16_feature_selection_vjezba

August 1, 2025

[1]:
```
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
import statsmodels.api as sm
from statsmodels.formula.api import ols
```

[2]:
```
lifeexp = pd.read_csv("../../datasets/life_exp.csv")
```

1 Feature selection vježba

Korištenjem feature selection metoda odredite koje varijable bi vam bile korisne pri prognoziranju ciljne varijable Life_Expectancy

Dataset nema missing values kao ni outliere tako da se s time ne moramo zamarati

[3]:
```
lifeexp
```

[3]:
```
    Unnamed: 0  Life_Expectancy  Average_Temperature  Daily_Screen_Time  \
0            0        72.483571            17.923146           4.357787
1            1        69.308678            22.896773           4.560785
2            2        73.238443            23.286427           5.083051
3            3        77.615149            20.988614           5.053802
4            4        68.829233            24.193571           2.622331
..         ...              ...                  ...                ...
95          95        62.682425            26.926587           3.307090
96          96        71.480601            20.580713           4.899600
97          97        71.305276            25.768626           4.307300
98          98        70.025567            25.291044           4.812862
99          99        68.827064            19.285149           4.629629

    Health_Index        Income    Country       Diet_Type  \
0      71.654576  74294.715447  Country B      Vegetarian
1      68.748497  73109.928448  Country B  Non-Vegetarian
2      73.985736  78248.930090  Country C      Vegetarian
3      78.225520  82709.110470  Country C           Vegan
4      68.808332  72929.102183  Country A      Vegetarian
..           ...           ...        ...             ...
95     62.213250  68760.245347  Country C  Non-Vegetarian
```

```
96     69.767467  74406.109077  Country A  Non-Vegetarian
97     72.659149  75924.599005  Country B  Non-Vegetarian
98     69.911027  73274.330776  Country C  Non-Vegetarian
99     70.064881  71061.464871  Country C           Vegan

    Government_Health_Policy
0                        1.0
1                        1.0
2                        1.0
3                        1.0
4                        1.0
..                       …
95                       1.0
96                       1.0
97                       1.0
98                       1.0
99                       1.0

[100 rows x 9 columns]
```

[4]:
```
lifeexp.describe()
```

[4]:
```
       Unnamed: 0  Life_Expectancy  Average_Temperature  Daily_Screen_Time  \
count  100.000000       100.000000           100.000000         100.000000
mean    49.500000        69.480767            25.111523           4.064896
std     29.011492         4.540842             4.768345           1.084283
min      0.000000        56.901274            15.406144           0.758733
25%     24.750000        66.995472            20.971697           3.344556
50%     49.500000        69.365219            25.420536           4.097696
75%     74.250000        72.029760            27.690852           4.704437
max     99.000000        79.261391            38.600846           7.852731

       Health_Index        Income  Government_Health_Policy
count    100.000000    100.000000                     100.0
mean      69.587608  74368.758472                       1.0
std        4.475948   4744.899489                       0.0
min       59.054457  62441.446464                       1.0
25%       66.820378  70968.995974                       1.0
50%       69.626849  74399.904642                       1.0
75%       72.651242  78126.987900                       1.0
max       79.173729  86449.739694                       1.0
```

[5]:
```
lifeexp.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 100 entries, 0 to 99
Data columns (total 9 columns):
 #   Column                    Non-Null Count  Dtype
```

```
---  ------                      --------------  -----
 0   Unnamed: 0                  100 non-null    int64
 1   Life_Expectancy             100 non-null    float64
 2   Average_Temperature         100 non-null    float64
 3   Daily_Screen_Time           100 non-null    float64
 4   Health_Index                100 non-null    float64
 5   Income                      100 non-null    float64
 6   Country                     100 non-null    object
 7   Diet_Type                   100 non-null    object
 8   Government_Health_Policy    100 non-null    float64
dtypes: float64(6), int64(1), object(2)
memory usage: 7.2+ KB
```

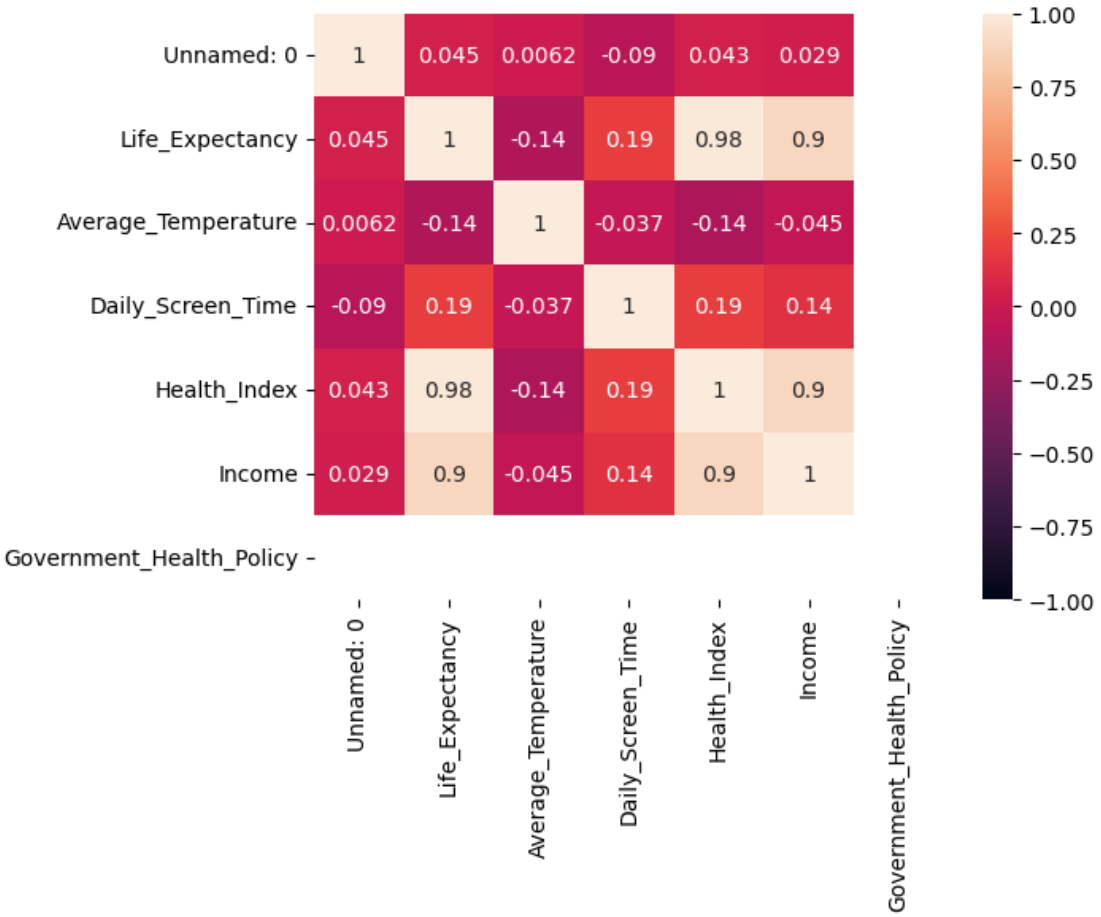
[6]:
```
lifeexp.corr(numeric_only = True)
```

[6]:

	Unnamed: 0	Life_Expectancy	Average_Temperature	Daily_Screen_Time	Health_Index	Income	Government_Health_Policy
Unnamed: 0	1.000000	0.044508	0.006198	-0.089520	0.043373	0.029239	NaN
Life_Expectancy	0.044508	1.000000	-0.136422	0.190840	0.980875	0.895932	NaN
Average_Temperature	0.006198	-0.136422	1.000000	-0.036632	-0.141879	-0.045018	NaN
Daily_Screen_Time	-0.089520	0.190840	-0.036632	1.000000	0.193556	0.135069	NaN
Health_Index	0.043373	0.980875	-0.141879	0.193556	1.000000	0.895719	NaN
Income	0.029239	0.895932	-0.045018	0.135069	0.895719	1.000000	NaN
Government_Health_Policy	NaN	NaN	NaN	NaN	NaN	NaN	NaN

[7]:
```
sns.heatmap(lifeexp.corr(numeric_only = True), vmin=-1, vmax=1, annot=True)
```

[7]: <Axes: >



[8]:
```
model = ols('Life_Expectancy ~ C(Country) + C(Diet_Type) + C(Country):
↪C(Diet_Type)', data=lifeexp).fit()
```

[9]:
```
anova_table = sm.stats.anova_lm(model, typ=2)
```

[10]:
```
anova_table
```

[10]:

	sum_sq	df	F	PR(>F)
C(Country)	28.499972	2.0	0.706552	0.496028
C(Diet_Type)	71.087330	2.0	1.762349	0.177448
C(Country):C(Diet_Type)	115.615265	4.0	1.433128	0.229411
Residual	1835.319446	91.0	NaN	NaN

1.1 Rješenje:

Mičemo sve varijable osim Income

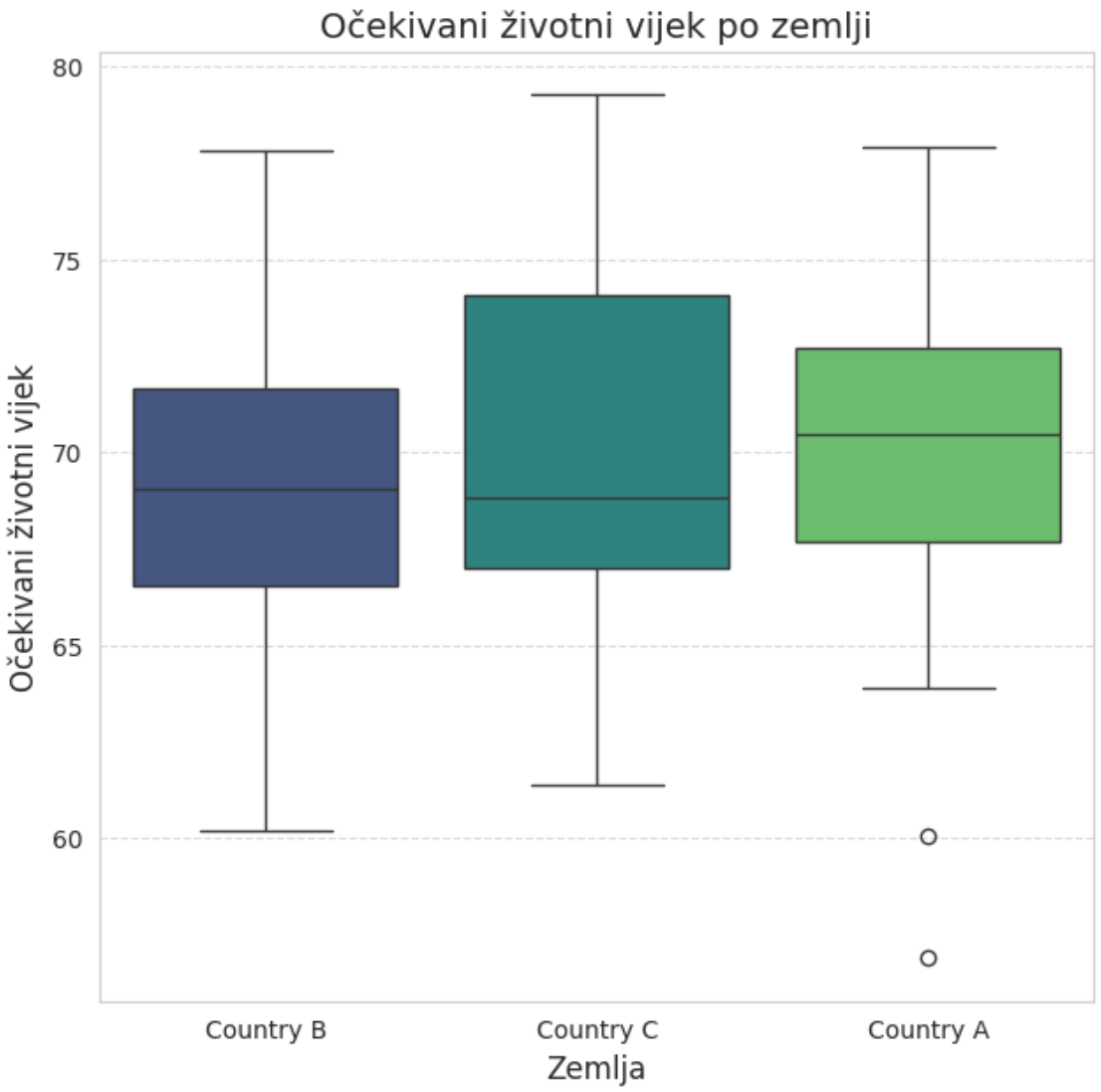
Korelacijska metoda te Anova analiza su nam pokazale kako nema utjecaja tih varijabli na Life_expectancy

Naglasak: ovo je rezultat analize na podacima koje imamo

provjera - napravit ćemo boxplotove gdje ćemo usporediti zemlju i tip prehrane s očekivanim životnim vijekom...

[11]:
```
# Postavljanje stila za plotove
sns.set_style("whitegrid")

plt.figure(figsize=(16, 7)) # Povećavamo veličinu figure za bolji prikaz

# Box plot za Life_Expectancy po Country
plt.subplot(1, 2, 1) # 1 red, 2 stupca, prvi plot
sns.boxplot(x='Country', y='Life_Expectancy', data=lifeexp, palette='viridis')
plt.title('Očekivani životni vijek po zemlji', fontsize=14)
plt.xlabel('Zemlja', fontsize=12)
plt.ylabel('Očekivani životni vijek', fontsize=12)
plt.grid(axis='y', linestyle='--', alpha=0.7) # Dodajemo mrežu na y-osi
```

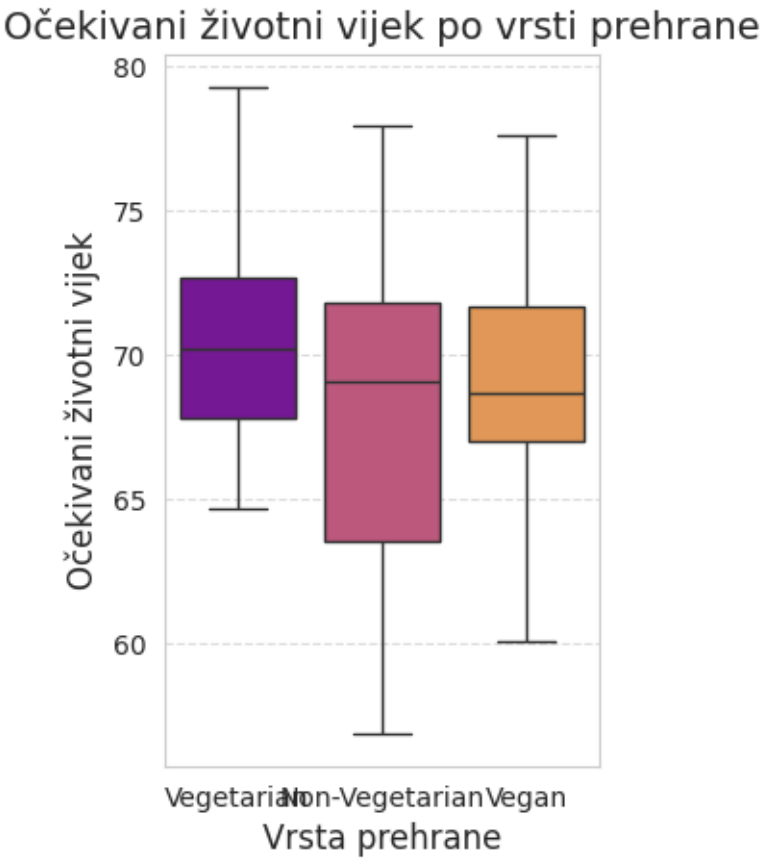
```
/tmp/ipykernel_1509/2779546637.py:8: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in
v0.14.0. Assign the `x` variable to `hue` and set `legend=False` for the same
effect.

  sns.boxplot(x='Country', y='Life_Expectancy', data=lifeexp, palette='viridis')
```



[12]:
```
# Box plot za Life_Expectancy po Diet_Type
plt.subplot(1, 2, 2) # 1 red, 2 stupca, drugi plot
sns.boxplot(x='Diet_Type', y='Life_Expectancy', data=lifeexp, palette='plasma')
plt.title('Očekivani životni vijek po vrsti prehrane', fontsize=14)
plt.xlabel('Vrsta prehrane', fontsize=12)
plt.ylabel('Očekivani životni vijek', fontsize=12)
plt.grid(axis='y', linestyle='--', alpha=0.7) # Dodajemo mrežu na y-osi
```

```
/tmp/ipykernel_1509/334417189.py:3: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in
v0.14.0. Assign the `x` variable to `hue` and set `legend=False` for the same
effect.
```

```
  sns.boxplot(x='Diet_Type', y='Life_Expectancy', data=lifeexp,
palette='plasma')
```



[13]:
```
lifeexp.drop(columns=['Government_Health_Policy', 'Daily_Screen_Time',␣
↪'Country', 'Diet_Type', 'Average_Temperature', 'Health_Index' ],␣
↪inplace=True)
```

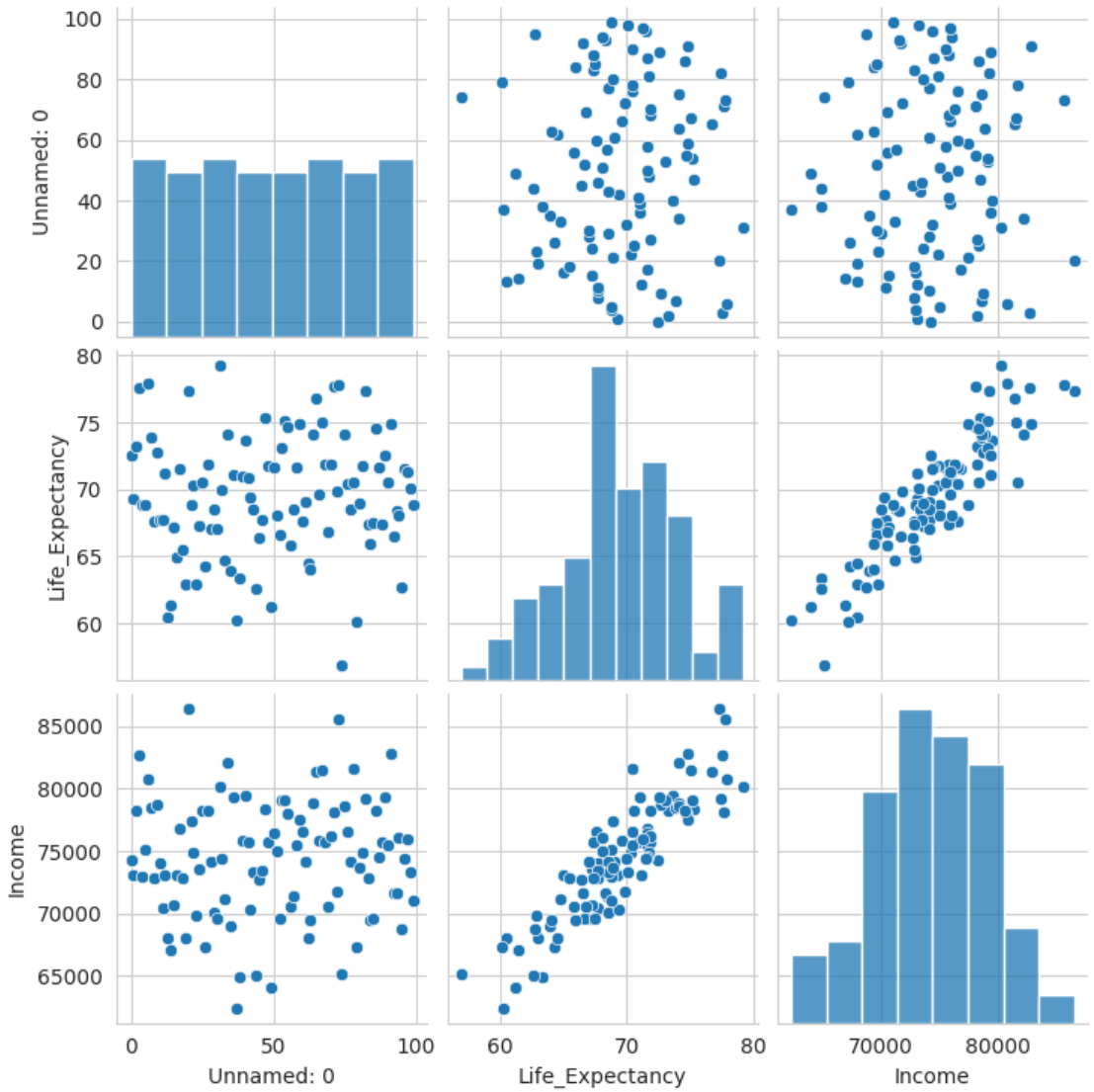
[14]:
```
lifeexp.head()
```

[14]:

	Unnamed: 0	Life_Expectancy	Income
0	0	72.483571	74294.715447
1	1	69.308678	73109.928448
2	2	73.238443	78248.930090
3	3	77.615149	82709.110470
4	4	68.829233	72929.102183

[15]:
```
sns.pairplot (lifeexp)
```

[15]:
```
<seaborn.axisgrid.PairGrid at 0x7fe812fc28d0>
```


Unnamed: 0
Life_Expectancy
Income
0
50
100
60
70
80
70000
80000
0
20
40
60
80
100
60
65
70
75
80
65000
70000
75000
80000
85000

[ ]: