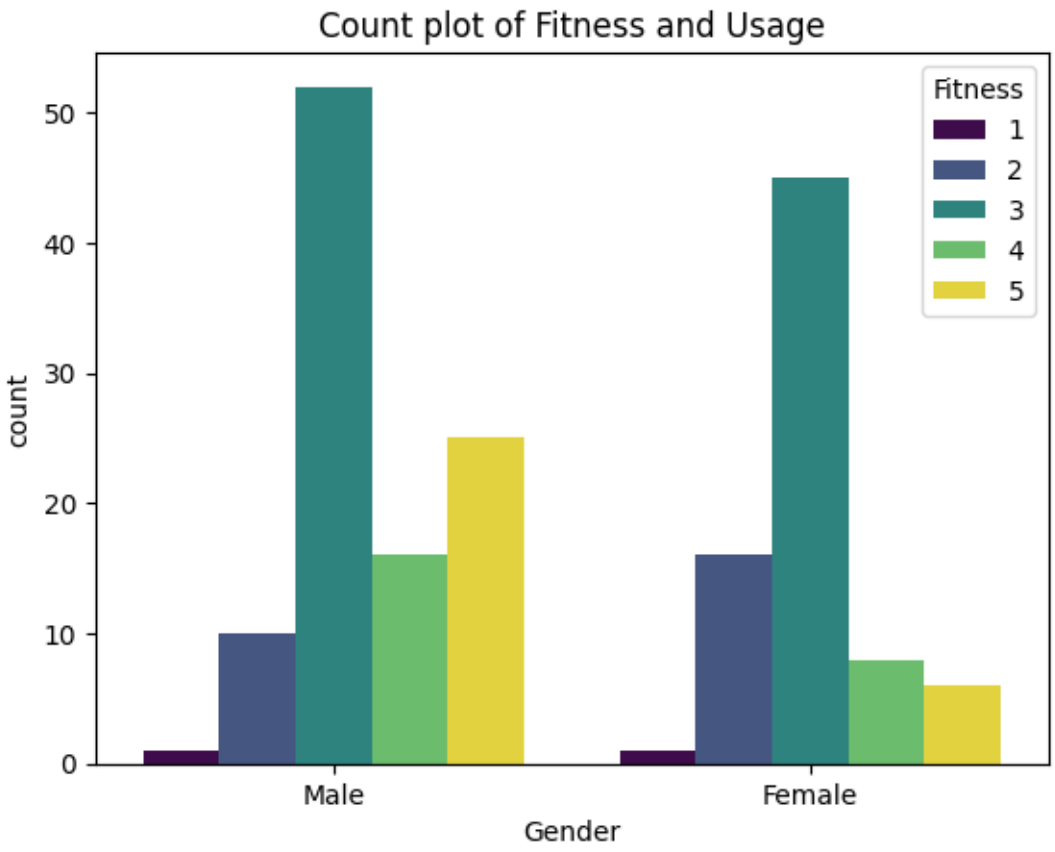
[443]:
```
# Labeling the bins
bin_labels = ['1 - 50 miles', '51 - 100 miles', '101 - 200 miles', '200+ miles']
bin_edges = [-np.inf, 50, 100, 200, np.inf]
bins_with_labels = pd.cut(df["Miles"], labels=bin_labels, bins = bin_edges)
df["bins_miles"] = bins_with_labels
sns.countplot(x='bins_miles', data=df, hue = "Fitness", palette= "viridis")
plt.title('Count plot of Fitness and Usage')
plt.show()
```



Insights: Those who are planning to run less than 50 scored themselves fitness score of 1 or 2 and those planning to run 200+ miles rated the fitness score of 4 or 5

Miles vs Fitness

[444]:
```
sns.countplot(x='Gender', data=df, hue = "Fitness", palette= "viridis")
plt.title('Count plot of Fitness and Usage')
plt.show()
```



Insights: Less number of Females Scored 4 or 5 Fitness score compared to male. Avg fitness score is 3 for both the gender.

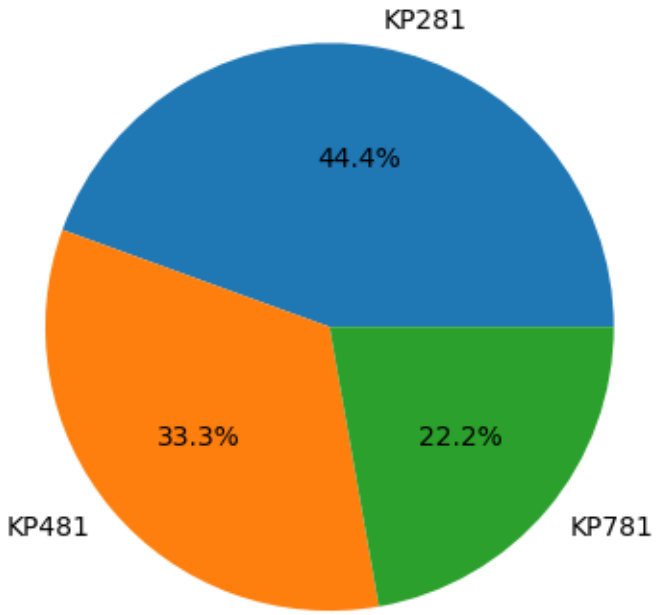
Binning the data : Binning the Age and Income columns

[445]:
```
# Binning the Age columns
bin_labels = ['< 20', '21 - 25', '26 - 30', '31 - 35', '36 - 40', '40 +']
bin_edges = [-np.inf, 20, 25, 30, 35, 40, np.inf]
bins_with_labels = pd.cut(df["Age"], labels=bin_labels, bins = bin_edges)
df["Age_binned"] = bins_with_labels
```

[446]:
```
# Binning the Income columns
bin_labels = ['less than 30k', '31 - 45k', '45 - 60k', '61 - 75k', '76 - 90k',␣
 ↪"90k+"]
bin_edges = [0, 30000, 45000, 60000, 75000, 90000, np.inf]
bins_with_labels = pd.cut(df["Income"], labels=bin_labels, bins = bin_edges)
df["Income_binned"] = bins_with_labels
```

3.3 For correlation: Heatmaps, Pairplots and Bivariate Analysis on the basis of product purchased.

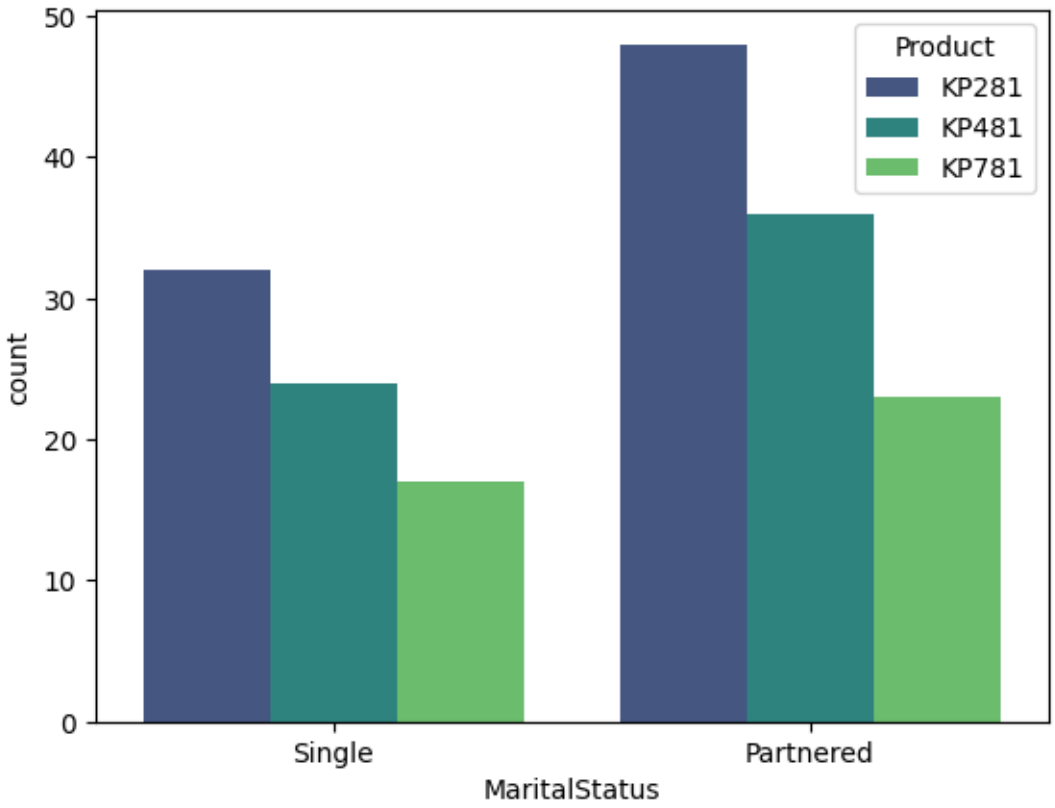
[447]:
```
plt.pie(df["Product"].value_counts(),  labels=df["Product"].value_counts().
  ↪index, autopct='%1.1f%%')
plt.show()
print(df["Product"].value_counts())
```




```
Product
KP281    80
KP481    60
KP781    40
Name: count, dtype: int64
```

Insights: Pie chart shows KP281 product is bought by 44.4% people followed by KP481 which is 33.3% and only 22.2% people bought KP781

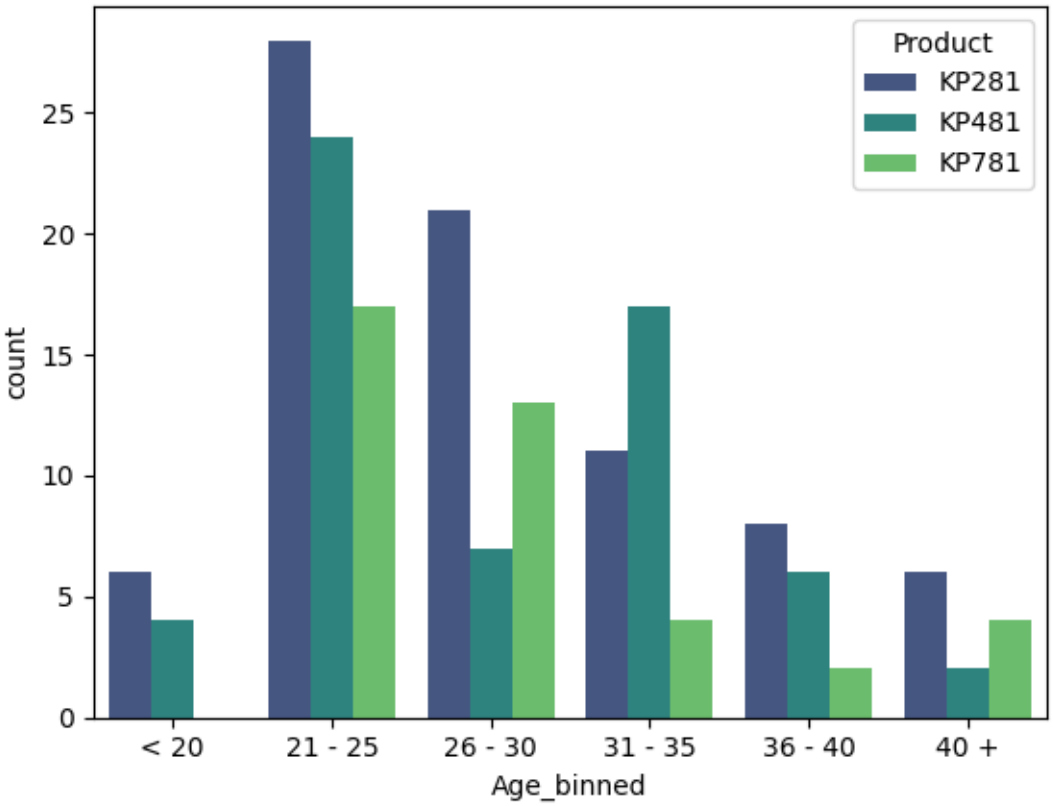
[448]:
```
# Check if features like marital status, age have any effect on the product␣
  ↪purchased (using countplot, histplots, boxplots etc)
sns.countplot(x = "MaritalStatus", data = df, hue = "Product", palette=␣
  ↪"viridis")
plt.show()
print(df.groupby(df["MaritalStatus"])["Product"].count())
```




```
MaritalStatus
Partnered    107
Single        73
Name: Product, dtype: int64
```

Insights: There is no significant differance in purchase of product based on their marital status.

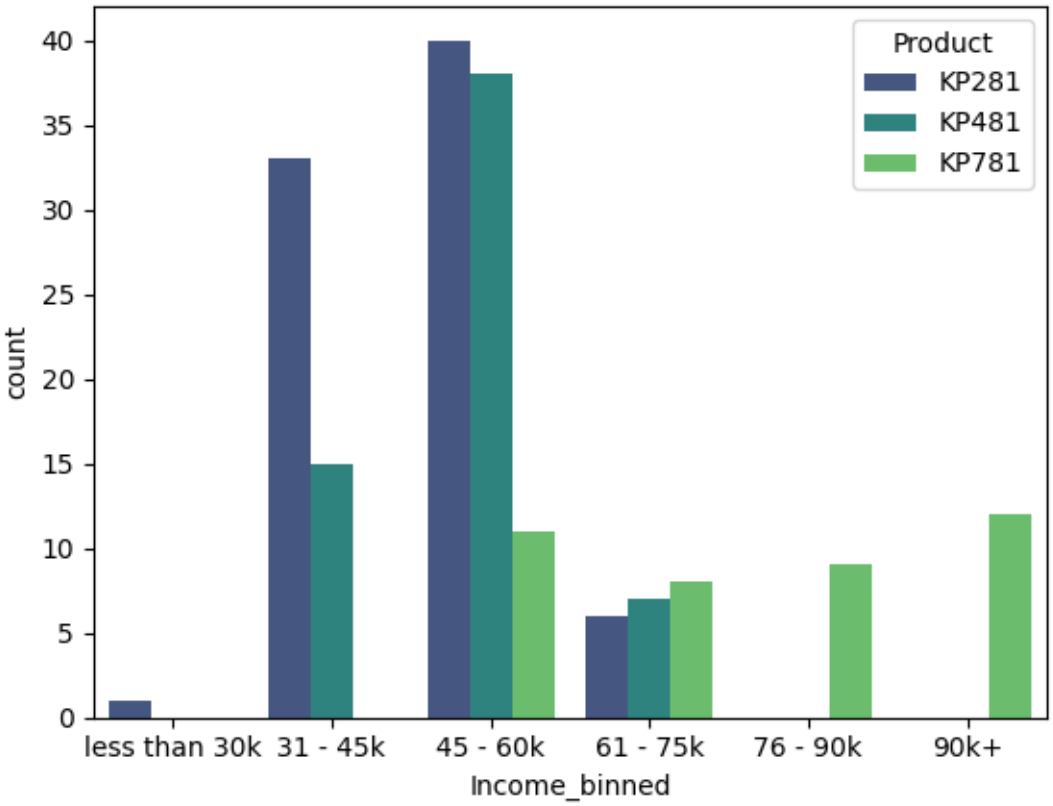
[449]:
```
sns.countplot(x = "Age_binned", data = df, hue = "Product", palette= "viridis")
plt.show()
print(df.groupby(df["Age_binned"])["Product"].count())
```




```
Age_binned
< 20        10
21 - 25     69
26 - 30     41
31 - 35     32
36 - 40     16
40 +        12
Name: Product, dtype: int64
```

Insights: For People with age 21-25 KP281 is more preferred followed by KP481 and KP781. For People with age 26-30 KP281 is more preferred followed by KP781 and KP481. For People with age 31-35 KP481 is more preferred followed by KP281 and KP781.

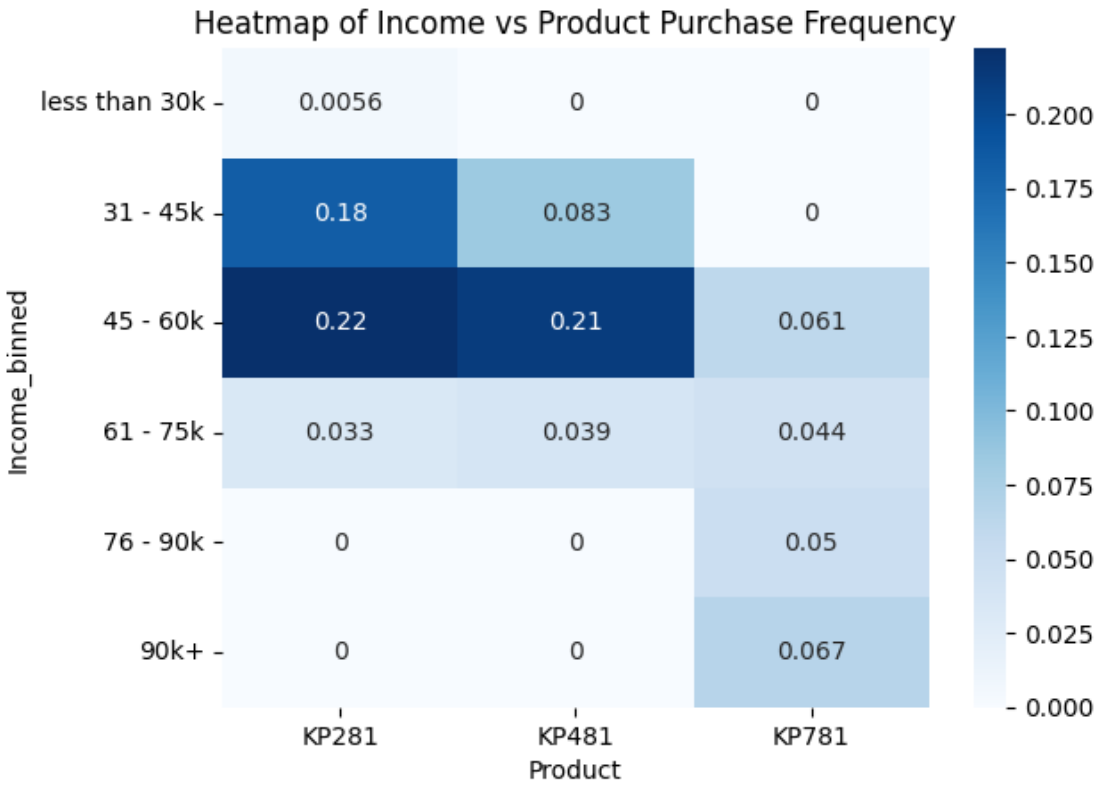
[450]:
```
sns.countplot(x = "Income_binned", data = df, hue = "Product", palette=␣
↪"viridis")
plt.show()
print(df.groupby(df["Income_binned"])["Product"].count())
```




```
Income_binned
less than 30k     1
31 - 45k         48
45 - 60k         89
61 - 75k         21
76 - 90k          9
90k+             12
Name: Product, dtype: int64
```

Insights: It is noticed that people whoso income less than 45k did not bought KP781 product. KP281 is sold more for people with income less than 45 followed by KP481.

[451]:
```
# Representing the marginal probability like - what percent of customers have␣
 ↪purchased KP281, KP481, or KP781 in a table

# Check correlation among different factors using heat maps or pair plots.
crosstab_result = pd.crosstab(df["Income_binned"], df["Product"], normalize =␣
 ↪True)
sns.heatmap(crosstab_result, annot=True, cmap='Blues')
plt.title('Heatmap of Income vs Product Purchase Frequency')
plt.show()
```



Insights: Above heatmap shows

22% people having income between 45-60k bought KP281.

21% people having income between 45-60k bought KP481.

6% people having income between 45-60k bought KP781.

3.3% people having income between 61-75k bought KP281.

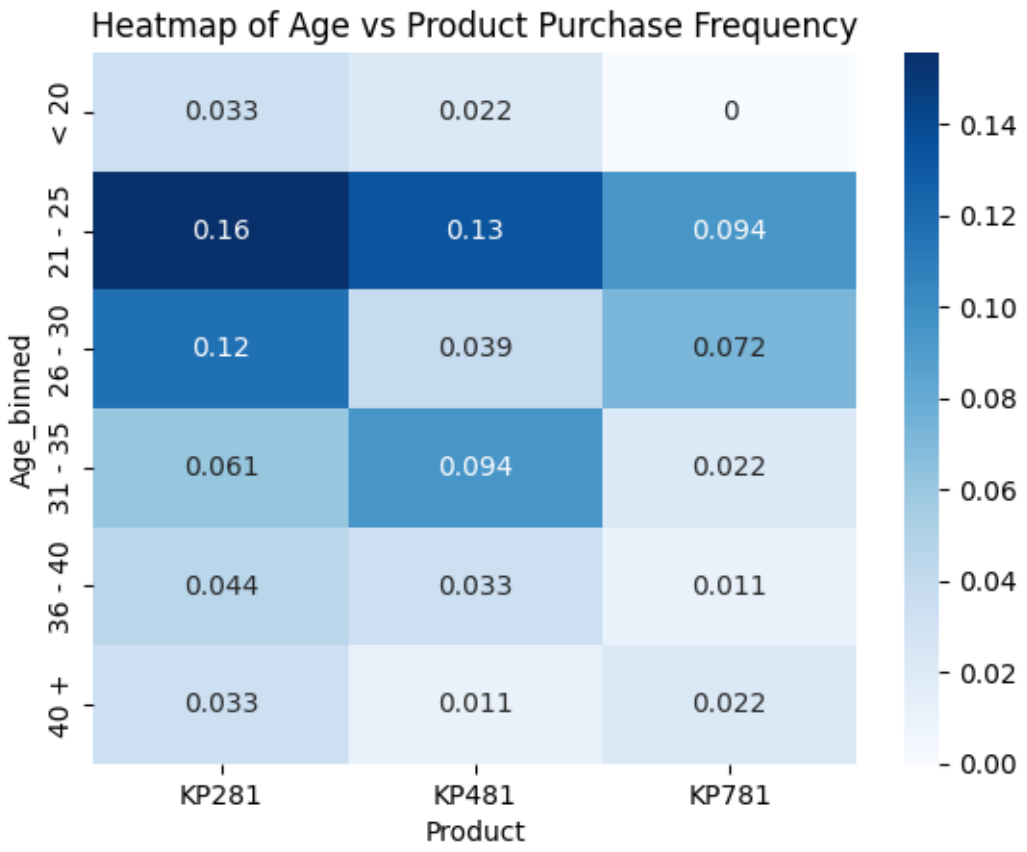
3.9% people having income between 61-75k bought KP481.

4.4% people having income between 61-75k bought KP781.

All people with income more than 75k bought KP781.

All people with income less than 45k bought either KP281 or KP481.

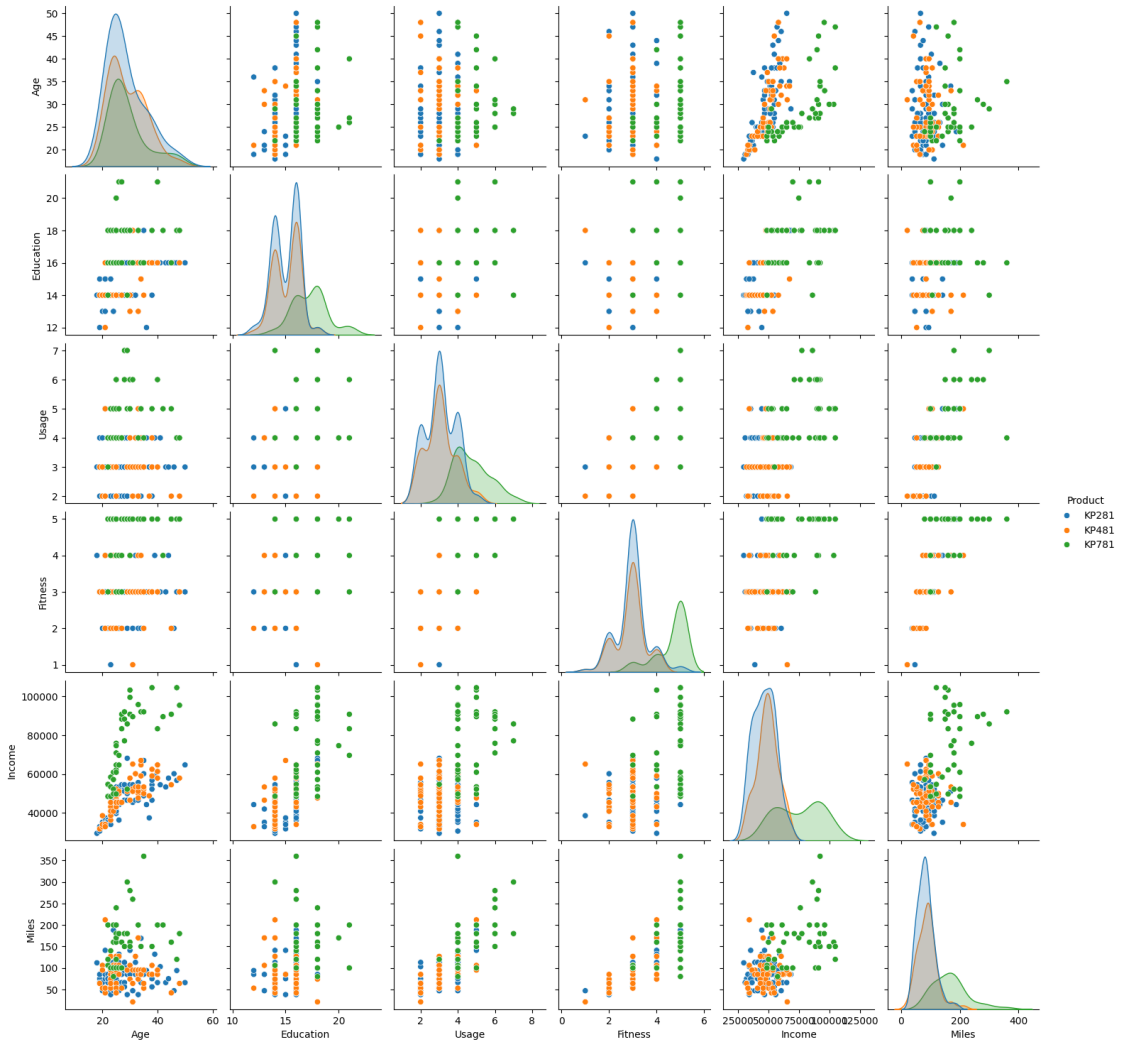
[452]:
```
crosstab_result = pd.crosstab(df["Age_binned"], df["Product"], normalize = True)
sns.heatmap(crosstab_result, annot=True, cmap='Blues')
plt.title('Heatmap of Age vs Product Purchase Frequency')
plt.show()
```



Insights: Above Heatmap shows

People age between 21-25 16% of those bought KP281 People age between 21-25 13% of those bought KP481 People age between 21-25 9% of those bought KP781

[453]:
```
# pair plots
sns.pairplot(df, hue='Product', diag_kind='kde')
plt.show()
```

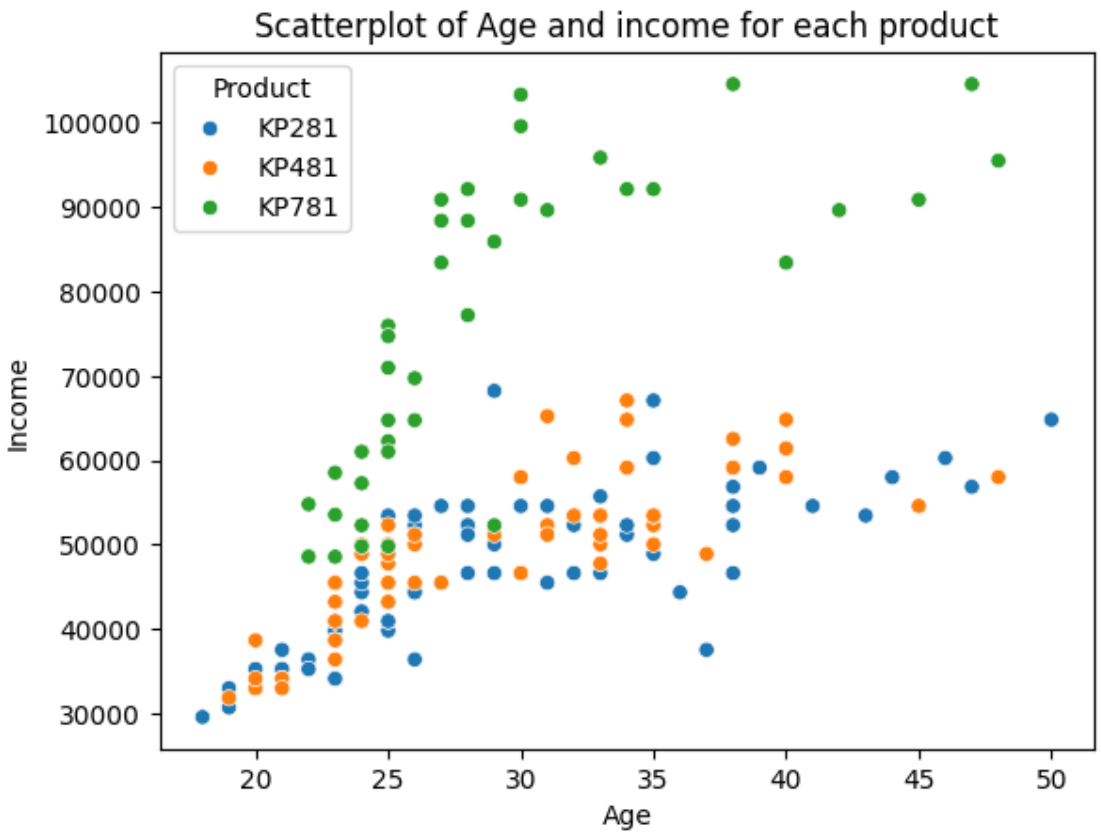


Insights: above pairplot show Income, Fiteness score, Usage per week, Miles run per week are the most important feature in selection of product purchase.

Higher the Income, fitness score, miles runned KP781 is preffered. Lower the Income and miles runned KP281 is preffered.

[454]:
```
sns.scatterplot(data = df, x = "Age", y = "Income", hue = "Product")
plt.title("Scatterplot of Age and income for each product")
```

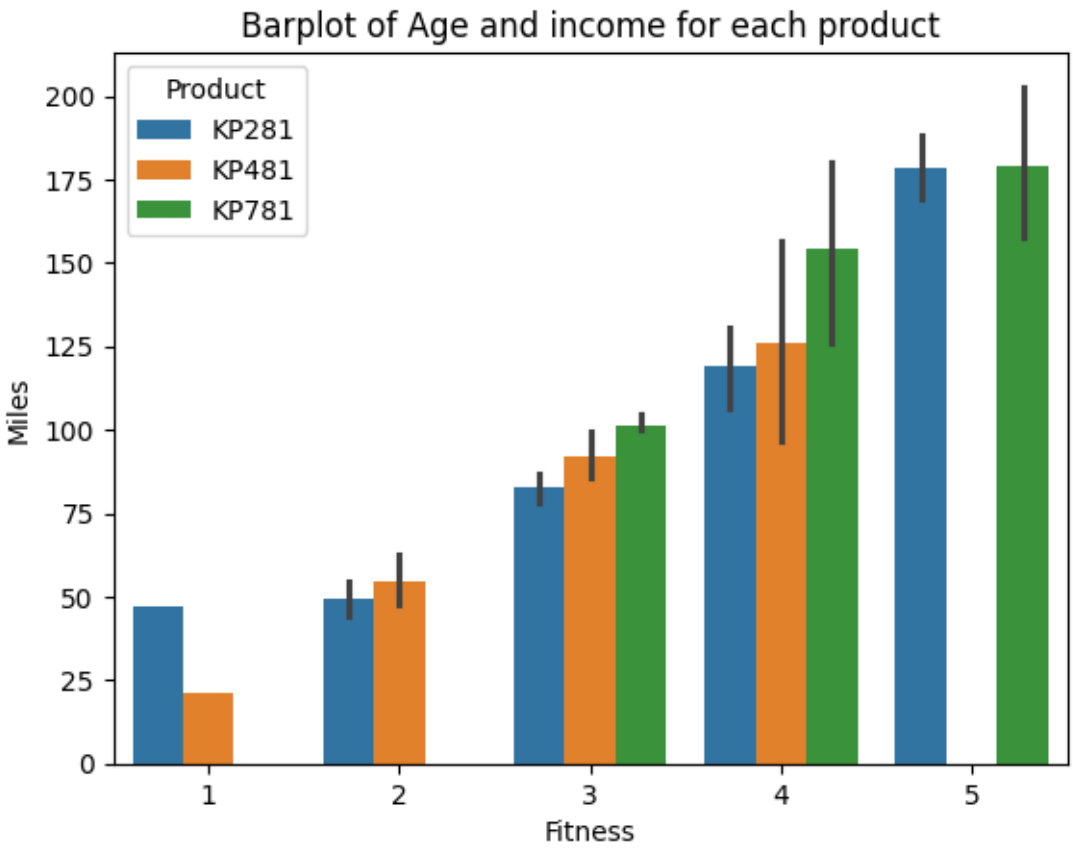
[454]:
```
Text(0.5, 1.0, 'Scatterplot of Age and income for each product')
```



1. Above graph suggests that people of age 23 to 30 having income above 50k preferred KP781 product.
2. Other people regard less of their age prefer KP281 or KP481

[455]:
```
sns.barplot(data = df, x = "Fitness", y = "Miles", hue = "Product")
plt.title("Barplot of Age and income for each product")
```

[455]:
```
Text(0.5, 1.0, 'Barplot of Age and income for each product')
```



People Who has fitness score as 5 preffers KP781.

To calculate what are the conditional probabilities of buying a perticular product given the fitness score we can use Cross tab function.

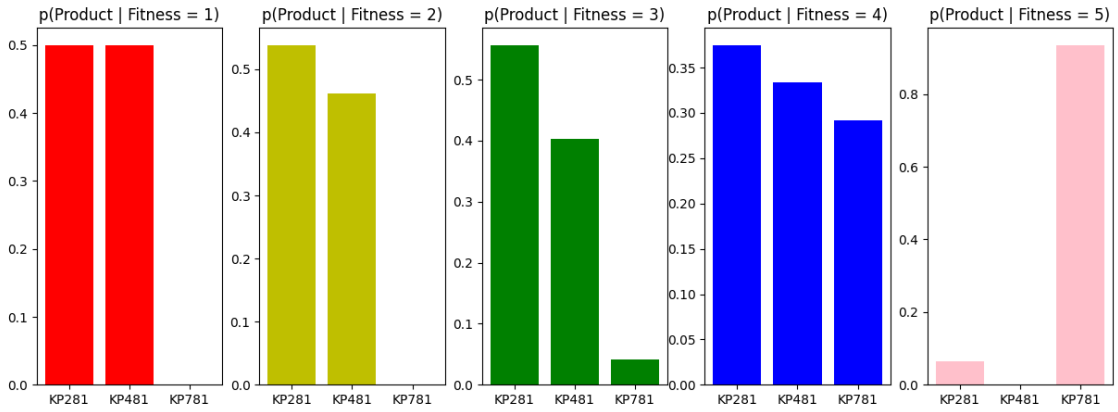
[456]:
```
ct1 = pd.crosstab(df["Product"], df["Fitness"])
ct1
```

[456]:
```
Fitness  1   2   3  4   5
Product
KP281    1  14  54  9   2
KP481    1  12  39  8   0
KP781    0   0   4  7  29
```

[463]:
```
# to calculate conditional probability based on fitness
f1 = ct1.loc[:,1]/ct1.loc[:,1].sum()
f2 = ct1.loc[:,2]/ct1.loc[:,2].sum()
f3 = ct1.loc[:,3]/ct1.loc[:,3].sum()
f4 = ct1.loc[:,4]/ct1.loc[:,4].sum()
f5 = ct1.loc[:,5]/ct1.loc[:,5].sum()
```

```
fig, axs = plt.subplots(1, 5, figsize=(15, 5))

axs[0].bar(f1.index, f1.values, color = "r")
axs[0].set_title('p(Product | Fitness = 1)')

axs[1].bar(f2.index, f2.values, color = "y")
axs[1].set_title('p(Product | Fitness = 2)')

axs[2].bar(f3.index, f3.values, color = "g")
axs[2].set_title('p(Product | Fitness = 3)')

axs[3].bar(f4.index, f4.values, color = 'b')
axs[3].set_title('p(Product | Fitness = 4)')

axs[4].bar(f5.index, f5.values, color = "pink")
axs[4].set_title('p(Product | Fitness = 5)')

plt.show()
```

```
Product
KP281    0.5
KP481    0.5
KP781    0.0
Name: 1, dtype: float64 Product
KP281    0.538462
KP481    0.461538
KP781    0.000000
Name: 2, dtype: float64
```



People who rated fitness score 5 prefer KP781

People who rated fitness score 1 to 3 prefer KP281 or KP481

Note: People who rated fiteness score 4 purchase either of any product to get more perticular we

can filter the Income of people with fitness = 4 and calculate probability of buying which product is more.

[479]:
```
print(f"probability of indivisual buying KP281, KP481 and KP781 given that his␣
 ↪fitness score 5", f5*100)
```

```
probability of indivisual buying KP281, KP481 and KP781 given that his fitness
score 5 Product
KP281     6.451613
KP481     0.000000
KP781    93.548387
Name: 5, dtype: float64
```

To calculate what are the probabilities of buying a perticular product given the Usage per week.

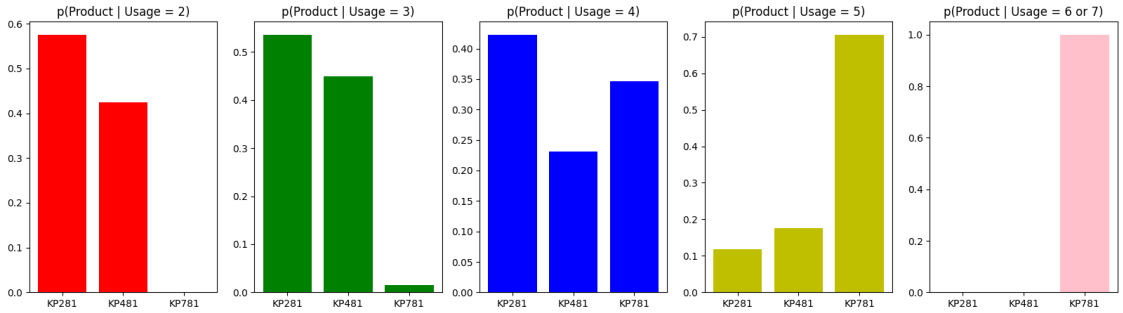
[458]:
```
ct2 = pd.crosstab(df["Product"], df["Usage"])
ct2
```

[458]:

Usage	2	3	4	5	6	7
Product						
KP281	19	37	22	2	0	0
KP481	14	31	12	3	0	0
KP781	0	1	18	12	7	2

[460]:
```
U1 = ct2.loc[:,2]/ct2.loc[:,2].sum()
U2 = ct2.loc[:,3]/ct2.loc[:,3].sum()
U3 = ct2.loc[:,4]/ct2.loc[:,4].sum()
U4 = ct2.loc[:,5]/ct2.loc[:,5].sum()
U6 = (ct2.loc[:, 6] + ct2.loc[:, 7]) / (ct2.loc[:, 6] + ct2.loc[:, 7]).sum()

fig, axs = plt.subplots(1, 5, figsize=(20, 5))


axs[0].bar(U1.index, U1.values, color = "r")
axs[0].set_title('p(Product | Usage = 2)')

axs[1].bar(U2.index, U2.values, color = "g")
axs[1].set_title('p(Product | Usage = 3)')

axs[2].bar(U3.index, U3.values, color = "b")
axs[2].set_title('p(Product | Usage = 4)')

axs[3].bar(U4.index, U4.values, color = "y")
axs[3].set_title('p(Product | Usage = 5)')

axs[4].bar(U6.index, U6.values, color = "pink")
axs[4].set_title('p(Product | Usage = 6 or 7)')
```

```
plt.show()
```



Insights:

Based on the usage per week probability of people buying KP781 given that Usage per week greater than 5 is 100%.

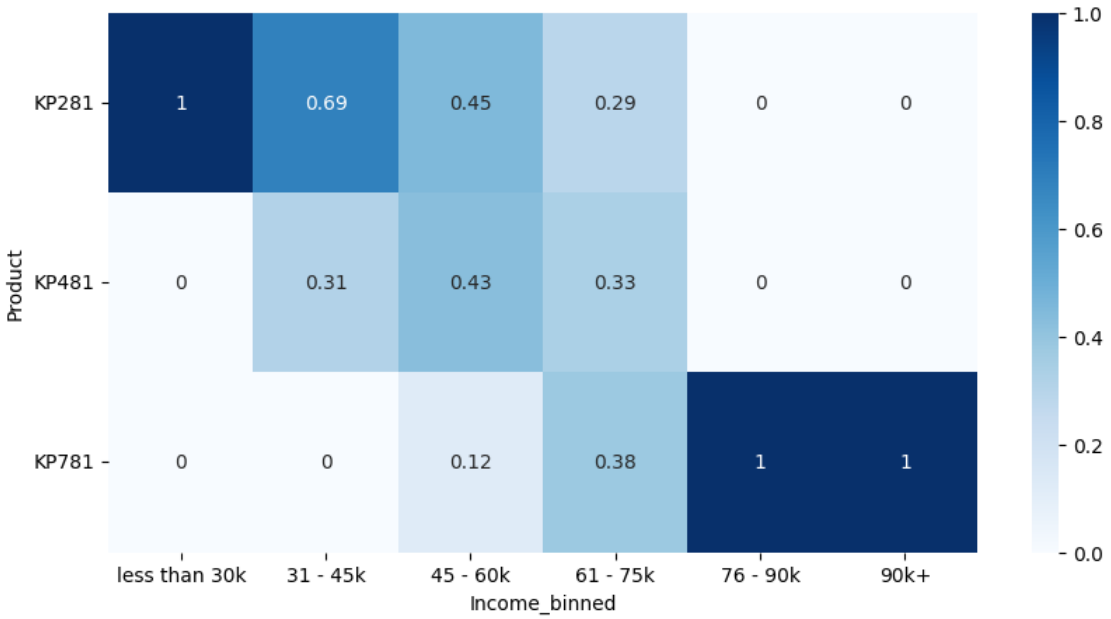
probability of people buying KP781 given that Usage per week less than 2 is 0%.

70% peoper prefer buying KP781 whose usage per week is 5.

Conditional probability based on income.

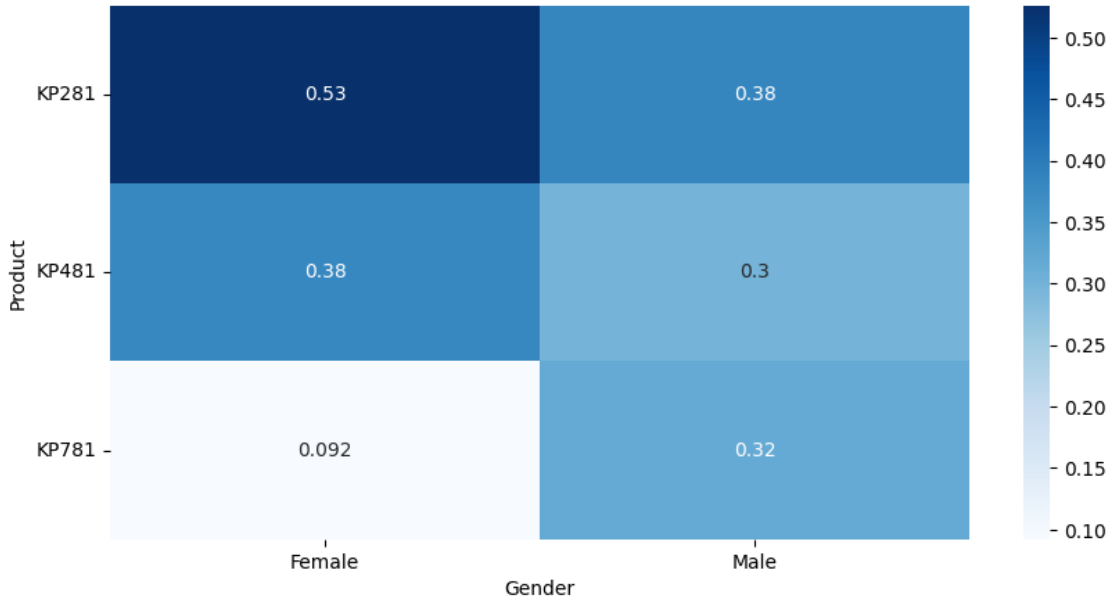
[461]:
```
ct3 = pd.crosstab(df["Product"], df["Income_binned"])/pd.
 ↪crosstab(df["Product"], df["Income_binned"]).sum()
plt.figure(figsize = (10, 5))
sns.heatmap(ct3, annot = True, cmap = 'Blues')
plt.xticks(rotation = 0)
plt.yticks(rotation = 0)
```

[461]:
```
(array([0.5, 1.5, 2.5]),
 [Text(0, 0.5, 'KP281'), Text(0, 1.5, 'KP481'), Text(0, 2.5, 'KP781')])
```



1. Probabilily of people buying KP281 given the income is less than 30k is 100% (means people with less income than 30k do not preffer KP481 or KP781)
2. Probabilily of people buying KP281 given the income between 31k to 45k is 69%
3. Probabilily of people buying KP481 given the income between 31k to 45k is 31%
4. For income between 45k to 60k probablily of people buying KP281 is 45%
5. For income between 45k to 60k probablily of people buying KP481 is 43%
6. For income between 45k to 60k probablily of people buying KP781 is 12%
7. For income between 61k to 75k probablily of people buying KP281 is 29%
8. For income between 61k to 75k probablily of people buying KP481 is 33%
9. For income between 61k to 75k probablily of people buying KP781 is 38%
10. Indivisual with Income more than 75k probablily of buying KP781 is 100% (means people with income more than 75k preffer buying only KP781)

[484]:
```
ct4 = pd.crosstab(df["Product"], df["Gender"])/pd.crosstab(df["Product"],␣
↪df["Gender"]).sum()
plt.figure(figsize = (10, 5))
sns.heatmap(ct4, annot = True, cmap = 'Blues')
plt.xticks(rotation = 0)
plt.yticks(rotation = 0)
plt.show()
```



Insights: Above heatmap show probabilities of People buying product given their Gender.

It is seen that 53% Female Choose to buy KP281 and very few females choos to buy KP781 9% only. KP481 38%.

Male There is no significant difference compared to female in male for purchase of any of the product.

probability of male customer buying KP281 is 38%

probability of male customer buying KP481 is 30%

probability of male customer buying KP781 is 32%.

[485]:
```
ct5 = pd.crosstab(df["Product"], df["MaritalStatus"])/pd.
  ↪crosstab(df["Product"], df["MaritalStatus"]).sum()
plt.figure(figsize = (10, 5))
sns.heatmap(ct5, annot = True, cmap = 'Blues')
plt.xticks(rotation = 0)
plt.yticks(rotation = 0)
plt.show()
```

Insights: Marital status and Product chioce is independent of each other

Summary of Insights:

Income Distribution and Product Preference:

Majority of customers fall in the middle-income range, preferring KP281 and KP481 models, while higher-income individuals show a preference for the premium KP781 model.

.

Usage Frequency and Product Preference:

Customers planning to use treadmills more frequently tend to prefer the KP781 model, indicating it may be favored by serious fitness enthusiasts or athletes.

.

Fitness Score and Product Preference:

Higher fitness scores correlate with a preference for the KP781 model, suggesting it's popular among those with advanced fitness levels or specific training needs.

.

Age and Income Segmentation:

Younger individuals with higher incomes prefer the KP781 model, while others lean towards KP281 or KP481, regardless of age.

.

Gender-Based Preferences:

Females prefer the KP281 model more than males, while males show relatively even preferences across models, indicating potential gender-specific marketing strategies.

.

Marital Status Influence:

Marital status does not significantly influence product preferences, suggesting other demographic and behavioral factors are more relevant.

.

Actionable recommendations

Tailored Marketing Campaigns:

For High Earners: Focus advertising on the KP781 treadmill in platforms and areas frequented by high-income individuals, emphasizing its superior features and suitability for serious athletes.

For Budget-Conscious Customers: Promote the KP281 and KP481 models in cost-effective mediums, highlighting their value and quality at a lower price point.

Feature Highlights in Advertising:

For Fitness Enthusiasts: Emphasize the advanced technology and durability of the KP781 in marketing materials.

For Casual Users: Highlight the ease of use and compact design of the KP281 and KP481 models.

Community Engagement:

Fitness Challenges: Sponsor local fitness events or online challenges that encourage people to engage with the brand and try different treadmill models.

Workshops and Demos: Host events where potential customers can try out treadmills and ask questions about their features and benefits.

Enhanced Customer Service:

Installation and Setup Help: Offer free or discounted installation services, especially for the premium KP781 model, to enhance customer satisfaction.

Responsive Support: Ensure customer service is easily accessible via phone, email, and social media to assist with any queries or issues.

Feedback and Reviews:

Encourage Reviews: Motivate customers to leave reviews by offering a small discount on future purchases. Positive reviews can help persuade new customers. Act on Feedback: Regularly review customer feedback to identify areas for improvement in products and services.

Inclusive Marketing:

Gender-Neutral Campaigns: Since preferences vary significantly by gender, ensure that marketing materials speak to both male and female audiences effectively, without stereotyping.

Diverse Models: Use models of different ages, fitness levels, and backgrounds in promotional materials to appeal to a broader demographic.

[486]:
```
!sudo apt-get install texlive-xetex texlive-fonts-recommended␣
↪texlive-plain-generic
```

```
Reading package lists… Done
Building dependency tree… Done
Reading state information… Done
The following additional packages will be installed:
  dvisvgm fonts-droid-fallback fonts-lato fonts-lmodern fonts-noto-mono
  fonts-texgyre fonts-urw-base35 libapache-pom-java libcommons-logging-java
  libcommons-parent-java libfontbox-java libfontenc1 libgs9 libgs9-common
  libidn12 libijs-0.35 libjbig2dec0 libkpathsea6 libpdfbox-java libptexenc1
  libruby3.0 libsynctex2 libteckit0 libtexlua53 libtexluajit2 libwoff1
  libzzip-0-13 lmodern poppler-data preview-latex-style rake ruby
  ruby-net-telnet ruby-rubygems ruby-webrick ruby-xmlrpc ruby3.0
  rubygems-integration t1utils teckit tex-common tex-gyre texlive-base
  texlive-binaries texlive-latex-base texlive-latex-extra
  texlive-latex-recommended texlive-pictures tipa xfonts-encodings
  xfonts-utils
Suggested packages:
  fonts-noto fonts-freefont-otf | fonts-freefont-ttf libavalon-framework-java
  libcommons-logging-java-doc libexcalibur-logkit-java liblog4j1.2-java
  poppler-utils ghostscript fonts-japanese-mincho | fonts-ipafont-mincho
  fonts-japanese-gothic | fonts-ipafont-gothic fonts-arphic-ukai
  fonts-arphic-uming fonts-nanum ri ruby-dev bundler debhelper gv
  | postscript-viewer perl-tk xpdf | pdf-viewer xzdec
  texlive-fonts-recommended-doc texlive-latex-base-doc python3-pygments
  icc-profiles libfile-which-perl libspreadsheet-parseexcel-perl
  texlive-latex-extra-doc texlive-latex-recommended-doc texlive-luatex
  texlive-pstricks dot2tex prerex texlive-pictures-doc vprerex
  default-jre-headless tipa-doc
The following NEW packages will be installed:
  dvisvgm fonts-droid-fallback fonts-lato fonts-lmodern fonts-noto-mono
  fonts-texgyre fonts-urw-base35 libapache-pom-java libcommons-logging-java
  libcommons-parent-java libfontbox-java libfontenc1 libgs9 libgs9-common
  libidn12 libijs-0.35 libjbig2dec0 libkpathsea6 libpdfbox-java libptexenc1
  libruby3.0 libsynctex2 libteckit0 libtexlua53 libtexluajit2 libwoff1
  libzzip-0-13 lmodern poppler-data preview-latex-style rake ruby
  ruby-net-telnet ruby-rubygems ruby-webrick ruby-xmlrpc ruby3.0
  rubygems-integration t1utils teckit tex-common tex-gyre texlive-base
  texlive-binaries texlive-fonts-recommended texlive-latex-base
  texlive-latex-extra texlive-latex-recommended texlive-pictures
  texlive-plain-generic texlive-xetex tipa xfonts-encodings xfonts-utils
0 upgraded, 54 newly installed, 0 to remove and 45 not upgraded.
Need to get 182 MB of archives.
After this operation, 571 MB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu jammy/main amd64 fonts-droid-fallback all
1:6.0.1r16-1.1build1 [1,805 kB]
```

```
Get:2 http://archive.ubuntu.com/ubuntu jammy/main amd64 fonts-lato all 2.0-2.1
[2,696 kB]
Get:3 http://archive.ubuntu.com/ubuntu jammy/main amd64 poppler-data all
0.4.11-1 [2,171 kB]
Get:4 http://archive.ubuntu.com/ubuntu jammy/universe amd64 tex-common all 6.17
[33.7 kB]
Get:5 http://archive.ubuntu.com/ubuntu jammy/main amd64 fonts-urw-base35 all
20200910-1 [6,367 kB]
Get:6 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libgs9-common
all 9.55.0~dfsg1-0ubuntu5.6 [751 kB]
Get:7 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libidn12 amd64
1.38-4ubuntu1 [60.0 kB]
Get:8 http://archive.ubuntu.com/ubuntu jammy/main amd64 libijs-0.35 amd64
0.35-15build2 [16.5 kB]
Get:9 http://archive.ubuntu.com/ubuntu jammy/main amd64 libjbig2dec0 amd64
0.19-3build2 [64.7 kB]
Get:10 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libgs9 amd64
9.55.0~dfsg1-0ubuntu5.6 [5,031 kB]
Get:11 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libkpathsea6
amd64 2021.20210626.59705-1ubuntu0.2 [60.4 kB]
Get:12 http://archive.ubuntu.com/ubuntu jammy/main amd64 libwoff1 amd64
1.0.2-1build4 [45.2 kB]
Get:13 http://archive.ubuntu.com/ubuntu jammy/universe amd64 dvisvgm amd64
2.13.1-1 [1,221 kB]
Get:14 http://archive.ubuntu.com/ubuntu jammy/universe amd64 fonts-lmodern all
2.004.5-6.1 [4,532 kB]
Get:15 http://archive.ubuntu.com/ubuntu jammy/main amd64 fonts-noto-mono all
20201225-1build1 [397 kB]
Get:16 http://archive.ubuntu.com/ubuntu jammy/universe amd64 fonts-texgyre all
20180621-3.1 [10.2 MB]
Get:17 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libapache-pom-java
all 18-1 [4,720 B]
Get:18 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libcommons-parent-
java all 43-1 [10.8 kB]
Get:19 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libcommons-logging-
java all 1.2-2 [60.3 kB]
Get:20 http://archive.ubuntu.com/ubuntu jammy/main amd64 libfontenc1 amd64
1:1.1.4-1build3 [14.7 kB]
Get:21 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libptexenc1
amd64 2021.20210626.59705-1ubuntu0.2 [39.1 kB]
Get:22 http://archive.ubuntu.com/ubuntu jammy/main amd64 rubygems-integration
all 1.18 [5,336 B]
Get:23 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 ruby3.0 amd64
3.0.2-7ubuntu2.4 [50.1 kB]
Get:24 http://archive.ubuntu.com/ubuntu jammy/main amd64 ruby-rubygems all
3.3.5-2 [228 kB]
Get:25 http://archive.ubuntu.com/ubuntu jammy/main amd64 ruby amd64 1:3.0~exp1
[5,100 B]
```

```
Get:26 http://archive.ubuntu.com/ubuntu jammy/main amd64 rake all 13.0.6-2 [61.7
kB]
Get:27 http://archive.ubuntu.com/ubuntu jammy/main amd64 ruby-net-telnet all
0.1.1-2 [12.6 kB]
Get:28 http://archive.ubuntu.com/ubuntu jammy/universe amd64 ruby-webrick all
1.7.0-3 [51.8 kB]
Get:29 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 ruby-xmlrpc all
0.3.2-1ubuntu0.1 [24.9 kB]
Get:30 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libruby3.0
amd64 3.0.2-7ubuntu2.4 [5,113 kB]
Get:31 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libsynctex2
amd64 2021.20210626.59705-1ubuntu0.2 [55.6 kB]
Get:32 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libteckit0 amd64
2.5.11+ds1-1 [421 kB]
Get:33 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libtexlua53
amd64 2021.20210626.59705-1ubuntu0.2 [120 kB]
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amd64 2021.20210626.59705-1ubuntu0.2 [267 kB]
Get:35 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libzzip-0-13 amd64
0.13.72+dfsg.1-1.1 [27.0 kB]
Get:36 http://archive.ubuntu.com/ubuntu jammy/main amd64 xfonts-encodings all
1:1.0.5-0ubuntu2 [578 kB]
Get:37 http://archive.ubuntu.com/ubuntu jammy/main amd64 xfonts-utils amd64
1:7.7+6build2 [94.6 kB]
Get:38 http://archive.ubuntu.com/ubuntu jammy/universe amd64 lmodern all
2.004.5-6.1 [9,471 kB]
Get:39 http://archive.ubuntu.com/ubuntu jammy/universe amd64 preview-latex-style
all 12.2-1ubuntu1 [185 kB]
Get:40 http://archive.ubuntu.com/ubuntu jammy/main amd64 t1utils amd64
1.41-4build2 [61.3 kB]
Get:41 http://archive.ubuntu.com/ubuntu jammy/universe amd64 teckit amd64
2.5.11+ds1-1 [699 kB]
Get:42 http://archive.ubuntu.com/ubuntu jammy/universe amd64 tex-gyre all
20180621-3.1 [6,209 kB]
Get:43 http://archive.ubuntu.com/ubuntu jammy-updates/universe amd64 texlive-
binaries amd64 2021.20210626.59705-1ubuntu0.2 [9,860 kB]
Get:44 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-base all
2021.20220204-1 [21.0 MB]
Get:45 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-fonts-
recommended all 2021.20220204-1 [4,972 kB]
Get:46 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-latex-base
all 2021.20220204-1 [1,128 kB]
Get:47 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libfontbox-java all
1:1.8.16-2 [207 kB]
Get:48 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libpdfbox-java all
1:1.8.16-2 [5,199 kB]
Get:49 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-latex-
recommended all 2021.20220204-1 [14.4 MB]
```

```
Get:50 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-pictures
all 2021.20220204-1 [8,720 kB]
Get:51 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-latex-extra
all 2021.20220204-1 [13.9 MB]
Get:52 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-plain-
generic all 2021.20220204-1 [27.5 MB]
Get:53 http://archive.ubuntu.com/ubuntu jammy/universe amd64 tipa all 2:1.3-21
[2,967 kB]
Get:54 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-xetex all
2021.20220204-1 [12.4 MB]
Fetched 182 MB in 3s (69.0 MB/s)
debconf: unable to initialize frontend: Dialog
debconf: (No usable dialog-like program is installed, so the dialog based
frontend cannot be used. at /usr/share/perl5/Debconf/FrontEnd/Dialog.pm line 78,
<> line 54.)
debconf: falling back to frontend: Readline
debconf: unable to initialize frontend: Readline
debconf: (This frontend requires a controlling tty.)
debconf: falling back to frontend: Teletype
dpkg-preconfigure: unable to re-open stdin:
Selecting previously unselected package fonts-droid-fallback.
(Reading database … 121752 files and directories currently installed.)
Preparing to unpack …/00-fonts-droid-fallback_1%3a6.0.1r16-1.1build1_all.deb
…
Unpacking fonts-droid-fallback (1:6.0.1r16-1.1build1) …
Selecting previously unselected package fonts-lato.
Preparing to unpack …/01-fonts-lato_2.0-2.1_all.deb …
Unpacking fonts-lato (2.0-2.1) …
Selecting previously unselected package poppler-data.
Preparing to unpack …/02-poppler-data_0.4.11-1_all.deb …
Unpacking poppler-data (0.4.11-1) …
Selecting previously unselected package tex-common.
Preparing to unpack …/03-tex-common_6.17_all.deb …
Unpacking tex-common (6.17) …
Selecting previously unselected package fonts-urw-base35.
Preparing to unpack …/04-fonts-urw-base35_20200910-1_all.deb …
Unpacking fonts-urw-base35 (20200910-1) …
Selecting previously unselected package libgs9-common.
Preparing to unpack …/05-libgs9-common_9.55.0~dfsg1-0ubuntu5.6_all.deb …
Unpacking libgs9-common (9.55.0~dfsg1-0ubuntu5.6) …
Selecting previously unselected package libidn12:amd64.
Preparing to unpack …/06-libidn12_1.38-4ubuntu1_amd64.deb …
Unpacking libidn12:amd64 (1.38-4ubuntu1) …
Selecting previously unselected package libijs-0.35:amd64.
Preparing to unpack …/07-libijs-0.35_0.35-15build2_amd64.deb …
Unpacking libijs-0.35:amd64 (0.35-15build2) …
Selecting previously unselected package libjbig2dec0:amd64.
Preparing to unpack …/08-libjbig2dec0_0.19-3build2_amd64.deb …
```

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Unpacking libjbig2dec0:amd64 (0.19-3build2) …
Selecting previously unselected package libgs9:amd64.
Preparing to unpack …/09-libgs9_9.55.0~dfsg1-0ubuntu5.6_amd64.deb …
Unpacking libgs9:amd64 (9.55.0~dfsg1-0ubuntu5.6) …
Selecting previously unselected package libkpathsea6:amd64.
Preparing to unpack …/10-libkpathsea6_2021.20210626.59705-1ubuntu0.2_amd64.deb
…
Unpacking libkpathsea6:amd64 (2021.20210626.59705-1ubuntu0.2) …
Selecting previously unselected package libwoff1:amd64.
Preparing to unpack …/11-libwoff1_1.0.2-1build4_amd64.deb …
Unpacking libwoff1:amd64 (1.0.2-1build4) …
Selecting previously unselected package dvisvgm.
Preparing to unpack …/12-dvisvgm_2.13.1-1_amd64.deb …
Unpacking dvisvgm (2.13.1-1) …
Selecting previously unselected package fonts-lmodern.
Preparing to unpack …/13-fonts-lmodern_2.004.5-6.1_all.deb …
Unpacking fonts-lmodern (2.004.5-6.1) …
Selecting previously unselected package fonts-noto-mono.
Preparing to unpack …/14-fonts-noto-mono_20201225-1build1_all.deb …
Unpacking fonts-noto-mono (20201225-1build1) …
Selecting previously unselected package fonts-texgyre.
Preparing to unpack …/15-fonts-texgyre_20180621-3.1_all.deb …
Unpacking fonts-texgyre (20180621-3.1) …
Selecting previously unselected package libapache-pom-java.
Preparing to unpack …/16-libapache-pom-java_18-1_all.deb …
Unpacking libapache-pom-java (18-1) …
Selecting previously unselected package libcommons-parent-java.
Preparing to unpack …/17-libcommons-parent-java_43-1_all.deb …
Unpacking libcommons-parent-java (43-1) …
Selecting previously unselected package libcommons-logging-java.
Preparing to unpack …/18-libcommons-logging-java_1.2-2_all.deb …
Unpacking libcommons-logging-java (1.2-2) …
Selecting previously unselected package libfontenc1:amd64.
Preparing to unpack …/19-libfontenc1_1%3a1.1.4-1build3_amd64.deb …
Unpacking libfontenc1:amd64 (1:1.1.4-1build3) …
Selecting previously unselected package libptexenc1:amd64.
Preparing to unpack …/20-libptexenc1_2021.20210626.59705-1ubuntu0.2_amd64.deb
…
Unpacking libptexenc1:amd64 (2021.20210626.59705-1ubuntu0.2) …
Selecting previously unselected package rubygems-integration.
Preparing to unpack …/21-rubygems-integration_1.18_all.deb …
Unpacking rubygems-integration (1.18) …
Selecting previously unselected package ruby3.0.
Preparing to unpack …/22-ruby3.0_3.0.2-7ubuntu2.4_amd64.deb …
Unpacking ruby3.0 (3.0.2-7ubuntu2.4) …
Selecting previously unselected package ruby-rubygems.
Preparing to unpack …/23-ruby-rubygems_3.3.5-2_all.deb …
Unpacking ruby-rubygems (3.3.5-2) …
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Selecting previously unselected package ruby.
Preparing to unpack …/24-ruby_1%3a3.0~exp1_amd64.deb …
Unpacking ruby (1:3.0~exp1) …
Selecting previously unselected package rake.
Preparing to unpack …/25-rake_13.0.6-2_all.deb …
Unpacking rake (13.0.6-2) …
Selecting previously unselected package ruby-net-telnet.
Preparing to unpack …/26-ruby-net-telnet_0.1.1-2_all.deb …
Unpacking ruby-net-telnet (0.1.1-2) …
Selecting previously unselected package ruby-webrick.
Preparing to unpack …/27-ruby-webrick_1.7.0-3_all.deb …
Unpacking ruby-webrick (1.7.0-3) …
Selecting previously unselected package ruby-xmlrpc.
Preparing to unpack …/28-ruby-xmlrpc_0.3.2-1ubuntu0.1_all.deb …
Unpacking ruby-xmlrpc (0.3.2-1ubuntu0.1) …
Selecting previously unselected package libruby3.0:amd64.
Preparing to unpack …/29-libruby3.0_3.0.2-7ubuntu2.4_amd64.deb …
Unpacking libruby3.0:amd64 (3.0.2-7ubuntu2.4) …
Selecting previously unselected package libsynctex2:amd64.
Preparing to unpack …/30-libsynctex2_2021.20210626.59705-1ubuntu0.2_amd64.deb
…
Unpacking libsynctex2:amd64 (2021.20210626.59705-1ubuntu0.2) …
Selecting previously unselected package libteckit0:amd64.
Preparing to unpack …/31-libteckit0_2.5.11+ds1-1_amd64.deb …
Unpacking libteckit0:amd64 (2.5.11+ds1-1) …
Selecting previously unselected package libtexlua53:amd64.
Preparing to unpack …/32-libtexlua53_2021.20210626.59705-1ubuntu0.2_amd64.deb
…
Unpacking libtexlua53:amd64 (2021.20210626.59705-1ubuntu0.2) …
Selecting previously unselected package libtexluajit2:amd64.
Preparing to unpack
…/33-libtexluajit2_2021.20210626.59705-1ubuntu0.2_amd64.deb …
Unpacking libtexluajit2:amd64 (2021.20210626.59705-1ubuntu0.2) …
Selecting previously unselected package libzzip-0-13:amd64.
Preparing to unpack …/34-libzzip-0-13_0.13.72+dfsg.1-1.1_amd64.deb …
Unpacking libzzip-0-13:amd64 (0.13.72+dfsg.1-1.1) …
Selecting previously unselected package xfonts-encodings.
Preparing to unpack …/35-xfonts-encodings_1%3a1.0.5-0ubuntu2_all.deb …
Unpacking xfonts-encodings (1:1.0.5-0ubuntu2) …
Selecting previously unselected package xfonts-utils.
Preparing to unpack …/36-xfonts-utils_1%3a7.7+6build2_amd64.deb …
Unpacking xfonts-utils (1:7.7+6build2) …
Selecting previously unselected package lmodern.
Preparing to unpack …/37-lmodern_2.004.5-6.1_all.deb …
Unpacking lmodern (2.004.5-6.1) …
Selecting previously unselected package preview-latex-style.
Preparing to unpack …/38-preview-latex-style_12.2-1ubuntu1_all.deb …
Unpacking preview-latex-style (12.2-1ubuntu1) …
```

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Selecting previously unselected package t1utils.
Preparing to unpack …/39-t1utils_1.41-4build2_amd64.deb …
Unpacking t1utils (1.41-4build2) …
Selecting previously unselected package teckit.
Preparing to unpack …/40-teckit_2.5.11+ds1-1_amd64.deb …
Unpacking teckit (2.5.11+ds1-1) …
Selecting previously unselected package tex-gyre.
Preparing to unpack …/41-tex-gyre_20180621-3.1_all.deb …
Unpacking tex-gyre (20180621-3.1) …
Selecting previously unselected package texlive-binaries.
Preparing to unpack …/42-texlive-
binaries_2021.20210626.59705-1ubuntu0.2_amd64.deb …
Unpacking texlive-binaries (2021.20210626.59705-1ubuntu0.2) …
Selecting previously unselected package texlive-base.
Preparing to unpack …/43-texlive-base_2021.20220204-1_all.deb …
Unpacking texlive-base (2021.20220204-1) …
Selecting previously unselected package texlive-fonts-recommended.
Preparing to unpack …/44-texlive-fonts-recommended_2021.20220204-1_all.deb …
Unpacking texlive-fonts-recommended (2021.20220204-1) …
Selecting previously unselected package texlive-latex-base.
Preparing to unpack …/45-texlive-latex-base_2021.20220204-1_all.deb …
Unpacking texlive-latex-base (2021.20220204-1) …
Selecting previously unselected package libfontbox-java.
Preparing to unpack …/46-libfontbox-java_1%3a1.8.16-2_all.deb …
Unpacking libfontbox-java (1:1.8.16-2) …
Selecting previously unselected package libpdfbox-java.
Preparing to unpack …/47-libpdfbox-java_1%3a1.8.16-2_all.deb …
Unpacking libpdfbox-java (1:1.8.16-2) …
Selecting previously unselected package texlive-latex-recommended.
Preparing to unpack …/48-texlive-latex-recommended_2021.20220204-1_all.deb …
Unpacking texlive-latex-recommended (2021.20220204-1) …
Selecting previously unselected package texlive-pictures.
Preparing to unpack …/49-texlive-pictures_2021.20220204-1_all.deb …
Unpacking texlive-pictures (2021.20220204-1) …
Selecting previously unselected package texlive-latex-extra.
Preparing to unpack …/50-texlive-latex-extra_2021.20220204-1_all.deb …
Unpacking texlive-latex-extra (2021.20220204-1) …
Selecting previously unselected package texlive-plain-generic.
Preparing to unpack …/51-texlive-plain-generic_2021.20220204-1_all.deb …
Unpacking texlive-plain-generic (2021.20220204-1) …
Selecting previously unselected package tipa.
Preparing to unpack …/52-tipa_2%3a1.3-21_all.deb …
Unpacking tipa (2:1.3-21) …
Selecting previously unselected package texlive-xetex.
Preparing to unpack …/53-texlive-xetex_2021.20220204-1_all.deb …
Unpacking texlive-xetex (2021.20220204-1) …
Setting up fonts-lato (2.0-2.1) …
Setting up fonts-noto-mono (20201225-1build1) …
```

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Setting up libwoff1:amd64 (1.0.2-1build4) …
Setting up libtexlua53:amd64 (2021.20210626.59705-1ubuntu0.2) …
Setting up libijs-0.35:amd64 (0.35-15build2) …
Setting up libtexluajit2:amd64 (2021.20210626.59705-1ubuntu0.2) …
Setting up libfontbox-java (1:1.8.16-2) …
Setting up rubygems-integration (1.18) …
Setting up libzzip-0-13:amd64 (0.13.72+dfsg.1-1.1) …
Setting up fonts-urw-base35 (20200910-1) …
Setting up poppler-data (0.4.11-1) …
Setting up tex-common (6.17) …
debconf: unable to initialize frontend: Dialog
debconf: (No usable dialog-like program is installed, so the dialog based
frontend cannot be used. at /usr/share/perl5/Debconf/FrontEnd/Dialog.pm line
78.)
debconf: falling back to frontend: Readline
update-language: texlive-base not installed and configured, doing nothing!
Setting up libfontenc1:amd64 (1:1.1.4-1build3) …
Setting up libjbig2dec0:amd64 (0.19-3build2) …
Setting up libteckit0:amd64 (2.5.11+ds1-1) …
Setting up libapache-pom-java (18-1) …
Setting up ruby-net-telnet (0.1.1-2) …
Setting up xfonts-encodings (1:1.0.5-0ubuntu2) …
Setting up t1utils (1.41-4build2) …
Setting up libidn12:amd64 (1.38-4ubuntu1) …
Setting up fonts-texgyre (20180621-3.1) …
Setting up libkpathsea6:amd64 (2021.20210626.59705-1ubuntu0.2) …
Setting up ruby-webrick (1.7.0-3) …
Setting up fonts-lmodern (2.004.5-6.1) …
Setting up fonts-droid-fallback (1:6.0.1r16-1.1build1) …
Setting up ruby-xmlrpc (0.3.2-1ubuntu0.1) …
Setting up libsynctex2:amd64 (2021.20210626.59705-1ubuntu0.2) …
Setting up libgs9-common (9.55.0~dfsg1-0ubuntu5.6) …
Setting up teckit (2.5.11+ds1-1) …
Setting up libpdfbox-java (1:1.8.16-2) …
Setting up libgs9:amd64 (9.55.0~dfsg1-0ubuntu5.6) …
Setting up preview-latex-style (12.2-1ubuntu1) …
Setting up libcommons-parent-java (43-1) …
Setting up dvisvgm (2.13.1-1) …
Setting up libcommons-logging-java (1.2-2) …
Setting up xfonts-utils (1:7.7+6build2) …
Setting up libptexenc1:amd64 (2021.20210626.59705-1ubuntu0.2) …
Setting up texlive-binaries (2021.20210626.59705-1ubuntu0.2) …
update-alternatives: using /usr/bin/xdvi-xaw to provide /usr/bin/xdvi.bin
(xdvi.bin) in auto mode
update-alternatives: using /usr/bin/bibtex.original to provide /usr/bin/bibtex
(bibtex) in auto mode
Setting up lmodern (2.004.5-6.1) …
Setting up texlive-base (2021.20220204-1) …
```

```
/usr/bin/ucfr
/usr/bin/ucfr
/usr/bin/ucfr
/usr/bin/ucfr
mktexlsr: Updating /var/lib/texmf/ls-R-TEXLIVEDIST…
mktexlsr: Updating /var/lib/texmf/ls-R-TEXMFMAIN…
mktexlsr: Updating /var/lib/texmf/ls-R…
mktexlsr: Done.
tl-paper: setting paper size for dvips to a4:
/var/lib/texmf/dvips/config/config-paper.ps
tl-paper: setting paper size for dvipdfmx to a4:
/var/lib/texmf/dvipdfmx/dvipdfmx-paper.cfg
tl-paper: setting paper size for xdvi to a4: /var/lib/texmf/xdvi/XDvi-paper
tl-paper: setting paper size for pdftex to a4: /var/lib/texmf/tex/generic/tex-
ini-files/pdftexconfig.tex
debconf: unable to initialize frontend: Dialog
debconf: (No usable dialog-like program is installed, so the dialog based
frontend cannot be used. at /usr/share/perl5/Debconf/FrontEnd/Dialog.pm line
78.)
debconf: falling back to frontend: Readline
Setting up tex-gyre (20180621-3.1) …
Setting up texlive-plain-generic (2021.20220204-1) …
Setting up texlive-latex-base (2021.20220204-1) …
Setting up texlive-latex-recommended (2021.20220204-1) …
Setting up texlive-pictures (2021.20220204-1) …
Setting up texlive-fonts-recommended (2021.20220204-1) …
Setting up tipa (2:1.3-21) …
Setting up texlive-latex-extra (2021.20220204-1) …
Setting up texlive-xetex (2021.20220204-1) …
Setting up rake (13.0.6-2) …
Setting up libruby3.0:amd64 (3.0.2-7ubuntu2.4) …
Setting up ruby3.0 (3.0.2-7ubuntu2.4) …
Setting up ruby (1:3.0~exp1) …
Setting up ruby-rubygems (3.3.5-2) …
Processing triggers for man-db (2.10.2-1) …
Processing triggers for fontconfig (2.13.1-4.2ubuntu5) …
Processing triggers for libc-bin (2.35-0ubuntu3.4) …
/sbin/ldconfig.real: /usr/local/lib/libtbbmalloc.so.2 is not a symbolic link

/sbin/ldconfig.real: /usr/local/lib/libtbbbind_2_0.so.3 is not a symbolic link

/sbin/ldconfig.real: /usr/local/lib/libtbbmalloc_proxy.so.2 is not a symbolic
link

/sbin/ldconfig.real: /usr/local/lib/libtbb.so.12 is not a symbolic link

/sbin/ldconfig.real: /usr/local/lib/libtbbbind_2_5.so.3 is not a symbolic link
```

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/sbin/ldconfig.real: /usr/local/lib/libtbbbind.so.3 is not a symbolic link

Processing triggers for tex-common (6.17) …
debconf: unable to initialize frontend: Dialog
debconf: (No usable dialog-like program is installed, so the dialog based
frontend cannot be used. at /usr/share/perl5/Debconf/FrontEnd/Dialog.pm line
78.)
debconf: falling back to frontend: Readline
Running updmap-sys. This may take some time… done.
Running mktexlsr /var/lib/texmf … done.
Building format(s) --all.
        This may take some time… done.
```

[487]:

```
!jupyter nbconvert --to pdf /content/Aerofit_Case_Study.ipynb
```

```
[NbConvertApp] Converting notebook /content/Aerofit_Case_Study.ipynb to pdf
[NbConvertApp] Support files will be in Aerofit_Case_Study_files/
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Making directory ./Aerofit_Case_Study_files
[NbConvertApp] Writing 87270 bytes to notebook.tex
[NbConvertApp] Building PDF
```

```
[NbConvertApp] Running xelatex 3 times: ['xelatex', 'notebook.tex', '-quiet']
[NbConvertApp] Running bibtex 1 time: ['bibtex', 'notebook']
[NbConvertApp] WARNING | bibtex had problems, most likely because there were no
citations
[NbConvertApp] PDF successfully created
[NbConvertApp] Writing 1015529 bytes to /content/Aerofit_Case_Study.pdf
```

[ ]: