```
import tensorflow as tf
print("Num GPUs Available: ", len(tf.config.list_physical_devices('GPU')))
```

```
Num GPUs Available:  0
```

```
import numpy as np
import pandas as pd
import matplotlib
import matplotlib.pyplot as plt
%matplotlib inline
import seaborn as sns
import sklearn.preprocessing as prep
import sklearn.cross_validation as cv
import sklearn.metrics
from sklearn.ensemble import RandomForestClassifier
from sklearn.ensemble import ExtraTreesClassifier
from sklearn.ensemble import AdaBoostClassifier
from sklearn.ensemble import GradientBoostingClassifier
from sklearn.tree import DecisionTreeClassifier
from sklearn.tree import ExtraTreeClassifier
```

```
train = pd.read_csv('/home/MALE/training-set.csv')
test = pd.read_csv('/home/MALE/testing-set.csv')
```

```
train.shape
```

```
(4 , 1,000)
```

```
train.head()
```

| | id | age | gender | education | country | ethnicity | jaundice | used_app_before | result | age_desc | ind_in_pain_level | ind_in_pain_duration | ind_in_fatigue_level | ind_in_fatigue_duration | ind_in_mood_level | ind_in_mood_duration | ind_in_sleep_disorder | ind_in_sleep_duration | ind_in_pain_points | ind_in_fatigue_points | ind_in_mood_points | ind_in_sleep_points | check_scor | Target |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1.52011 | 18 | M? | 7 | 0 | 49 | 0 | 0 | 0 | 18-19 | 1 | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 4 | Normal |
| 1 | 1.52011 | 18 | M? | 7 | 0 | 49 | 0 | 0 | 0 | 18-19 | 1 | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 4 | Normal |
| 2 | 1.52011 | 18 | M? | 7 | 0 | 49 | 0 | 0 | 0 | 18-19 | 1 | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 4 | Normal |
| 3 | 1.52010 | 18 | M? | 7 | 0 | 49 | 0 | 0 | 0 | 18-19 | 1 | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 4 | Normal |
| 4 | 1.52010 | 18 | M? | 7 | 0 | 49 | 0 | 0 | 0 | 18-19 | 1 | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 4 | Normal |

5 rows × 41 columns

```
test = pd.read_csv('/home/MALE/testing-set.csv')
test.head()
```

| | id | age | gender | education | country | ethnicity | jaundice | used_app_before | result | age_desc | ind_in_pain_level | ind_in_pain_duration | ind_in_fatigue_level | ind_in_fatigue_duration | ind_in_mood_level | ind_in_mood_duration | ind_in_sleep_disorder | ind_in_sleep_duration | ind_in_pain_points | ind_in_fatigue_points | ind_in_mood_points | ind_in_sleep_points | check_scor | Target |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1.51944 | 18 | M? | 7 | 0 | 49 | 0 | 0 | 0 | 18-19 | 1 | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 4 | Normal |
| 1 | 1.51944 | 18 | M? | 7 | 0 | 49 | 0 | 0 | 0 | 18-19 | 1 | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 4 | Normal |
| 2 | 1.51944 | 18 | M? | 7 | 0 | 49 | 0 | 0 | 0 | 18-19 | 1 | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 4 | Normal |
| 3 | 1.51943 | 18 | M? | 7 | 0 | 49 | 0 | 0 | 0 | 18-19 | 1 | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 4 | Normal |
| 4 | 1.51943 | 18 | M? | 7 | 0 | 49 | 0 | 0 | 0 | 18-19 | 1 | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 4 | Normal |

5 rows × 41 columns

```
train.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 4 entries, 0 to 3
Data columns (total 41 columns):
id                        int64
age                       int64
gender                    object
education                 int64
country                   int64
ethnicity                 int64
jaundice                  int64
used_app_before           int64
result                    int64
age_desc                  object
ind_in_pain_level         int64
ind_in_pain_duration      int64
ind_in_fatigue_level      int64
ind_in_fatigue_duration   int64
ind_in_mood_level         int64
ind_in_mood_duration      int64
ind_in_sleep_disorder     int64
ind_in_sleep_duration     int64
ind_in_pain_points        int64
ind_in_fatigue_points     int64
ind_in_mood_points        int64
ind_in_sleep_points       int64
check_score               int64
Target                    object
dtypes: float64(1), int64(39), object(1)
memory usage: 1.3 KB
```

```
test.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 4 entries, 0 to 3
Data columns (total 41 columns):
id                        int64
age                       int64
gender                    object
education                 int64
country                   int64
ethnicity                 int64
jaundice                  int64
used_app_before           int64
result                    int64
age_desc                  object
ind_in_pain_level         int64
ind_in_pain_duration      int64
ind_in_fatigue_level      int64
ind_in_fatigue_duration   int64
ind_in_mood_level         int64
ind_in_mood_duration      int64
ind_in_sleep_disorder     int64
ind_in_sleep_duration     int64
ind_in_pain_points        int64
ind_in_fatigue_points     int64
ind_in_mood_points        int64
ind_in_sleep_points       int64
check_score               int64
Target                    object
dtypes: float64(1), int64(39), object(1)
memory usage: 1.3 KB
```

```
train.describe()
```

| | id | age | education | country | ethnicity | jaundice | used_app_before | result | ind_in_pain_level | ind_in_pain_duration | ind_in_fatigue_level | ind_in_fatigue_duration | ind_in_mood_level | ind_in_mood_duration | ind_in_sleep_disorder | ind_in_sleep_duration | ind_in_pain_points | ind_in_fatigue_points | ind_in_mood_points | ind_in_sleep_points | check_score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| count | 1.52011e+03000 | 1.52011e+03000 | 1.52011e+03000 | 1.52011e+03000 | 1.52011e+03000 | 1.52011e+03000 | 1.52011e+03000 | 1.52011e+03000 | 1.52011e+03000 | 1.52011e+03000 | 1.52011e+03000 | 1.52011e+03000 | 1.52011e+03000 | 1.52011e+03000 | 1.52011e+03000 | 1.52011e+03000 | 1.52011e+03000 | 1.52011e+03000 | 1.52011e+03000 | 1.52011e+03000 | 1.52011e+03000 |
| mean | 1.52011e+03000 | 2.52000e+03000 | 7.00000e+03000 | 0.00000e+03000 | 4.90000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 1.00000e+03000 | 2.00000e+03000 | 2.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 1.00000e+03000 | 1.00000e+03000 | 1.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 4.00000e+03000 |
| std | 1.52011e+03000 | 1.41421e+03000 | 1.41421e+03000 | 0.00000e+03000 | 1.41421e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 |
| min | 1.52011e+03000 | 1.80000e+03000 | 7.00000e+03000 | 0.00000e+03000 | 4.90000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 1.00000e+03000 | 2.00000e+03000 | 2.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 1.00000e+03000 | 1.00000e+03000 | 1.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 4.00000e+03000 |
| 25% | 1.52011e+03000 | 1.80000e+03000 | 7.00000e+03000 | 0.00000e+03000 | 4.90000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 1.00000e+03000 | 2.00000e+03000 | 2.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 1.00000e+03000 | 1.00000e+03000 | 1.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 4.00000e+03000 |
| 50% | 1.52011e+03000 | 2.52000e+03000 | 7.00000e+03000 | 0.00000e+03000 | 4.90000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 1.00000e+03000 | 2.00000e+03000 | 2.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 1.00000e+03000 | 1.00000e+03000 | 1.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 4.00000e+03000 |
| 75% | 1.52011e+03000 | 3.20000e+03000 | 7.00000e+03000 | 0.00000e+03000 | 4.90000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 1.00000e+03000 | 2.00000e+03000 | 2.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 1.00000e+03000 | 1.00000e+03000 | 1.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 4.00000e+03000 |
| max | 1.52011e+03000 | 3.80000e+03000 | 7.00000e+03000 | 0.00000e+03000 | 4.90000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 1.00000e+03000 | 2.00000e+03000 | 2.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 1.00000e+03000 | 1.00000e+03000 | 1.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 0.00000e+03000 | 4.00000e+03000 |

```
train.corr()
```

| | id | age | education | country | ethnicity | jaundice | used_app_before | result | ind_in_pain_level | ind_in_pain_duration | ind_in_fatigue_level | ind_in_fatigue_duration | ind_in_mood_level | ind_in_mood_duration | ind_in_sleep_disorder | ind_in_sleep_duration | ind_in_pain_points | ind_in_fatigue_points | ind_in_mood_points | ind_in_sleep_points | check_score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| id | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| age | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| education | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| country | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| ethnicity | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| jaundice | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| used_app_before | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| result | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| ind_in_pain_level | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| ind_in_pain_duration | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| ind_in_fatigue_level | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| ind_in_fatigue_duration | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| ind_in_mood_level | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| ind_in_mood_duration | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| ind_in_sleep_disorder | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| ind_in_sleep_duration | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| ind_in_pain_points | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| ind_in_fatigue_points | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 |
| ind_in_mood_points | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 |
| ind_in_sleep_points | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 |
| check_score | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 |

```
train.isnull()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 4 entries, 0 to 3
Data columns (total 41 columns):
id                        bool
age                       bool
gender                    bool
education                 bool
country                   bool
ethnicity                 bool
jaundice                  bool
used_app_before           bool
result                    bool
age_desc                  bool
ind_in_pain_level         bool
ind_in_pain_duration      bool
ind_in_fatigue_level      bool
ind_in_fatigue_duration   bool
ind_in_mood_level         bool
ind_in_mood_duration      bool
ind_in_sleep_disorder     bool
ind_in_sleep_duration     bool
ind_in_pain_points        bool
ind_in_fatigue_points     bool
ind_in_mood_points        bool
ind_in_sleep_points       bool
check_score               bool
Target                    bool
dtypes: bool(41)
memory usage: 41 B
```

```
train.isnull().sum()
```

```
id                        0
age                       0
gender                    0
education                 0
country                   0
ethnicity                 0
jaundice                  0
used_app_before           0
result                    0
age_desc                  0
ind_in_pain_level         0
ind_in_pain_duration      0
ind_in_fatigue_level      0
ind_in_fatigue_duration   0
ind_in_mood_level         0
ind_in_mood_duration      0
ind_in_sleep_disorder     0
ind_in_sleep_duration     0
ind_in_pain_points        0
ind_in_fatigue_points     0
ind_in_mood_points        0
ind_in_sleep_points       0
check_score               0
Target                    0
dtype: int64
```

```
train.isnull().sum()/train.shape[0]*100 # Percentage
train.isnull().sum().sort_values(ascending=False)/train.shape[0]*100 # Sorted Percentage
```

```
id                        0.00000
age                       0.00000
gender                    0.00000
education                 0.00000
country                   0.00000
ethnicity                 0.00000
jaundice                  0.00000
used_app_before           0.00000
result                    0.00000
age_desc                  0.00000
ind_in_pain_level         0.00000
ind_in_pain_duration      0.00000
ind_in_fatigue_level      0.00000
ind_in_fatigue_duration   0.00000
ind_in_mood_level         0.00000
ind_in_mood_duration      0.00000
ind_in_sleep_disorder     0.00000
ind_in_sleep_duration     0.00000
ind_in_pain_points        0.00000
ind_in_fatigue_points     0.00000
ind_in_mood_points        0.00000
ind_in_sleep_points       0.00000
check_score               0.00000
Target                    0.00000
dtype: int64
```

```
train.shape/test.shape
```

```
(1.00000, 1.00000)
```

```
train.columns
```

```
Index(['id', 'age', 'gender', 'education', 'country', 'ethnicity',
       'jaundice', 'used_app_before', 'result', 'age_desc',
       'ind_in_pain_level', 'ind_in_pain_duration', 'ind_in_fatigue_level',
       'ind_in_fatigue_duration', 'ind_in_mood_level', 'ind_in_mood_duration',
       'ind_in_sleep_disorder', 'ind_in_sleep_duration', 'ind_in_pain_points',
       'ind_in_fatigue_points', 'ind_in_mood_points', 'ind_in_sleep_points',
       'check_score', 'Target'],
      dtype='object')
```

```
train.columns.values
```

```
array['id', 'age', 'gender', 'education', 'country', 'ethnicity',
       'jaundice', 'used_app_before', 'result', 'age_desc',
       'ind_in_pain_level', 'ind_in_pain_duration', 'ind_in_fatigue_level',
       'ind_in_fatigue_duration', 'ind_in_mood_level', 'ind_in_mood_duration',
       'ind_in_sleep_disorder', 'ind_in_sleep_duration', 'ind_in_pain_points',
       'ind_in_fatigue_points', 'ind_in_mood_points', 'ind_in_sleep_points',
       'check_score', 'Target']
```

```
# ind_in_pain_level
# ind_in_pain_duration
# ind_in_fatigue_level
# ind_in_fatigue_duration
# ind_in_mood_level
# ind_in_mood_duration
# ind_in_sleep_disorder
# ind_in_sleep_duration
# ind_in_pain_points
# ind_in_fatigue_points
# ind_in_mood_points
# ind_in_sleep_points
# check_score
```

```
# ind_in_pain_level
# ind_in_pain_duration
# ind_in_fatigue_level
# ind_in_fatigue_duration
# ind_in_mood_level
# ind_in_mood_duration
# ind_in_sleep_disorder
# ind_in_sleep_duration
# ind_in_pain_points
# ind_in_fatigue_points
# ind_in_mood_points
# ind_in_sleep_points
# check_score
```

```
train.dtypes
```

```
id                        int64
age                       int64
gender                    object
education                 int64
country                   int64
ethnicity                 int64
jaundice                  int64
used_app_before           int64
result                    int64
age_desc                  object
ind_in_pain_level         int64
ind_in_pain_duration      int64
ind_in_fatigue_level      int64
ind_in_fatigue_duration   int64
ind_in_mood_level         int64
ind_in_mood_duration      int64
ind_in_sleep_disorder     int64
ind_in_sleep_duration     int64
ind_in_pain_points        int64
ind_in_fatigue_points     int64
ind_in_mood_points        int64
ind_in_sleep_points       int64
check_score               int64
Target                    object
dtype: int64
```

```
train.dtypes.value_counts
```

```
int64    39
object    2
dtype: int64
```

```
train.dtypes.value_counts()
```

```
int64    39
object    2
dtype: int64
```

```
train.dtypes.value_counts().plot(kind='pie')
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fb9a1a0d0d0>
```



```
train.dtypes.value_counts().plot(kind='bar')
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fb9a1a0d0d0>
```



```
train.dtypes.value_counts().plot(kind='barh')
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fb9a1a0d0d0>
```



```
train.dtypes.value_counts().plot(kind='line')
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fb9a1a0d0d0>
```



```
train.dtypes.value_counts().plot(kind='area')
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fb9a1a0d0d0>
```



```
train.dtypes.value_counts().plot(kind='hist')
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fb9a1a0d0d0>
```



```
train.dtypes.value_counts().plot(kind='kde')
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fb9a1a0d0d0>
```



```
train.dtypes.value_counts().plot(kind='box')
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fb9a1a0d0d0>
```



```
train.dtypes.value_counts().plot(kind='pie', figsize=(8,8))
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fb9a1a0d0d0>
```



```
train.dtypes.value_counts().plot(kind='bar', figsize=(8,8))
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fb9a1a0d0d0>
```



```
train.dtypes.value_counts().plot(kind='barh', figsize=(8,8))
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fb9a1a0d0d0>
```



```
train.dtypes.value_counts().plot(kind='line', figsize=(8,8))
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fb9a1a0d0d0>
```



```
train.dtypes.value_counts().plot(kind='area', figsize=(8,8))
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fb9a1a0d0d0>
```



```
train.dtypes.value_counts().plot(kind='hist', figsize=(8,8))
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fb9a1a0d0d0>
```



```
train.dtypes.value_counts().plot(kind='kde', figsize=(8,8))
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fb9a1a0d0d0>
```



```
train.dtypes.value_counts().plot(kind='box', figsize=(8,8))
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fb9a1a0d0d0>
```



```
train.corr()
```

| | id | age | education | country | ethnicity | jaundice | used_app_before | result | ind_in_pain_level | ind_in_pain_duration | ind_in_fatigue_level | ind_in_fatigue_duration | ind_in_mood_level | ind_in_mood_duration | ind_in_sleep_disorder | ind_in_sleep_duration | ind_in_pain_points | ind_in_fatigue_points | ind_in_mood_points | ind_in_sleep_points | check_score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| id | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| age | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| education | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| country | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| ethnicity | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| jaundice | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| used_app_before | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| result | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| ind_in_pain_level | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| ind_in_pain_duration | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| ind_in_fatigue_level | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| ind_in_fatigue_duration | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| ind_in_mood_level | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| ind_in_mood_duration | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| ind_in_sleep_disorder | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| ind_in_sleep_duration | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| ind_in_pain_points | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| ind_in_fatigue_points | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00000 |
| ind_in_mood_points | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 | 0.00000 |
| ind_in_sleep_points | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 | 0.00000 |
| check_score | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 1.00000 |

```
# ind_in_pain_level
# ind_in_pain_duration
# ind_in_fatigue_level
# ind_in_fatigue_duration
# ind_in_mood_level
# ind_in_mood_duration
# ind_in_sleep_disorder
# ind_in_sleep_duration
# ind_in_pain_points
# ind_in_fatigue
```