

# Automated EDA - AutoViz

September 30, 2022

```
[1]: #pip install autoviz
```

```
Collecting autoviz
  Downloading autoviz-0.1.55-py3-none-any.whl (64 kB)
----- 64.3/64.3 kB 3.4 MB/s eta 0:00:00
Collecting xgboost>=0.82
  Downloading xgboost-1.6.2-py3-none-win_amd64.whl (125.4 MB)
----- 125.4/125.4 MB 13.9 MB/s eta 0:00:00
Requirement already satisfied: ipython in c:\users\91895\anaconda3\lib\site-
packages (from autoviz) (7.29.0)
Collecting pyamg
  Downloading pyamg-4.2.3-cp39-cp39-win_amd64.whl (1.4 MB)
----- 1.4/1.4 MB 30.0 MB/s eta 0:00:00
Requirement already satisfied: pandas in c:\users\91895\anaconda3\lib\site-
packages (from autoviz) (1.3.4)
Collecting wordcloud
  Downloading wordcloud-1.8.2.2-cp39-cp39-win_amd64.whl (153 kB)
----- 153.1/153.1 kB 9.5 MB/s eta 0:00:00
Collecting hvplot>=0.7.3
  Downloading hvplot-0.8.1-py2.py3-none-any.whl (3.2 MB)
----- 3.2/3.2 MB 25.3 MB/s eta 0:00:00
Collecting holoviews>=1.14.6
  Downloading holoviews-1.15.0-py2.py3-none-any.whl (4.3 MB)
----- 4.3/4.3 MB 27.0 MB/s eta 0:00:00
Requirement already satisfied: jupyter in c:\users\91895\anaconda3\lib\site-
packages (from autoviz) (1.0.0)
Collecting textblob
  Downloading textblob-0.17.1-py2.py3-none-any.whl (636 kB)
----- 636.8/636.8 kB 20.2 MB/s eta 0:00:00
Collecting bokeh>=2.4.2
  Downloading bokeh-2.4.3-py3-none-any.whl (18.5 MB)
----- 18.5/18.5 MB 27.3 MB/s eta 0:00:00
Requirement already satisfied: numpy in c:\users\91895\anaconda3\lib\site-
packages (from autoviz) (1.20.3)
Requirement already satisfied: matplotlib>=3.3.3 in
c:\users\91895\anaconda3\lib\site-packages (from autoviz) (3.4.3)
Collecting typing-extensions>=4.1.1
  Downloading typing_extensions-4.3.0-py3-none-any.whl (25 kB)
```

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Requirement already satisfied: fsspec>=0.8.3 in
c:\users\91895\anaconda3\lib\site-packages (from autoviz) (2021.10.1)
Collecting emoji
  Downloading emoji-2.1.0.tar.gz (216 kB)
  ----- 216.6/216.6 kB 12.9 MB/s eta 0:00:00
  Preparing metadata (setup.py): started
  Preparing metadata (setup.py): finished with status 'done'
Collecting panel~=0.12.6
  Downloading panel-0.12.7-py2.py3-none-any.whl (12.9 MB)
  ----- 12.9/12.9 MB 26.2 MB/s eta 0:00:00
Requirement already satisfied: scikit-learn in
c:\users\91895\anaconda3\lib\site-packages (from autoviz) (0.24.2)
Requirement already satisfied: nltk in c:\users\91895\anaconda3\lib\site-
packages (from autoviz) (3.6.5)
Requirement already satisfied: seaborn>=0.11.1 in
c:\users\91895\anaconda3\lib\site-packages (from autoviz) (0.11.2)
Requirement already satisfied: statsmodels in c:\users\91895\anaconda3\lib\site-
packages (from autoviz) (0.12.2)
Requirement already satisfied: xlrd in c:\users\91895\anaconda3\lib\site-
packages (from autoviz) (2.0.1)
Requirement already satisfied: PyYAML>=3.10 in
c:\users\91895\anaconda3\lib\site-packages (from bokeh>=2.4.2->autoviz) (6.0)
Requirement already satisfied: pillow>=7.1.0 in
c:\users\91895\anaconda3\lib\site-packages (from bokeh>=2.4.2->autoviz) (8.4.0)
Requirement already satisfied: tornado>=5.1 in
c:\users\91895\anaconda3\lib\site-packages (from bokeh>=2.4.2->autoviz) (6.1)
Requirement already satisfied: Jinja2>=2.9 in c:\users\91895\anaconda3\lib\site-
packages (from bokeh>=2.4.2->autoviz) (2.11.3)
Requirement already satisfied: packaging>=16.8 in
c:\users\91895\anaconda3\lib\site-packages (from bokeh>=2.4.2->autoviz) (21.0)
Collecting param<2.0,>=1.9.3
  Downloading param-1.12.2-py2.py3-none-any.whl (86 kB)
  ----- 86.8/86.8 kB ? eta 0:00:00
Collecting holoviews>=1.14.6
  Downloading holoviews-1.14.9-py2.py3-none-any.whl (4.3 MB)
  ----- 4.3/4.3 MB 18.1 MB/s eta 0:00:00
Collecting pyviz-comms>=0.7.4
  Downloading pyviz_comms-2.2.1-py2.py3-none-any.whl (42 kB)
  ----- 42.9/42.9 kB ? eta 0:00:00
Collecting colorcet
  Downloading colorcet-3.0.0-py2.py3-none-any.whl (1.6 MB)
  ----- 1.6/1.6 MB 17.4 MB/s eta 0:00:00
Requirement already satisfied: kiwisolver>=1.0.1 in
c:\users\91895\anaconda3\lib\site-packages (from matplotlib>=3.3.3->autoviz)
(1.3.1)
Requirement already satisfied: python-dateutil>=2.7 in
c:\users\91895\anaconda3\lib\site-packages (from matplotlib>=3.3.3->autoviz)
(2.8.2)

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Requirement already satisfied: cyclor>=0.10 in  
c:\users\91895\anaconda3\lib\site-packages (from matplotlib>=3.3.3->autoviz)  
(0.10.0)

Requirement already satisfied: pyparsing>=2.2.1 in  
c:\users\91895\anaconda3\lib\site-packages (from matplotlib>=3.3.3->autoviz)  
(3.0.4)

Requirement already satisfied: pytz>=2017.3 in  
c:\users\91895\anaconda3\lib\site-packages (from pandas->autoviz) (2021.3)

Requirement already satisfied: tqdm>=4.48.0 in  
c:\users\91895\anaconda3\lib\site-packages (from panel~=0.12.6->autoviz)  
(4.62.3)

Requirement already satisfied: bleach in c:\users\91895\anaconda3\lib\site-  
packages (from panel~=0.12.6->autoviz) (4.0.0)

Requirement already satisfied: setuptools<61,>=42 in  
c:\users\91895\anaconda3\lib\site-packages (from panel~=0.12.6->autoviz)  
(58.0.4)

Requirement already satisfied: requests in c:\users\91895\anaconda3\lib\site-  
packages (from panel~=0.12.6->autoviz) (2.26.0)

Collecting pyct>=0.4.4  
 Downloading pyct-0.4.8-py2.py3-none-any.whl (15 kB)

Requirement already satisfied: markdown in c:\users\91895\anaconda3\lib\site-  
packages (from panel~=0.12.6->autoviz) (3.3.6)

Requirement already satisfied: scipy>=1.0 in c:\users\91895\anaconda3\lib\site-  
packages (from seaborn>=0.11.1->autoviz) (1.7.1)

Requirement already satisfied: jedi>=0.16 in c:\users\91895\anaconda3\lib\site-  
packages (from ipython->autoviz) (0.18.0)

Requirement already satisfied: prompt-toolkit!=3.0.0,!<3.0.1,<3.1.0,>=2.0.0 in  
c:\users\91895\anaconda3\lib\site-packages (from ipython->autoviz) (3.0.20)

Requirement already satisfied: decorator in c:\users\91895\anaconda3\lib\site-  
packages (from ipython->autoviz) (5.1.0)

Requirement already satisfied: traitlets>=4.2 in  
c:\users\91895\anaconda3\lib\site-packages (from ipython->autoviz) (5.1.0)

Requirement already satisfied: colorama in c:\users\91895\anaconda3\lib\site-  
packages (from ipython->autoviz) (0.4.4)

Requirement already satisfied: pygments in c:\users\91895\anaconda3\lib\site-  
packages (from ipython->autoviz) (2.10.0)

Requirement already satisfied: matplotlib-inline in  
c:\users\91895\anaconda3\lib\site-packages (from ipython->autoviz) (0.1.2)

Requirement already satisfied: pickleshare in c:\users\91895\anaconda3\lib\site-  
packages (from ipython->autoviz) (0.7.5)

Requirement already satisfied: backcall in c:\users\91895\anaconda3\lib\site-  
packages (from ipython->autoviz) (0.2.0)

Requirement already satisfied: ipykernel in c:\users\91895\anaconda3\lib\site-  
packages (from jupyter->autoviz) (6.4.1)

Requirement already satisfied: nbconvert in c:\users\91895\anaconda3\lib\site-  
packages (from jupyter->autoviz) (6.4.5)

Requirement already satisfied: ipywidgets in c:\users\91895\anaconda3\lib\site-  
packages (from jupyter->autoviz) (7.6.5)

Requirement already satisfied: qtconsole in c:\users\91895\anaconda3\lib\site-packages (from jupyter->autoviz) (5.1.1)

Requirement already satisfied: notebook in c:\users\91895\anaconda3\lib\site-packages (from jupyter->autoviz) (6.4.11)

Requirement already satisfied: jupyter-console in c:\users\91895\anaconda3\lib\site-packages (from jupyter->autoviz) (6.4.0)

Requirement already satisfied: click in c:\users\91895\anaconda3\lib\site-packages (from nltk->autoviz) (8.0.3)

Requirement already satisfied: joblib in c:\users\91895\anaconda3\lib\site-packages (from nltk->autoviz) (1.1.0)

Requirement already satisfied: regex<=2021.8.3 in c:\users\91895\anaconda3\lib\site-packages (from nltk->autoviz) (2021.8.3)

Requirement already satisfied: threadpoolctl<=2.0.0 in c:\users\91895\anaconda3\lib\site-packages (from scikit-learn->autoviz) (2.2.0)

Requirement already satisfied: patsy<=0.5 in c:\users\91895\anaconda3\lib\site-packages (from statsmodels->autoviz) (0.5.2)

Requirement already satisfied: six in c:\users\91895\anaconda3\lib\site-packages (from cycler<=0.10->matplotlib<=3.3.3->autoviz) (1.16.0)

Requirement already satisfied: parso<0.9.0,>=0.8.0 in c:\users\91895\anaconda3\lib\site-packages (from jedi<=0.16->ipython->autoviz) (0.8.2)

Requirement already satisfied: MarkupSafe<=0.23 in c:\users\91895\anaconda3\lib\site-packages (from Jinja2<=2.9->bokeh<=2.4.2->autoviz) (2.0.1)

Requirement already satisfied: wcwidth in c:\users\91895\anaconda3\lib\site-packages (from prompt-toolkit!=3.0.0,!<3.0.1,<3.1.0,>=2.0.0->ipython->autoviz) (0.2.5)

Requirement already satisfied: webencodings in c:\users\91895\anaconda3\lib\site-packages (from bleach->panel<=0.12.6->autoviz) (0.5.1)

Requirement already satisfied: ipython-genutils in c:\users\91895\anaconda3\lib\site-packages (from ipykernel->jupyter->autoviz) (0.2.0)

Requirement already satisfied: debugpy<2.0,>=1.0.0 in c:\users\91895\anaconda3\lib\site-packages (from ipykernel->jupyter->autoviz) (1.4.1)

Requirement already satisfied: jupyter-client<8.0 in c:\users\91895\anaconda3\lib\site-packages (from ipykernel->jupyter->autoviz) (6.1.12)

Requirement already satisfied: widgetsnbextension<=3.5.0 in c:\users\91895\anaconda3\lib\site-packages (from ipywidgets->jupyter->autoviz) (3.5.1)

Requirement already satisfied: jupyterlab-widgets<=1.0.0 in c:\users\91895\anaconda3\lib\site-packages (from ipywidgets->jupyter->autoviz) (1.0.0)

Requirement already satisfied: nbformat<=4.2.0 in c:\users\91895\anaconda3\lib\site-packages (from ipywidgets->jupyter->autoviz) (5.1.3)

Requirement already satisfied: importlib-metadata>=4.4 in  
c:\users\91895\anaconda3\lib\site-packages (from  
markdown->panel~=0.12.6->autoviz) (4.8.1)

Requirement already satisfied: nbclient<0.6.0,>=0.5.0 in  
c:\users\91895\anaconda3\lib\site-packages (from nbconvert->jupyter->autoviz)  
(0.5.3)

Requirement already satisfied: jupyter-core in  
c:\users\91895\anaconda3\lib\site-packages (from nbconvert->jupyter->autoviz)  
(4.8.1)

Requirement already satisfied: pandocfilters>=1.4.1 in  
c:\users\91895\anaconda3\lib\site-packages (from nbconvert->jupyter->autoviz)  
(1.4.3)

Requirement already satisfied: jupyterlab-pygments in  
c:\users\91895\anaconda3\lib\site-packages (from nbconvert->jupyter->autoviz)  
(0.1.2)

Requirement already satisfied: entrypoints>=0.2.2 in  
c:\users\91895\anaconda3\lib\site-packages (from nbconvert->jupyter->autoviz)  
(0.3)

Requirement already satisfied: mistune<2,>=0.8.1 in  
c:\users\91895\anaconda3\lib\site-packages (from nbconvert->jupyter->autoviz)  
(0.8.4)

Requirement already satisfied: defusedxml in c:\users\91895\anaconda3\lib\site-  
packages (from nbconvert->jupyter->autoviz) (0.7.1)

Requirement already satisfied: testpath in c:\users\91895\anaconda3\lib\site-  
packages (from nbconvert->jupyter->autoviz) (0.5.0)

Requirement already satisfied: beautifulsoup4 in  
c:\users\91895\anaconda3\lib\site-packages (from nbconvert->jupyter->autoviz)  
(4.10.0)

Requirement already satisfied: nest-asyncio>=1.5 in  
c:\users\91895\anaconda3\lib\site-packages (from notebook->jupyter->autoviz)  
(1.5.1)

Requirement already satisfied: pyzmq>=17 in c:\users\91895\anaconda3\lib\site-  
packages (from notebook->jupyter->autoviz) (22.2.1)

Requirement already satisfied: Send2Trash>=1.8.0 in  
c:\users\91895\anaconda3\lib\site-packages (from notebook->jupyter->autoviz)  
(1.8.0)

Requirement already satisfied: terminado>=0.8.3 in  
c:\users\91895\anaconda3\lib\site-packages (from notebook->jupyter->autoviz)  
(0.9.4)

Requirement already satisfied: prometheus-client in  
c:\users\91895\anaconda3\lib\site-packages (from notebook->jupyter->autoviz)  
(0.11.0)

Requirement already satisfied: argon2-cffi in c:\users\91895\anaconda3\lib\site-  
packages (from notebook->jupyter->autoviz) (20.1.0)

Requirement already satisfied: qtpy in c:\users\91895\anaconda3\lib\site-  
packages (from qtconsole->jupyter->autoviz) (1.10.0)

Requirement already satisfied: charset-normalizer~=2.0.0 in  
c:\users\91895\anaconda3\lib\site-packages (from

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requests->panel~=0.12.6->autoviz) (2.0.4)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in
c:\users\91895\anaconda3\lib\site-packages (from
requests->panel~=0.12.6->autoviz) (1.26.7)
Requirement already satisfied: idna<4,>=2.5 in
c:\users\91895\anaconda3\lib\site-packages (from
requests->panel~=0.12.6->autoviz) (3.2)
Requirement already satisfied: certifi>=2017.4.17 in
c:\users\91895\anaconda3\lib\site-packages (from
requests->panel~=0.12.6->autoviz) (2022.5.18.1)
Requirement already satisfied: zipp>=0.5 in c:\users\91895\anaconda3\lib\site-
packages (from importlib-metadata>=4.4->markdown->panel~=0.12.6->autoviz)
(3.6.0)
Requirement already satisfied: pywin32>=1.0 in
c:\users\91895\anaconda3\lib\site-packages (from jupyter-
core->nbconvert->jupyter->autoviz) (228)
Requirement already satisfied: async-generator in
c:\users\91895\anaconda3\lib\site-packages (from
nbclient<0.6.0,>=0.5.0->nbconvert->jupyter->autoviz) (1.10)
Requirement already satisfied: jsonschema!=2.5.0,>=2.4 in
c:\users\91895\anaconda3\lib\site-packages (from
nbformat>=4.2.0->ipywidgets->jupyter->autoviz) (3.2.0)
Requirement already satisfied: pywinpty>=0.5 in
c:\users\91895\anaconda3\lib\site-packages (from
terminado>=0.8.3->notebook->jupyter->autoviz) (0.5.7)
Requirement already satisfied: cffi>=1.0.0 in c:\users\91895\anaconda3\lib\site-
packages (from argon2-cffi->notebook->jupyter->autoviz) (1.14.6)
Requirement already satisfied: soupsieve>1.2 in
c:\users\91895\anaconda3\lib\site-packages (from
beautifulsoup4->nbconvert->jupyter->autoviz) (2.2.1)
Requirement already satisfied: pycparser in c:\users\91895\anaconda3\lib\site-
packages (from cffi>=1.0.0->argon2-cffi->notebook->jupyter->autoviz) (2.20)
Requirement already satisfied: pyparsing>=2.4.0 in
c:\users\91895\anaconda3\lib\site-packages (from
jsonschema!=2.5.0,>=2.4->nbformat>=4.2.0->ipywidgets->jupyter->autoviz) (2.4.2)
Requirement already satisfied: attrs>=17.4.0 in
c:\users\91895\anaconda3\lib\site-packages (from
jsonschema!=2.5.0,>=2.4->nbformat>=4.2.0->ipywidgets->jupyter->autoviz) (21.2.0)
Building wheels for collected packages: emoji
  Building wheel for emoji (setup.py): started
  Building wheel for emoji (setup.py): finished with status 'done'
  Created wheel for emoji: filename=emoji-2.1.0-py3-none-any.whl size=212392
sha256=1c17c5b1134f58873d17332136bf1725aa24135aa5d6cd4011d73855e4ca0317
  Stored in directory: c:\users\91895\appdata\local\pip\cache\wheels\b0\4a\c8\9c
580a0ea94dea641b8023456a1b178a7e4509d992224ed4aa
Successfully built emoji
Installing collected packages: typing-extensions, param, emoji, xgboost, pyviz-
comms, pyct, pyamg, bokeh, wordcloud, textblob, panel, colorcet, holoviews,

```

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hvplot, autoviz
Attempting uninstall: typing-extensions
  Found existing installation: typing-extensions 3.10.0.2
  Uninstalling typing-extensions-3.10.0.2:
    Successfully uninstalled typing-extensions-3.10.0.2
Attempting uninstall: bokeh
  Found existing installation: bokeh 2.4.1
  Uninstalling bokeh-2.4.1:
    Successfully uninstalled bokeh-2.4.1
Successfully installed autoviz-0.1.55 bokeh-2.4.3 colorcet-3.0.0 emoji-2.1.0
holoviews-1.14.9 hvplot-0.8.1 panel-0.12.7 param-1.12.2 pyamg-4.2.3 pyct-0.4.8
pyviz-comms-2.2.1 textblob-0.17.1 typing-extensions-4.3.0 wordcloud-1.8.2.2
xgboost-1.6.2

```

```

[notice] A new release of pip available: 22.1.2 -> 22.2.2
[notice] To update, run: python.exe -m pip install --upgrade pip
Note: you may need to restart the kernel to use updated packages.

```

```

ERROR: pip's dependency resolver does not currently take into account all the
packages that are installed. This behaviour is the source of the following
dependency conflicts.
pandas-profiling 3.1.0 requires joblib~=1.0.1, but you have joblib 1.1.0 which
is incompatible.

```

```
[2]: import seaborn as sns
```

```
[3]: df = sns.load_dataset('titanic')
df.head()
```

```
[3]:
```

|   | survived | pclass | sex    | age  | sibsp | parch | fare    | embarked | class | \ |
|---|----------|--------|--------|------|-------|-------|---------|----------|-------|---|
| 0 | 0        | 3      | male   | 22.0 | 1     | 0     | 7.2500  | S        | Third |   |
| 1 | 1        | 1      | female | 38.0 | 1     | 0     | 71.2833 | C        | First |   |
| 2 | 1        | 3      | female | 26.0 | 0     | 0     | 7.9250  | S        | Third |   |
| 3 | 1        | 1      | female | 35.0 | 1     | 0     | 53.1000 | S        | First |   |
| 4 | 0        | 3      | male   | 35.0 | 0     | 0     | 8.0500  | S        | Third |   |

|   | who   | adult_male | deck | embark_town | alive | alone |
|---|-------|------------|------|-------------|-------|-------|
| 0 | man   | True       | NaN  | Southampton | no    | False |
| 1 | woman | False      | C    | Cherbourg   | yes   | False |
| 2 | woman | False      | NaN  | Southampton | yes   | True  |
| 3 | woman | False      | C    | Southampton | yes   | False |
| 4 | man   | True       | NaN  | Southampton | no    | True  |

```
[4]: df.to_csv('titanic.csv')
```

```
[5]: from autoviz.AutoViz_Class import AutoViz_Class
```

```
Imported v0.1.55. After importing, execute '%matplotlib inline' to display
```

```

charts in Jupyter.
    AV = AutoViz_Class()
    dfte = AV.AutoViz(filename, sep=',', depVar='', dfte=None, header=0,
verbose=1, lowess=False,
                        chart_format='svg',max_rows_analyzed=150000,max_cols_analyzed=30,
save_plot_dir=None)
Update: verbose=0 displays charts in your local Jupyter notebook.
        verbose=1 additionally provides EDA data cleaning suggestions. It also
displays charts.
        verbose=2 does not display charts but saves them in AutoViz_Plots folder
in local machine.
        chart_format='bokeh' displays charts in your local Jupyter notebook.
        chart_format='server' displays charts in your browser: one tab for each
chart type
        chart_format='html' silently saves interactive HTML files in your local
machine

```

```
[6]: av = AutoViz_Class()
```

```
[9]: import matplotlib.pyplot as plt
      %matplotlib inline
      filename = "titanic.csv"
      dft = av.AutoViz(
          filename
      )

```

```

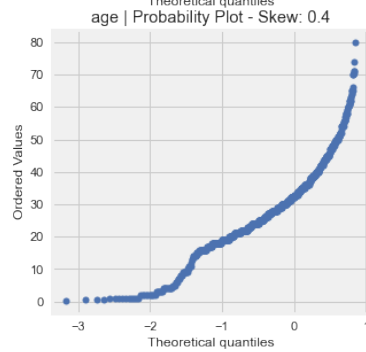
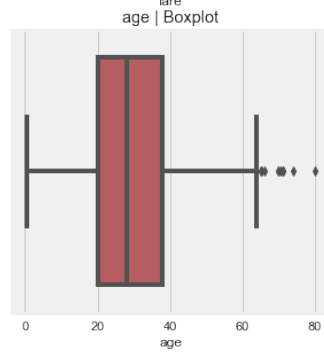
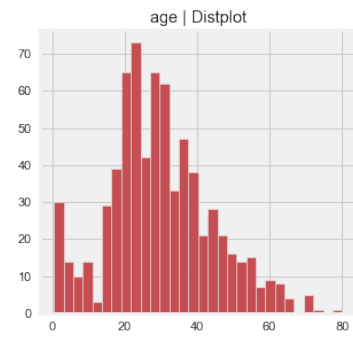
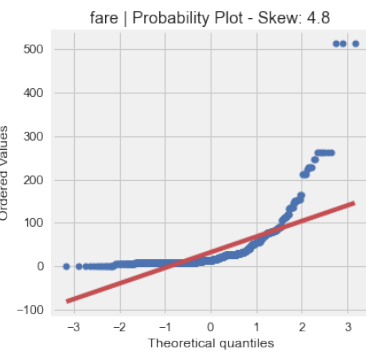
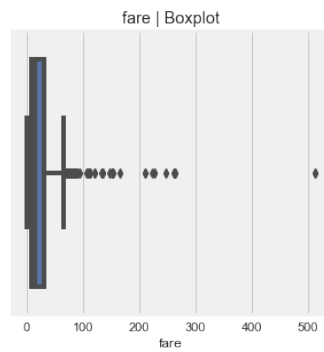
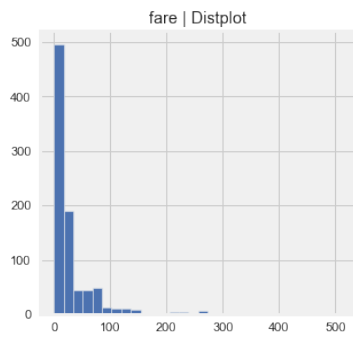
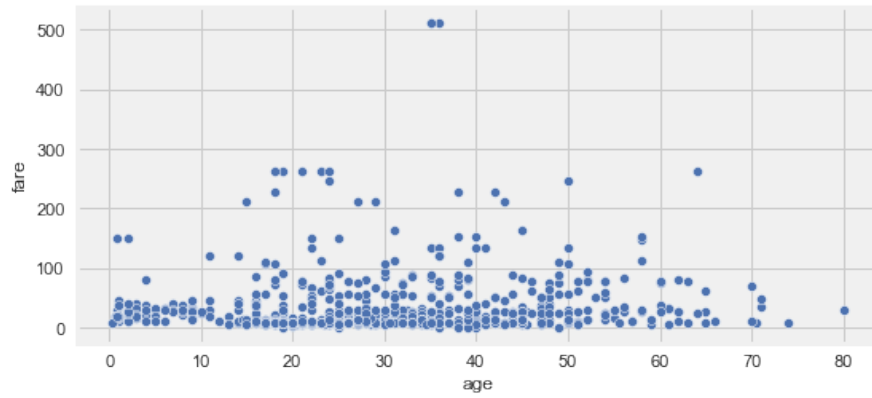
Shape of your Data Set loaded: (891, 16)
#####
#####
##### C L A S S I F Y I N G   V A R I A B L E S
#####
#####
#####
Classifying variables in data set...
<pandas.io.formats.style.Styler at 0x20b0163dfa0>

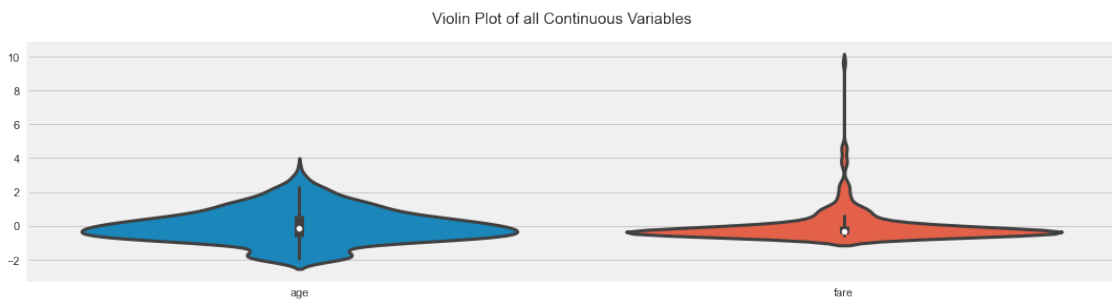
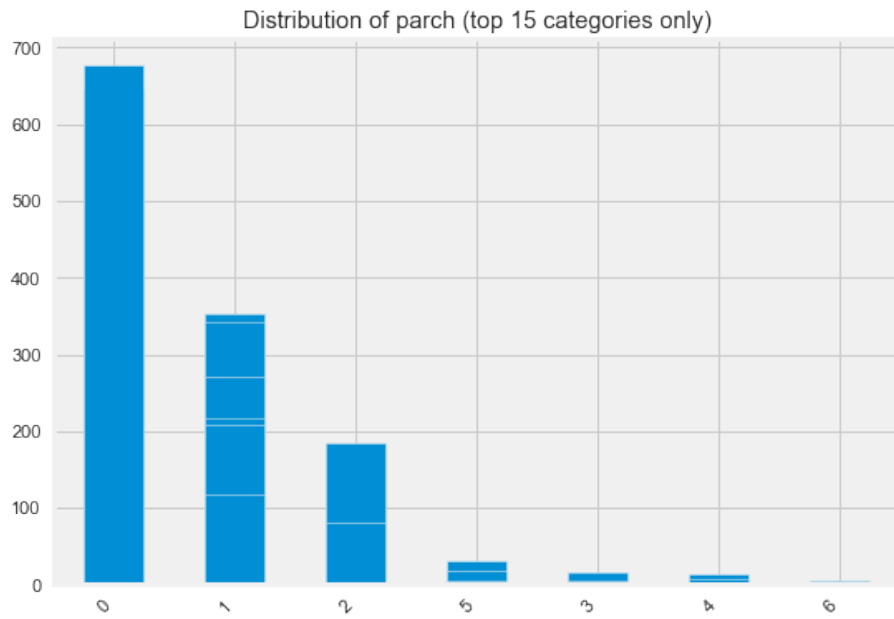
    16 Predictors classified...
        1 variables removed since they were ID or low-information variables
        List of variables removed: ['Unnamed: 0']
Number of All Scatter Plots = 3

```

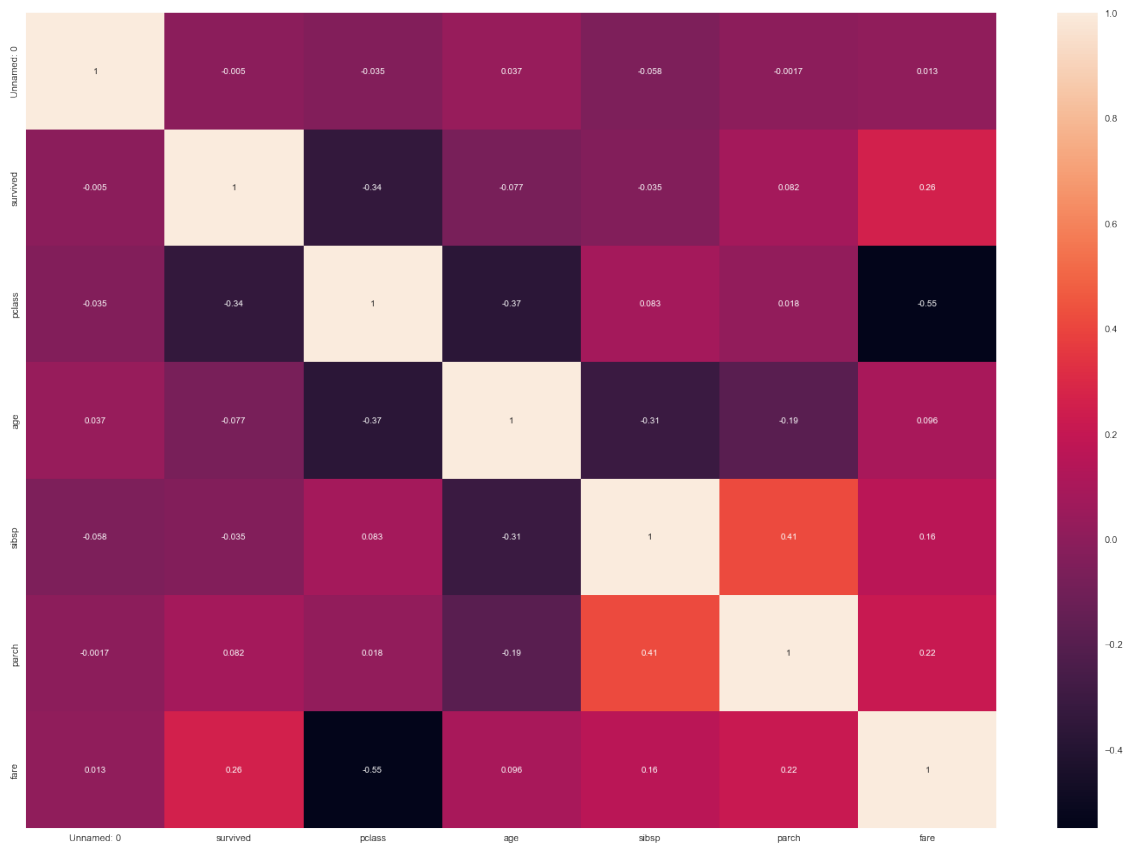


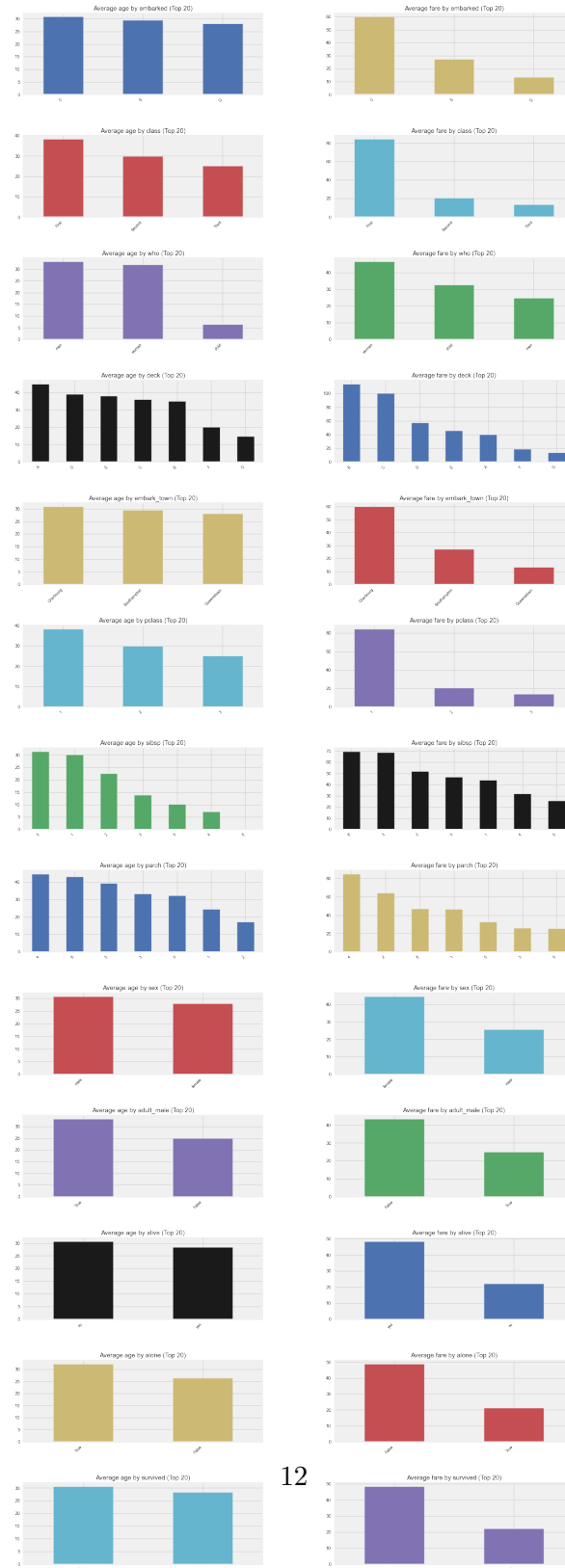
Pair-wise Scatter Plot of all Continuous Variables





Heatmap of all Continuous Variables including target =





```
All Plots done  
Time to run AutoViz = 4 seconds
```

```
##### AUTO VISUALIZATION Completed #####
```

```
[ ]:
```

