EDA

August 23, 2020

[1]:
```
import pandas as pd
df= pd.read_csv("train.csv").applymap(lambda x: x.lower() if type(x) == str␣
 ↪else x)
dftest=pd.read_csv("test.csv").applymap(lambda x: x.lower() if type(x) == str␣
 ↪else x)
```

[2]:
```
df.head()
```

[2]:

	age	job	marital	education	default	balance	housing	loan	contact	day	month	duration	campaign	previous	poutcome	class
0	58	management	married	tertiary	no	2143.0	yes	no	unknown	5	may	261.0	1	0	unknown	no
1	44	technician	single	secondary	no	29.0	yes	no	unknown	5	may	151.0	1	0	unknown	no
2	33	entrepreneur	married	secondary	no	2.0	yes	yes	unknown	5	may	76.0	1	0	unknown	no
3	47	blue-collar	married	unknown	no	1506.0	yes	no	unknown	5	may	92.0	1	0	unknown	no
4	33	unknown	single	unknown	no	1.0	no	no	unknown	5	may	198.0	1	0	unknown	no

1) in first look there is no missing values in the dataframe but need to check all of the data frame

2) probbly there is some NUMERIC column (age,balance,day,duration,campaign,previous)

3)

[3]:
```
df.shape
```

[3]:
```
(42180, 16)
```

looks like there is 16 column and 42180 rows

[4]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 42180 entries, 0 to 42179
Data columns (total 16 columns):
```

```
 #   Column     Non-Null Count  Dtype
---  ------     --------------  -----
 0   age        42180 non-null  int64
 1   job        42180 non-null  object
 2   marital    42180 non-null  object
 3   education  42178 non-null  object
 4   default    42180 non-null  object
 5   balance    42175 non-null  float64
 6   housing    42177 non-null  object
 7   loan       42179 non-null  object
 8   contact    42173 non-null  object
 9   day        42180 non-null  int64
 10  month      42180 non-null  object
 11  duration   42169 non-null  float64
 12  campaign   42180 non-null  int64
 13  previous   42180 non-null  int64
 14  poutcome   42180 non-null  object
 15  class      42180 non-null  object
dtypes: float64(2), int64(4), object(10)
memory usage: 5.1+ MB
```

1) Out of 16 columns, only 10 columns have complete data.
2) not alot of data are missing

1 Looking at the percentage of missing values per column

there is 29 missing values.

[10]:
```
missing_data = pd.DataFrame({'total_missing': df.isnull().sum(), 'perc_missing':
 ↪ (df.isnull().sum()/42180)*100})
missing_data
```

[10]:

	total_missing	perc_missing
age	0	0.000000
job	0	0.000000
marital	0	0.000000
education	2	0.004742
default	0	0.000000
balance	5	0.011854
housing	3	0.007112
loan	1	0.002371
contact	7	0.016596
day	0	0.000000
month	0	0.000000
duration	11	0.026079
campaign	0	0.000000
previous	0	0.000000
poutcome	0	0.000000

```
class                   0       0.000000
```

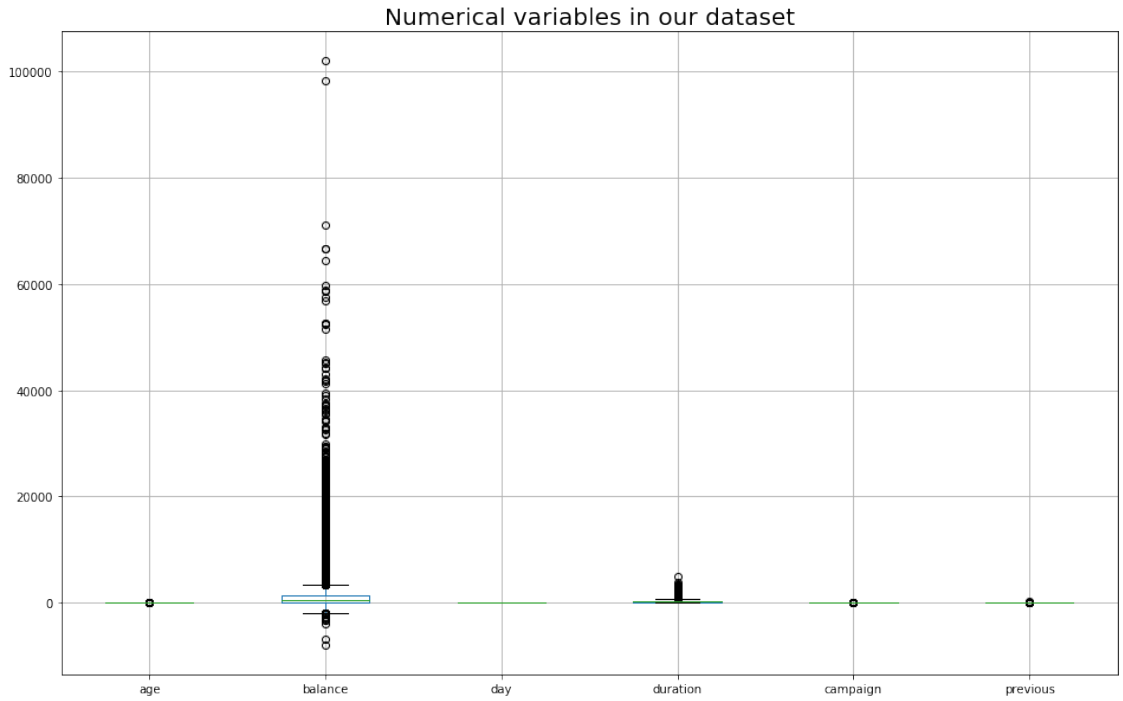
Statistical description of numerical variables

[6]:
```
df.describe()
```

[6]:
```
                age        balance           day      duration      campaign  \
count  42180.000000   42175.000000  42180.000000  42169.000000  42180.000000
mean      40.739379    1321.708880     15.864391    255.429273      2.824941
std       10.097570    2984.706622      8.303157    258.178684      3.175839
min       18.000000   -8019.000000      1.000000      0.000000      1.000000
25%       33.000000      61.000000      8.000000    101.000000      1.000000
50%       39.000000     425.000000     16.000000    176.000000      2.000000
75%       48.000000    1369.500000     21.000000    314.000000      3.000000
max       95.000000  102127.000000     31.000000   4918.000000     63.000000

           previous
count  42180.000000
mean       0.450403
std        2.143422
min        0.000000
25%        0.000000
50%        0.000000
75%        0.000000
max      275.000000
```

[7]:
```
from matplotlib import pyplot as plt
num_cols = ['age','balance','day','duration','campaign','previous']
plt.figure(figsize=(16,10))
df[num_cols].boxplot()
plt.title("Numerical variables in our dataset", fontsize=20)
plt.show()
```



As we see on boxplot, there is a huge interval between balance values. But the biggest accumulation of values varies between 0 and 3000. Also there could be negative values.