lec4_step7_BarStack_Aligned_Stage6

November 30, 2022

[ ]:
```
## Python basics for novice data scientists, supported by Wagatsuma Lab@Kyutech
#
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#
# # @Time    : 2020-11-30
# # @Author  : Hiroaki Wagatsuma
# # @Site    : https://github.com/hirowgit/2A1_python_intermediate_course
# # @IDE     : Python 3.9.14 (main, Sep  6 2022, 23:29:09) [Clang 13.1.6␣
 ↪(clang-1316.0.21.2.5)] on darwin
# # @File    : lec4_step7_BarStack_Aligned_Stage6.py
```

[292]:
```
import numpy as np
#prFill=[90    60    50    50    50    90    40    30    80    40  20 ]/100;
prFill=np.array([90, 60, 50, 50, 50, 90, 40, 30, 80, 40, 20])
prFill=prFill/100
fillLine=np.full(len(prFill),True)
LineT=[]
tmp=[]
k=0
for i in range(len(prFill)):
```

```python
#for i in range(5):
#for i in range(5):
    if fillLine[i]:
        remF=1-prFill[i]
        IDrem=np.where((prFill[i+1:len(prFill)]<=remF) & fillLine[i+1:
↪len(prFill)])
        tmp=i
        fID=i
        #j=0
        while IDrem[0].size > 0:
            fID=IDrem[0][0]+fID+1
            tmp=np.append(tmp,fID)
            remF=remF-prFill[fID]
            IDrem=np.where((prFill[fID+1:len(prFill)]<=remF) & fillLine[fID+1:
↪len(prFill)])
        LineT.append(tmp)
        fillLine[tmp]=False
        print("k;",k)
        print("LineT;",LineT)
        k=k+1
        print("k;",k)
```

```
k; 0
LineT; [0]
k; 1
k; 1
LineT; [0, array([1, 6], dtype=int64)]
k; 2
k; 2
LineT; [0, array([1, 6], dtype=int64), array([2, 3], dtype=int64)]
k; 3
k; 3
LineT; [0, array([1, 6], dtype=int64), array([2, 3], dtype=int64), array([ 4,
7, 10], dtype=int64)]
k; 4
k; 4
LineT; [0, array([1, 6], dtype=int64), array([2, 3], dtype=int64), array([ 4,
7, 10], dtype=int64), 5]
k; 5
k; 5
LineT; [0, array([1, 6], dtype=int64), array([2, 3], dtype=int64), array([ 4,
7, 10], dtype=int64), 5, 8]
k; 6
k; 6
LineT; [0, array([1, 6], dtype=int64), array([2, 3], dtype=int64), array([ 4,
7, 10], dtype=int64), 5, 8, 9]
k; 7
```

[293]:
```
#
for i in LineT:
    print(type(i))
```

```
<class 'int'>
<class 'numpy.ndarray'>
<class 'numpy.ndarray'>
<class 'numpy.ndarray'>
<class 'int'>
<class 'int'>
<class 'int'>
```

[294]:
```
# int  'numpy.ndarray'
f_LineT = [np.array(i) if type(i)==int else i for i in LineT]
print(f_LineT)
[print(type(i)) for i in f_LineT]
```

```
[array(0), array([1, 6], dtype=int64), array([2, 3], dtype=int64), array([ 4,
7, 10], dtype=int64), array(5), array(8), array(9)]
<class 'numpy.ndarray'>
<class 'numpy.ndarray'>
<class 'numpy.ndarray'>
<class 'numpy.ndarray'>
<class 'numpy.ndarray'>
<class 'numpy.ndarray'>
<class 'numpy.ndarray'>
```

[294]:
```
[None, None, None, None, None, None, None]
```

[295]:
```
LineT
```

[295]:
```
[0,
 array([1, 6], dtype=int64),
 array([2, 3], dtype=int64),
 array([ 4,  7, 10], dtype=int64),
 5,
 8,
 9]
```

[296]:
```
#lenLineT=cell2mat(cellfun(@(x) length(x),LineT,'UniformOutput',false));
lenLineT = [i.size for i in f_LineT]
print(lenLineT)
```

```
[1, 2, 2, 3, 1, 1, 1]
```

[297]:
```
#stackBarD=zeros(size(LineT,2),max(lenLineT));
stackBarD = np.zeros((np.shape(f_LineT)[0],max(lenLineT)))
```

```
[[0. 0. 0.]
 [0. 0. 0.]
 [0. 0. 0.]
 [0. 0. 0.]
 [0. 0. 0.]
 [0. 0. 0.]
 [0. 0. 0.]]
```

```
C:\Users\Kaito\anaconda3\lib\site-packages\numpy\core\_asarray.py:102:
VisibleDeprecationWarning: Creating an ndarray from ragged nested sequences
(which is a list-or-tuple of lists-or-tuples-or ndarrays with different lengths
or shapes) is deprecated. If you meant to do this, you must specify
'dtype=object' when creating the ndarray.
  return array(a, dtype, copy=False, order=order)
```

[298]:

```
len(f_LineT)
```

[298]: 7

[299]:

```
f_LineT[1]
print(prFill)
i = [1, 6]
print(prFill[i])
```

```
[0.9 0.6 0.5 0.5 0.5 0.9 0.4 0.3 0.8 0.4 0.2]
[0.6 0.4]
```

[300]:

```
#stackBarD     prFill
for i in range(len(f_LineT)):
    tmp = f_LineT[i]
    stackBarD[i,0:lenLineT[i]] = prFill[tmp]
print(stackBarD)
```

```
1
[0.]
[[0.9 0.  0. ]
 [0.  0.  0. ]
 [0.  0.  0. ]
 [0.  0.  0. ]
 [0.  0.  0. ]
 [0.  0.  0. ]
 [0.  0.  0. ]]
2
[0. 0.]
[[0.9 0.  0. ]
 [0.6 0.4 0. ]
 [0.  0.  0. ]
 [0.  0.  0. ]
 [0.  0.  0. ]
 [0.  0.  0. ]
 [0.  0.  0. ]]
2
[0. 0.]
[[0.9 0.  0. ]
 [0.6 0.4 0. ]
 [0.5 0.5 0. ]
 [0.  0.  0. ]
 [0.  0.  0. ]
 [0.  0.  0. ]
 [0.  0.  0. ]]
3
[0. 0. 0.]
[[0.9 0.  0. ]
 [0.6 0.4 0. ]
 [0.5 0.5 0. ]
 [0.5 0.3 0.2]
 [0.  0.  0. ]
 [0.  0.  0. ]
 [0.  0.  0. ]]
1
[0.]
[[0.9 0.  0. ]
 [0.6 0.4 0. ]
 [0.5 0.5 0. ]
 [0.5 0.3 0.2]
 [0.9 0.  0. ]
 [0.  0.  0. ]
 [0.  0.  0. ]]
1
[0.]
[[0.9 0.  0. ]
 [0.6 0.4 0. ]
 [0.5 0.5 0. ]
 [0.5 0.3 0.2]
 [0.9 0.  0. ]
 [0.8 0.  0. ]
 [0.  0.  0. ]]
1
[0.]
[[0.9 0.  0. ]
 [0.6 0.4 0. ]
 [0.5 0.5 0. ]
 [0.5 0.3 0.2]
 [0.9 0.  0. ]
 [0.8 0.  0. ]
 [0.4 0.  0. ]]
```

[ ]:

```
```

[301]:

```
y_data_stack = []
y_data_stack = tuple([np.append(y_data_stack, i)  for i in stackBarD])
print(y_data_stack)
```

```
(array([0.9, 0. , 0. ]), array([0.6, 0.4, 0. ]), array([0.5, 0.5, 0. ]),
array([0.5, 0.3, 0.2]), array([0.9, 0. , 0. ]), array([0.8, 0. , 0. ]),
array([0.4, 0. , 0. ]))
```

[302]:

```
LineT[0]
```

[302]:

```
0
```

[331]:

```
x_label = [i+1 for i in range(len(prFill))]
x_stack_label = [i+1 for i in range(len(stackBarD))]
y_label = np.arange(0, 12, 2)
y_label =[i/10 for i in y_label]
print(x_label)
print(x_stack_label)
print(y_label)
```

```
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
[1, 2, 3, 4, 5, 6, 7]
[0.0, 0.2, 0.4, 0.6, 0.8, 1.0]
```

[332]:

```
#matplotlib
import matplotlib.pyplot as plt
```

[336]:

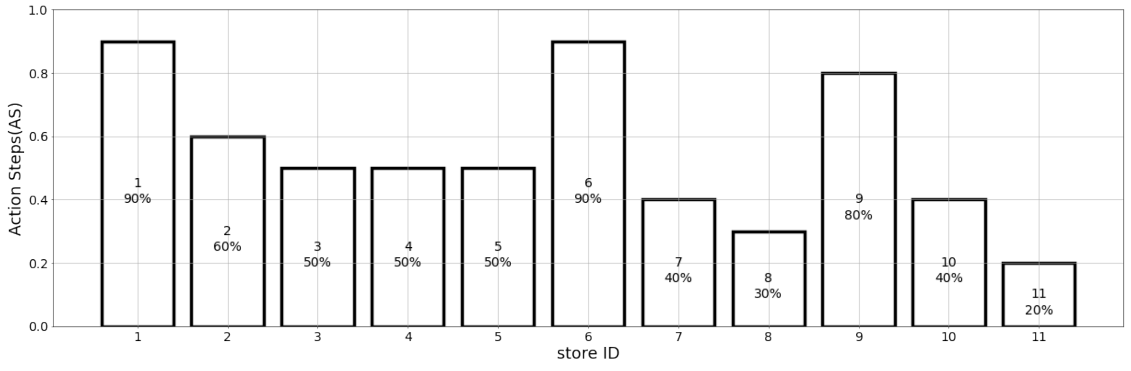
```
#2
fig = plt.figure(figsize=(30,20), dpi=50)
init_fig = fig.add_subplot(2 , 1, 1)
stack_fig = fig.add_subplot(2, 1, 2)

#
#  https://www.yutaka-note.com/entry/matplotlib_axis

init_fig.set_xlabel("store ID", size = 25)
init_fig.set_xticks(x_label)
init_fig.set_xticklabels(x_label, size=20)

init_fig.set_ylabel("Action Steps(AS)", size = 25)
init_fig.set_yticks(y_label)
init_fig.set_yticklabels(y_label, size=20)
init_fig.set_ylim(0 , 1)
# init_fig.set_yticks(np.arange(0, 1, 0.2))
# init_fig.title("")
```

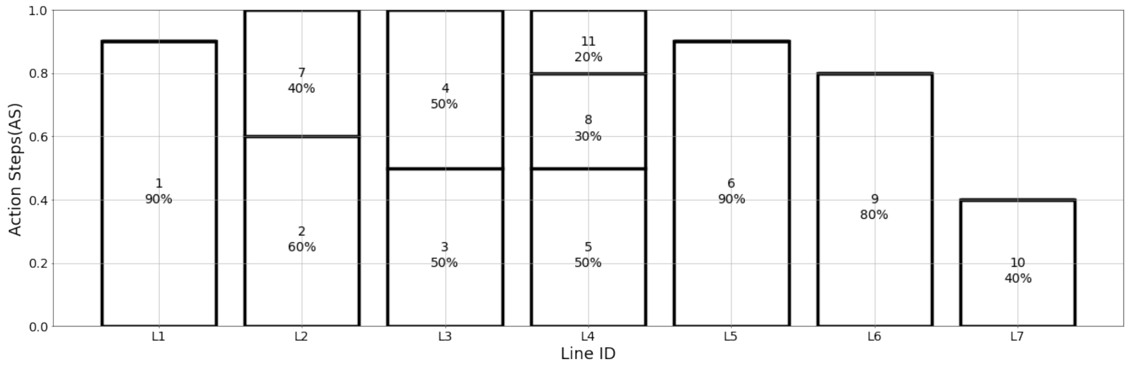
```
init_fig.grid(True)
#
bar = init_fig.bar(x_label, prFill, color = 'w', edgecolor ='black', linewidth␣
↪= '5')
# init_fig.text(cx, cy, df.columns[i], color="k", ha="center", va="center")

#   BAR

for i in range(len(bar)):
        cx = bar[i].get_x() + bar[i].get_width() / 2
#         print(cx)
        cy = bar[i].get_y() + bar[i].get_height() / 2
#         print(cy)
        init_fig.text(cx, cy, x_label[i], size= 20,  color="k", ha="center",␣
↪va="center")
        init_fig.text(cx, cy-0.05, str(f'{prFill[i]*100:.0f}') +'%',size= 20, ␣
↪color="k", ha="center", va="center")

#
#  https://www.yutaka-note.com/entry/matplotlib_axis

stack_fig.set_xlabel("Line ID", size = 25)
stack_fig.set_xticks(x_stack_label)
stack_fig.set_xticklabels(list(map(lambda label:'L' + str(label),␣
↪x_stack_label)), size=20)

stack_fig.set_ylabel("Action Steps(AS)", size = 25)
stack_fig.set_yticks(y_label)
stack_fig.set_yticklabels(y_label, size=20)
stack_fig.set_ylim(0 , 1)
# init_fig.set_yticks(np.arange(0, 1, 0.2))
# init_fig.title("")
stack_fig.grid(True)
#
bottom = np.zeros(stackBarD.T.shape[1])

for i in range(stackBarD.T.shape[0]):

    if i ==0:
        s_bar = stack_fig.bar(x_stack_label, stackBarD.T[i], color = 'w',␣
↪edgecolor ='black', linewidth = '5')
    else:
        s_bar = stack_fig.bar(x_stack_label, stackBarD.T[i], bottom= bottom,␣
↪color = 'w', edgecolor ='black', linewidth = '5')
```

```
    bottom = np.add(bottom, stackBarD.T[i])
    print(bottom)
# stack_fig.bar(x_stack_label, stackBarD.T[0], color = 'w', edgecolor ='black',␣
↪linewidth = '5')
# stack_fig.bar(x_stack_label, stackBarD.T[1], bottom= stackBarD.T[0], color =␣
↪'w', edgecolor ='black', linewidth = '5')
# stack_fig.bar(x_stack_label, stackBarD.T[2], bottom= stackBarD.T[0] +␣
↪stackBarD.T[1], color = 'w', edgecolor ='black', linewidth = '5')
n_LineT = list(map(lambda Line:Line +1, f_LineT))

for i in range(stackBarD.shape[0]):
    baseY=0
    for j in range(stackBarD.shape[1]):
        if stackBarD[i][j]>0:
#             print('ffff',f_LineT[i].size)
            if f_LineT[i].size ==1:
                key = f_LineT[i]
                print('key1;',key)
                tmp = prFill[key]
                print('tmp1;',tmp)
            else:
                key = f_LineT[i][j]
                print('key;',key)
                tmp = prFill[key]
                print('tmp;',tmp)
            ypos = tmp/2
            stack_fig.text(s_bar[i].get_x() + s_bar[i].get_width() / 2, baseY+␣
↪ypos, str(key+1),size= 20,  color="k", ha="center", va="center")
            stack_fig.text(s_bar[i].get_x() + s_bar[i].get_width() / 2, baseY+␣
↪ypos - 0.05, str(f'{tmp*100:.0f}') +'%',size= 20,  color="k", ha="center",␣
↪va="center")
            baseY = baseY+tmp
#     cx = s_bar[j].get_x() + s_bar[j].get_width() / 2
#     print(cx)
#     cy = s_bar[j].get_y() + s_bar[j].get_height() / 2
#     print(cy)
#     stack_fig.text(cx, cy,stackBarD.T[0][j], size= 20,  color="k",␣
↪ha="center", va="center")
# stack_fig
#       init_fig.text(cx, cy-0.05, str(f'{prFill[i]*100:.0f}') +'%',size= 20, ␣
↪color="k", ha="center", va="center")
```

```
[0.9 0.6 0.5 0.5 0.9 0.8 0.4]
[0.9 1.  1.  0.8 0.9 0.8 0.4]
[0.9 1.  1.  1.  0.9 0.8 0.4]
key1; 0
tmp1; 0.9
```

```
key; 1
tmp; 0.6
key; 6
tmp; 0.4
key; 2
tmp; 0.5
key; 3
tmp; 0.5
key; 4
tmp; 0.5
key; 7
tmp; 0.3
key; 10
tmp; 0.2
key1; 5
tmp1; 0.9
key1; 8
tmp1; 0.8
key1; 9
tmp1; 0.4
```





[317]:
```python
print(stackBarD)
print(f_LineT)
print(n_LineT)
print(prFill)
f_LineT[0].size
```

```
[[0.9 0.  0. ]
 [0.6 0.4 0. ]
 [0.5 0.5 0. ]
 [0.5 0.3 0.2]
 [0.9 0.  0. ]
 [0.8 0.  0. ]
 [0.4 0.  0. ]]
[array(0), array([1, 6], dtype=int64), array([2, 3], dtype=int64), array([ 4,
7, 10], dtype=int64), array(5), array(8), array(9)]
[1, array([2, 7], dtype=int64), array([3, 4], dtype=int64), array([ 5,  8, 11],
dtype=int64), 6, 9, 10]
[0.9 0.6 0.5 0.5 0.5 0.9 0.4 0.3 0.8 0.4 0.2]
```

[317]: 1

[268]:
```
print(LineT)
print(type(LineT))
n_LineT = list(map(lambda Line:Line +1, LineT))
print(l)
print(type(l))
```

```
[0, array([1, 6], dtype=int64), array([2, 3], dtype=int64), array([ 4,  7, 10],
dtype=int64), 5, 8, 9]
<class 'list'>
[1, array([2, 7], dtype=int64), array([3, 4], dtype=int64), array([ 5,  8, 11],
dtype=int64), 6, 9, 10]
<class 'list'>
```

[269]:
```
print(LineT)
print(stackBarD.T)
```

```
[0, array([1, 6], dtype=int64), array([2, 3], dtype=int64), array([ 4,  7, 10],
dtype=int64), 5, 8, 9]
[[0.9 0.6 0.5 0.5 0.9 0.8 0.4]
 [0.  0.4 0.5 0.3 0.  0.  0. ]
 [0.  0.  0.  0.2 0.  0.  0. ]]
```

[270]:
```
#
#  https://www.yutaka-note.com/entry/matplotlib_axis

stack_fig.set_xlabel("store ID", size = 25)
stack_fig.set_xticks(x_stack_label)
stack_fig.set_xticklabels(x_stack_label, size=20)
stack_fig.set_ylabel("Action Steps(AS)", size = 25)
stack_fig.set_yticks(y_label)
stack_fig.set_yticklabels(y_label, size=20)
stack_fig.set_ylim(0 , 1)
# init_fig.set_yticks(np.arange(0, 1, 0.2))
# init_fig.title("")
stack_fig.grid(True)
#
stack_fig.bar(x_stack_label, stackBarD.T[0], color = 'w', edgecolor ='black',␣
 ↪linewidth = '5')
```

[270]:
```
<BarContainer object of 7 artists>
```

[26]:
```
init_fig.bar(x_label, prFill)
# plt.show
```

[26]:
```
<BarContainer object of 11 artists>
```

[ ]:
```
len(LineT[1])
```

[ ]:
```
LineT[2].size
```

[140]:
```
np.zeros(stackBarD.T.shape[1])
```

[140]:
```
array([0., 0., 0., 0., 0., 0., 0.])
```

[ ]:

[ ]:

[ ]:

[ ]: