Brainome University 101 Quick Start

Running brainome in four easy steps

1. Install brainome from scratch
2. Download data sets
3. Run brainome to build a predictor.py
4. Validate the predictor.py

Install brainome via pip

includes dependencies

In [1]:
```
# pip install brainome
import sys
!{sys.executable} -m pip install brainome
```

```
Requirement already satisfied: brainome in /opt/conda/lib/python3.9/site-
packages (1.5.61)
Requirement already satisfied: brainome-linux-python3.9==1.5.* in /opt/co
nda/lib/python3.9/site-packages (from brainome) (1.5.7)
Requirement already satisfied: numpy>=1.20.0 in /opt/conda/lib/python3.9/
site-packages (from brainome-linux-python3.9==1.5.*->brainome) (1.21.1)
Requirement already satisfied: Jinja2>=3.0.0 in /opt/conda/lib/python3.9/
site-packages (from brainome-linux-python3.9==1.5.*->brainome) (3.0.1)
Requirement already satisfied: xgboost==1.4.2 in /opt/conda/lib/python3.
9/site-packages (from brainome-linux-python3.9==1.5.*->brainome) (1.4.2)
Requirement already satisfied: torch>=1.4.0 in /opt/conda/lib/python3.9/s
ite-packages (from brainome-linux-python3.9==1.5.*->brainome) (1.9.0)
Requirement already satisfied: scikit-learn>=0.22.1 in /opt/conda/lib/pyt
hon3.9/site-packages (from brainome-linux-python3.9==1.5.*->brainome) (0.
24.2)
Requirement already satisfied: requests in /opt/conda/lib/python3.9/site-
packages (from brainome-linux-python3.9==1.5.*->brainome) (2.26.0)
Requirement already satisfied: scipy in /opt/conda/lib/python3.9/site-pac
kages (from xgboost==1.4.2->brainome-linux-python3.9==1.5.*->brainome)
(1.7.0)
Requirement already satisfied: MarkupSafe>=2.0 in /opt/conda/lib/python3.
9/site-packages (from Jinja2>=3.0.0->brainome-linux-python3.9==1.5.*->bra
inome) (2.0.1)
Requirement already satisfied: threadpoolctl>=2.0.0 in /opt/conda/lib/pyt
hon3.9/site-packages (from scikit-learn>=0.22.1->brainome-linux-python3.9
==1.5.*->brainome) (2.2.0)
Requirement already satisfied: joblib>=0.11 in /opt/conda/lib/python3.9/s
ite-packages (from scikit-learn>=0.22.1->brainome-linux-python3.9==1.5.*-
>brainome) (1.0.1)
Requirement already satisfied: typing-extensions in /opt/conda/lib/python
3.9/site-packages (from torch>=1.4.0->brainome-linux-python3.9==1.5.*->br
ainome) (3.10.0.0)
Requirement already satisfied: idna<4,>=2.5 in /opt/conda/lib/python3.9/s
ite-packages (from requests->brainome-linux-python3.9==1.5.*->brainome)
(3.1)
Requirement already satisfied: certifi>=2017.4.17 in /opt/conda/lib/pytho
n3.9/site-packages (from requests->brainome-linux-python3.9==1.5.*->brain
ome) (2021.5.30)
Requirement already satisfied: charset-normalizer~=2.0.0 in /opt/conda/li
b/python3.9/site-packages (from requests->brainome-linux-python3.9==1.5.*
->brainome) (2.0.0)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in /opt/conda/lib/py
thon3.9/site-packages (from requests->brainome-linux-python3.9==1.5.*->br
ainome) (1.26.6)
```

Download titanic training and validation data sets

In [2]:
```
!wget -N https://download.brainome.ai/data/public/titanic_train.csv
!wget -N https://download.brainome.ai/data/public/titanic_validate.csv
```

```
--2021-07-29 23:55:10--  https://download.brainome.ai/data/public/titanic
_train.csv (https://download.brainome.ai/data/public/titanic_train.csv)
Resolving download.brainome.ai (download.brainome.ai)... 99.86.37.22, 99.
86.37.81, 99.86.37.123, ...
Connecting to download.brainome.ai (download.brainome.ai)|99.86.37.22|:44
3... connected.
HTTP request sent, awaiting response... 304 Not Modified
File ‘titanic_train.csv’ not modified on server. Omitting download.

--2021-07-29 23:55:11--  https://download.brainome.ai/data/public/titanic
_validate.csv (https://download.brainome.ai/data/public/titanic_validate.
csv)
Resolving download.brainome.ai (download.brainome.ai)... 99.86.37.22, 99.
86.37.81, 99.86.37.123, ...
Connecting to download.brainome.ai (download.brainome.ai)|99.86.37.22|:44
3... connected.
HTTP request sent, awaiting response... 304 Not Modified
File ‘titanic_validate.csv’ not modified on server. Omitting download.
```

Preview training data

In [3]:
```
with open('titanic_train.csv', 'r') as data:
    print(data.read())
```

```
PassengerId,Cabin_Class,Name,Sex,Age,Sibling_Spouse,Parent_Children,Ticke
t_Number,Fare,Cabin_Number,Port_of_Embarkation,Survived
1,3,"Braund, Mr. Owen Harris",male,22,1,0,A/5 21171,7.25,,S,died
2,1,"Cumings, Mrs. John Bradley (Florence Briggs Thayer)",female,38,1,0,P
C 17599,71.2833,C85,C,survived
3,3,"Heikkinen, Miss. Laina",female,26,0,0,STON/O2. 3101282,7.925,,S,surv
ived
4,1,"Futrelle, Mrs. Jacques Heath (Lily May Peel)",female,35,1,0,113803,5
3.1,C123,S,survived
5,3,"Allen, Mr. William Henry",male,35,0,0,373450,8.05,,S,died
6,3,"Moran, Mr. James",male,,0,0,330877,8.4583,,Q,died
7,1,"McCarthy, Mr. Timothy J",male,54,0,0,17463,51.8625,E46,S,died
8,3,"Palsson, Master. Gosta Leonard",male,2,3,1,349909,21.075,,S,died
9,3,"Johnson, Mrs. Oscar W (Elisabeth Vilhelmina Berg)",female,27,0,2,347
742,11.1333,,S,survived
10,2,"Nasser, Mrs. Nicholas (Adele Achem)",female,14,1,0,237736,30.0708,,
C,survived
11,3,"Sandstrom, Miss. Marguerite Rut",female,4,1,1,PP 9549,16.7,G6,S,sur
vived
```

Run brainome to measure and build a predictor.py

In [4]:
```
!brainome titanic_train.csv -rank --yes -o predictor.py
```

```
WARNING: Could not detect a GPU. Neural Network generation will be slow.

Brainome Table Compiler v1.005-7-prod
Copyright (c) 2019-2021 Brainome, Inc. All Rights Reserved.
Licensed to:                 y Demo User  (Evaluation)
Expiration Date:             2021-12-12   136 days left
Maximum File Size:           100 MB
Maximum Instances:           20000
Maximum Attributes:          100
Maximum Classes:             unlimited
Connected to:                daimensions.brainome.ai  (local execution)

Command:
    btc titanic_train.csv -rank --yes -o predictor.py

Start Time:                  07/29/2021, 23:55 UTC

Cleaning...done.
Ranking attributes...done.
```

View predictor.py source

In [5]:
```
with open('predictor.py', 'r') as data:
    print(data.read())
```

```
sys.setrecursionlimit(1000000)
TRAINFILE = ['titanic_train.csv']
mapping = {'died': 0, 'survived': 1}
ignorelabels = []
ignorecolumns = ['PassengerId', 'Name', 'Age', 'Ticket_Number', 'Fare',
 'Cabin_Number', 'Port_of_Embarkation']
target = ''
target_column = 11
important_idxs = [1, 3, 5, 6]
ignore_idxs = [0, 2, 4, 7, 8, 9, 10]
classifier_type = 'RF'
num_attr = 11
n_classes = 2
model_cap = 17
logits_dict = {0: array([0.0, 0.0, 0.0, -0.815487981, -0.0624225363, 0.30
6210905, 0.629472435]), 1: array([0.0, 0.0, 0.0, 0.815487981, 0.062422536
3, -0.306210905, -0.629472435]), 2: array([0.0, 0.0, 0.0, -0.267614931,
 0.26338464, 0.237916529, -0.0341751762]), 3: array([0.0, 0.0, 0.0, 0.267
61499, -0.263384581, -0.237916559, 0.0341751203]), 4: array([0.0, 0.0, 0.
0   0.460301042   0.0762317702   0.0469896123   0.4156591591]   5: array([0
```

Validate predictor

In [6]:
```
!{sys.executable} predictor.py -validate titanic_validate.csv
```

```
Classifier Type:                    Random Forest
System Type:                        2-way classifier

Accuracy:
    Best-guess accuracy:            61.25%
    Model accuracy:                 80.00% (64/80 correct)
    Improvement over best guess:    18.75% (of possible 38.75%)

Model capacity (MEC):               17 bits
Generalization ratio:               3.62 bits/bit

Confusion Matrix:

      Actual |   Predicted
    -------------------------
        died |      45        4
    survived |      12       19

Accuracy by Class:

      target | TP FP TN FN     TPR     TNR     PPV     NPV      F1      T
S
    -------- | -- -- -- -- ------- ------- ------- ------- ------- ------
-
        died | 45 12 19  4  91.84%  61.29%  78.95%  82.61%  84.91%  73.7
7%
    survived | 19  4 45 12  61.29%  91.84%  82.61%  78.95%  70.37%  54.2
9%
```

Next steps

Check out Brainome 201 Features and Functions