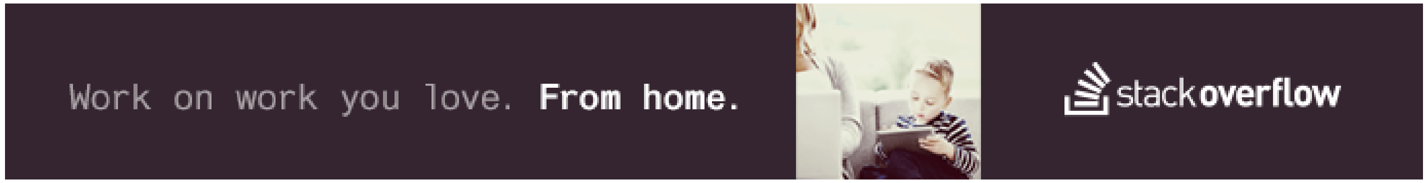
How do I create test and train samples from one dataframe with pandas?



I have a fairly large dataset in the form of a dataframe and I was wondering how I would be able to split the dataframe into two random samples (80% and 20%) for training and testing.

Thanks!

python python-2.7 pandas dataframe

asked Jun 10 '14 at 17:24

user3712008
398 1 5 16

9 Answers

I would just use numpy's `randn` :

```
In [11]: df = pd.DataFrame(np.random.randn(100, 2))

In [12]: msk = np.random.rand(len(df)) < 0.8

In [13]: train = df[msk]

In [14]: test = df[~msk]
```

And just to see this has worked:

```
In [15]: len(test)
Out[15]: 21

In [16]: len(train)
Out[16]: 79
```

edited Jun 11 '14 at 0:30

answered Jun 10 '14 at 17:29

Andy Hayden
81.4k 13 187 220

Since `msk` returns an array of bools, perhaps `df.iloc` should be `df.loc` lest True/False be treated as 1,0 indices. – unutbu Jun 10 '14 at 17:37

@unutbu hmmmmmm good point, I was thinking the same about the loc ambiguity (if they are labelled with 0 or 1... maybe best not to use at all? – Andy Hayden Jun 10 '14 at 17:51

2 Sorry, my mistake. As long as `msk` is of dtype `bool` , `df[msk]` , `df.iloc[msk]` and `df.loc[msk]` always return the same result. – unutbu Jun 10 '14 at 18:32

2 I think you should use `rand` to `< 0.8` make sense because it returns uniformly distributed random numbers between 0 and 1. – Rolando Jun 10 '14 at 18:43

@AndyHayden, in your example, if I change 0.8 to 0.2 I get `len(train)` equal to 59 and `len(test)` equal to 41. – Rolando Jun 10 '14 at 23:51

SciKit Learn's `train_test_split` is a good one.

```
import pandas as pd
import numpy as np
from sklearn.cross_validation import train_test_split

train, test = train_test_split(df, test_size = 0.2)
```

answered Jun 10 '14 at 22:19
GoBrewers14
3,377 5 13 32

9 This will return numpy arrays and not Pandas Dataframes however – Bar Oct 22 '14 at 15:10

15 Btw, it does return a Pandas Dataframe now (just tested on Sklearn 0.16.1) – Julien Marrec Jul 8 '15 at 10:30

1 If you're looking for KFold, its a bit more complex sadly. `kf = KFold(n, n_folds=folds) for train_index, test_index in kf: X_train, X_test = X.ix[train_index], X.ix[test_index]` see full example here: quantstart.com/articles/… – ihadanny Feb 23 at 13:13

I would use scikit-learn's own training_test_split, and generate it from the index

```
from sklearn.cross_validation import train_test_split


y = df.pop('output')
X = df

X_train,X_test,y_train,y_test = train_test_split(X.index,y,test_size=0.2)
X.iloc[X_train] # return dataframe train
```

edited Oct 13 '15 at 11:11

answered May 26 '15 at 9:33
Napitupulu Jon
559 5 14

Pandas random sample will also work

```
train=df.sample(frac=0.8,random_state=200)
test=df.drop(train.index)
```

answered Feb 21 at 1:28

ParagM
260 2 12

2 This seems to me as even more cleaner way how to do that than current top answer. It's shorter and clearer. – kotrfa Apr 21 at 12:27

This is what I wrote when I needed to split a DataFrame. I considered using Andy's approach above, but didn't like that I could not control the size of the data sets exactly (i.e., it would be sometimes 79, sometimes 81, etc.).

```
def make_sets(data_df, test_portion):
    import random as rnd

    tot_ix = range(len(data_df))
    test_ix = sort(rnd.sample(tot_ix, int(test_portion * len(data_df))))
    train_ix = list(set(tot_ix) ^ set(test_ix))

    test_df = data_df.ix[test_ix]
    train_df = data_df.ix[train_ix]

    return train_df, test_df


train_df, test_df = make_sets(data_df, 0.2)
test_df.head()
```

edited Dec 25 '14 at 20:59

answered Dec 25 '14 at 20:52

Anarcho-Chossid
364 2 17

You may also consider stratified division into training and testing set. Startified division also generates training and testing set randomly but in such a way that original class proportions are preserved. This makes training and testing sets better reflect the properties of the original dataset.

```
import numpy as np

def get_train_test_inds(y,train_proportion=0.7):
    '''Generates indices, making random stratified split into training set and testing
sets
    with proportions train_proportion and (1-train_proportion) of initial sample.
    y is any iterable indicating classes of each observation in the sample.
    Initial proportions of classes inside training and
    testing sets are preserved (stratified sampling).
    '''

    y=np.array(y)
    train_inds = np.zeros(len(y),dtype=bool)
    test_inds = np.zeros(len(y),dtype=bool)
    values = np.unique(y)
    for value in values:
        value_inds = np.nonzero(y==value)[0]
        np.random.shuffle(value_inds)
        n = int(train_proportion*len(value_inds))

        train_inds[value_inds[:n]]=True
        test_inds[value_inds[n:]]=True

    return train_inds,test_inds
```

df[train_inds] and df[test_inds] give you the training and testing sets of your original DataFrame df.

answered Dec 10 '14 at 23:11
Apogentus
1,371 11 19

If your wish is to have one dataframe in and two dataframes out (not numpy arrays), this should do the trick:

```
def split_data(df, train_perc = 0.8):

   df['train'] = np.random.rand(len(df)) < train_perc

   train = df[df.train == 1]
```

```
    test = df[df.train == 0]

    split_data ={'train': train, 'test': test}

    return split_data
```

answered Jul 19 '15 at 21:29

Johnny V
21 4

I think you also need to a get a copy not a slice of dataframe if you wanna add columns later.

```
msk = np.random.rand(len(df)) < 0.8
train, test = df[msk].copy(deep = True), df[~msk].copy(deep = True)
```

answered Aug 4 '15 at 4:16

Hakim
399 1 3 14

You can make use of df.as_matrix() function and create Numpy-array and pass it.

```
Y = df.pop()
X = df.as_matrix()
x_train, x_test, y_train, y_test = train_test_split(X, Y, test_size = 0.2)
model.fit(x_train, y_train)
model.test(x_test)
```

answered Nov 27 '15 at 8:50

kiran6
195 1 11
