project-covid

January 5, 2024

```
[1]: import numpy as np
     import pandas as pd
     import matplotlib.pyplot as plt
     from sklearn.model_selection import train_test_split
     from sklearn.linear_model import LogisticRegression
     from sklearn.metrics import accuracy_score
```

```
[2]: df = pd.read_csv("C:/Users/ASUS/OneDrive/Desktop/covid_data_2020-2021.csv")
     df.head()
```

```
[2]:     test_date  cough  fever  sore_throat  shortness_of_breath  head_ache  \
     0  2021-10-11      0      0            0                    0          0
     1  2021-10-11      0      0            0                    0          0
     2  2021-10-11      0      0            0                    0          0
     3  2021-10-11      0      0            0                    0          0
     4  2021-10-11      0      0            0                    0          0

       corona_result age_60_and_above  gender test_indication
     0      Negative              Yes  female           Other
     1      Negative              Yes    male           Other
     2      Negative               No  female           Other
     3      Negative              Yes  female           Other
     4      Negative              Yes  female           Other
```

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

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 5861480 entries, 0 to 5861479
Data columns (total 10 columns):
 #   Column               Dtype
---  ------               -----
 0   test_date            object
 1   cough                int64
 2   fever                int64
 3   sore_throat          int64
 4   shortness_of_breath  int64
 5   head_ache            int64
 6   corona_result        object
 7   age_60_and_above     object
 8   gender               object
 9   test_indication      object
dtypes: int64(5), object(5)
memory usage: 447.2+ MB
```

[4]:

```
df.isnull().sum()
```

[4]:

```
test_date              0
cough                  0
fever                  0
sore_throat            0
shortness_of_breath    0
head_ache              0
corona_result          0
age_60_and_above       0
gender                 0
test_indication        0
dtype: int64
```

[5]:

```
df['test_year'] = df['test_date'].str[:4].astype(int)
df['test_month'] = df['test_date'].str[5:7].astype(int)
df['test_day'] = df['test_date'].str[8:10].astype(int)
```

[6]:

```
df.head()
```

[6]:

```
    test_date  cough  fever  sore_throat  shortness_of_breath  head_ache  \
0  2021-10-11      0      0            0                    0          0
1  2021-10-11      0      0            0                    0          0
2  2021-10-11      0      0            0                    0          0
3  2021-10-11      0      0            0                    0          0
4  2021-10-11      0      0            0                    0          0

  corona_result age_60_and_above  gender test_indication  test_year  \
0      Negative              Yes  female           Other       2021
1      Negative              Yes    male           Other       2021
2      Negative               No  female           Other       2021
3      Negative              Yes  female           Other       2021
4      Negative              Yes  female           Other       2021

   test_month  test_day
0          10        11
1          10        11
2          10        11
3          10        11
4          10        11
```

[7]:

```
df.drop(columns=['test_date'], inplace=True)
```

[8]:

```
df['corona_result'] = df['corona_result'].map({'Negative': 0, 'Positive': 1})
df['gender'] = df['gender'].map({'female': 0, 'male': 1})
df['age_60_and_above'] = df['age_60_and_above'].map({'No': 0, 'Yes': 1})
```

[9]:

```
df.head()
```

[9]:

```
   cough  fever  sore_throat  shortness_of_breath  head_ache  corona_result  \
0      0      0            0                    0          0              0
1      0      0            0                    0          0              0
2      0      0            0                    0          0              0
3      0      0            0                    0          0              0
4      0      0            0                    0          0              0

   age_60_and_above  gender test_indication  test_year  test_month  test_day
0                 1       0           Other       2021          10        11
1                 1       1           Other       2021          10        11
2                 0       0           Other       2021          10        11
3                 1       0           Other       2021          10        11
4                 1       0           Other       2021          10        11
```

[10]:

```
df['test_indication'] = df['test_indication'].map({'Abroad': 'abroad', 'Contact␣
 ↪with confirmed': 'contact_with_covid_positive_patient', 'Other': 'other'})
df = pd.get_dummies(df, columns = ['test_indication'])
```

[11]:

```
x= df.drop(columns=['corona_result'])
y = df['corona_result']
xtrain, xtest, ytrain, ytest = train_test_split(x, y, test_size=0.2,␣
 ↪random_state=42)
```

[12]:

```
model = LogisticRegression()
model.fit(xtrain, ytrain)
```

[12]:

```
LogisticRegression()
```

[13]:

```
ypred = model.predict(xtest)
```

[14]:

```
accuracy = accuracy_score(ytest, ypred)
print(f'Accuracy: {accuracy:.5f}')
```

```
Accuracy: 0.91093
```

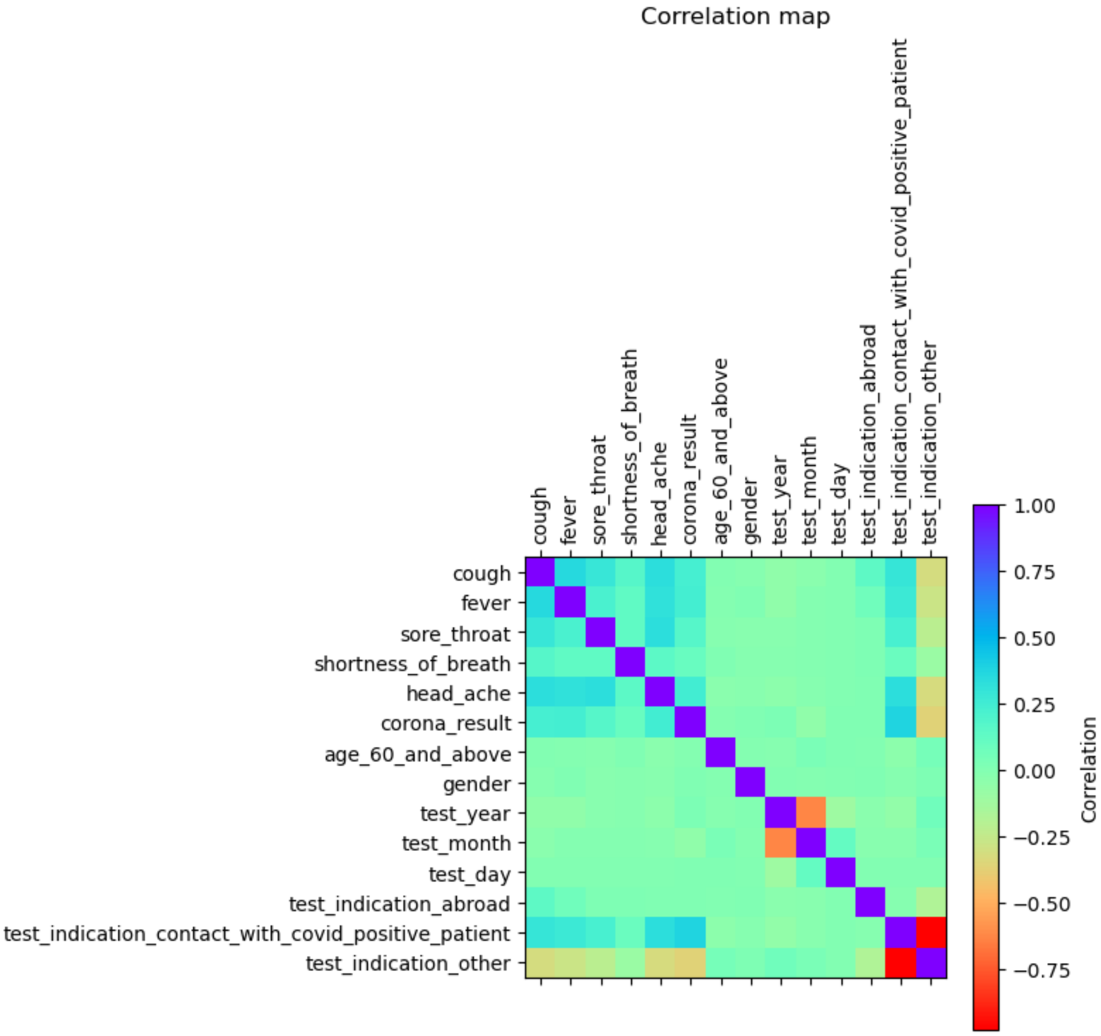
[15]:

```
correlation_matrix = df.corr()
```

[20]:

```
plt.figure(figsize=(10, 8))
plt.matshow(correlation_matrix, cmap='rainbow_r')
plt.colorbar(label='Correlation')
plt.xticks(range(len(correlation_matrix)), correlation_matrix.columns,␣
  ↪rotation=90)
plt.yticks(range(len(correlation_matrix)), correlation_matrix.columns)
plt.title('Correlation map')
plt.show()
```

```
<Figure size 1000x800 with 0 Axes>
```



[17]:
```
from sklearn.metrics import precision_score, confusion_matrix,␣
  ↪mean_squared_error, f1_score, recall_score
```

[18]:
```
print(f"The confusion matrix is \n {confusion_matrix(ytest,ypred)}")
print(f"The accuracy score id {accuracy_score(ytest,ypred)}")
print(f"The precision score is {precision_score(ytest,ypred, average=None,␣
 ↪zero_division=0)}")
print(f"The F1 score is {f1_score(ytest,ypred)}")
print(f"The MSE score is {mean_squared_error(ytest,ypred)}")
```

```
The confusion matrix is
 [[1053848   17386]
 [  87034   14028]]
The accuracy score id 0.9109269331295168
The precision score is [0.92371341 0.44655249]
The F1 score is 0.2117817566955524
The MSE score is 0.08907306687048322
```