MATLAB programming course for beginners, supported by Wagatsuma Lab@Kyutech

Specifications and requirements

1. @Time : 2022-11-30

2. @Author : Hiroaki Wagatsuma

3. @Site : https://github.com/hirowgit/1A1_matlab_intermediate_course

4. @IDE : MATLAB R2022a

5. @File : lec4_step2_genMat4Assort_Platinum.m

```matlab
% List of towns in South Korea
% clear all

NofStID=244;
NofPrdID=1670;

NofData=100;

NofLines=8;


% NofStID=5;
% NofPrdID=10;
% NofData=50;

NofStID=10;
```

MATLAB programming course
for beginners, supported by
Wagatsuma Lab@Kyutech

```matlab
NofPrdID=20;
NofData=50;

NofPrdOrd=100;

stLabelN=1:NofStID;
stLabelN0=[0 stLabelN];
prdLabelN=1:NofPrdID;
prdLabelN0=[0 prdLabelN];




% NofData=3;

LongTail_pdf_Advanced;
% r2=floor(NofPrdID*y./max(y))+1;
r2=floor((NofPrdID-1)*y./max(y))+1;

LongTail_pdf_Advanced;
% r2=floor(NofPrdID*y./max(y))+1;
n2=floor((NofPrdOrd-1)*y./max(y))+1;

stIDNameM=floor(NofStID*rand(NofData,1))+1;
% prdIDNameM=floor(NofPrdID*rand(NofData,1))+1;
IDr2=floor(size(r2,1)*rand(NofData,1))+1;
prdIDNameM=r2(IDr2);

% NofPrdD=floor(NofPrdOrd*rand(NofData,1))+1;
IDn2=floor(size(n2,1)*rand(NofData,1))+1;
NofPrdD=n2(IDn2);


serialD=[stIDNameM prdIDNameM NofPrdD];

% dT=[];
dT=zeros(NofPrdID,NofStID);

tic
for i=1:size(serialD,1)
%     dT(serialD(i,2),serialD(i,1))=serialD(i,3);   % (productNum,storeNum)
    i
    dT(serialD(i,2),serialD(i,1))=dT(serialD(i,2),serialD(i,1))+serialD(i,3);
   % (productNum,storeNum)
end

clc
% % disp([stLabelN0; [prdLabelN' dT]]);

% dTs=[dT; sum(dT)];

NpieceInBox=20;
NboxInLine=10;
```

MATLAB programming course
for beginners, supported by
Wagatsuma Lab@Kyutech

```matlab
alpha=0.5;
% alpha=0.8;

beta=1-alpha;
simIndexFlg=2;

if simIndexFlg==2
% ==== SP2 =====
    sumDT=sum(dT);
    markedSt=find(sumDT==max(sum(dT)));
    [ki kj]=find(dT>0);
    NofItem=sum(boolean(dT));
    NiNorm=NofItem./max(NofItem);
    alignedSimilarity=dT(:,markedSt)'*dT;
    aSNorm=alignedSimilarity./max(alignedSimilarity);

    dTsRev=[stLabelN; dT; alpha*NofItem+beta*aSNorm]';
% ==== SP2 =====

elseif simIndexFlg==1
% ==== SP1 =====
    sumDT=sum(dT);
    markedSt=find(sumDT==max(sum(dT)));
    alignedSimilarity=dT(:,markedSt)'*dT;
    dTsRev=[stLabelN; dT; alignedSimilarity]';
% ==== SP1 =====

else
    dTsRev=[stLabelN; dT; sum(dT)]';
end

dTsRevS=sortrows(dTsRev,NofPrdID+2,'descend');
% disp(dTsRevS);

sortedSt=dTsRevS(:,1);
sortedSumByStore=dTsRevS(:,end);      % by Store
sDataBody=dTsRevS(:,2:end-1);
% disp(sDataBody');
% % disp([[0 sortedSt']; [prdLabelN' sDataBody']]);


dTsS=sortrows([prdLabelN; sDataBody; sum(sDataBody)]',NofStID+2,'descend');
sortedPrd=dTsS(:,1);  %i
sortedSumRevByProduct=dTsS(:,end);      % by Product
s2DataBody=dTsS(:,2:end-1);

% disp(s2DataBody);
dispData=[[0 sortedSt']; [sortedPrd s2DataBody]];

[ki kj]=find(s2DataBody>0);

ki2=unique(ki);
kj2=unique(kj);
```

MATLAB programming course
for beginners, supported by
Wagatsuma Lab@Kyutech

```matlab
nPrd=sortedPrd(ki2);
nSt=sortedSt(kj2);

AlgData=s2DataBody(ki2,kj2);
% disp([[0 nSt']; [nPrd s2DataBody(ki,kj)]]);
disp([[0 nSt']; [nPrd AlgData]]);
toc

figure(9);clf
bar3(AlgData)
xticks(1:size(nSt,1));
xticklabels(nSt)
xlabel('store ID');

yticks(1:size(nPrd,1));
yticklabels(nPrd)
ylabel('product ID');

% zlabel('N of Items');
zlabel('# products');

set(gca,'zlim',[1 max(max(dT))]);
view(38.5,36.5);

ASnum=sum(ceil(AlgData./NpieceInBox));

% fillLine=boolean(zeros(1,NofLines));
% LineT=zeros(1,NofLines);

prFill=ASnum/NboxInLine;

fillLine=boolean(ones(1,size(prFill,2)));
LineT={};
k=1;
for i=1:size(prFill,2)
    if fillLine(i)
        remF=1-prFill(i);
        IDrem=find(prFill(i+1:end)<=remF & fillLine(i+1:end));
        tmp=i; j=1; fID=i;
        while ~isempty(IDrem)
            fID=IDrem(1)+fID;
            tmp(end+1)=fID;
            remF=remF-prFill(IDrem(j)+i);
            IDrem=find(prFill(fID+1:end)<=remF & fillLine(fID+1:end));
        end
        LineT{k}=tmp;
        fillLine(tmp)=false;
        k=k+1;
    end
end

lenLineT=cell2mat(cellfun(@(x) length(x),LineT,'UniformOutput',false));
stackBarD=zeros(size(LineT,2),max(lenLineT));
```

MATLAB programming course
for beginners, supported by
Wagatsuma Lab@Kyutech

```matlab
for i=1:length(LineT)
    tmp=LineT{i};
    stackBarD(i,1:length(tmp))=prFill(tmp);
end

figure(1);clf;
subplot(2,1,1);
barOri = bar(prFill,'FaceColor','flat','LineWidth',2);
barOri.CData = [1 1 1];
xlabel('store ID');
ylabel('Action Steps (AS)');
set(gca,'FontSize',12);
grid on;

for i = 1:size(prFill,2)  % Line ID (horizontal)
    ypos=prFill(i)./2;
    text(i-0.03-0.1,0.035+ypos,num2str(i));
    text(i-0.15-0.1,0.035+ypos-0.07,[num2str(prFill(i)*100),'%']);


end

subplot(2,1,2);
barS = bar(stackBarD,'stacked','FaceColor','flat','LineWidth',2),hold on;
bsLabel=num2cell(1:size(LineT,2));
bsLabel2=cellfun(@(x) ['L',num2str(x)],bsLabel,'UniformOutput',false);
xticklabels(bsLabel2);
for i = 1:size(stackBarD,2)
    barS(i).CData = [1 1 1];
end
xlabel('Line ID');
ylabel('Action Steps (AS)');
set(gca,'FontSize',12);

for i = 1:size(stackBarD,1)  % Line ID (horizontal)
    baseY=0;
    for j = 1:size(stackBarD,2) % stacked  (vertical)
        if  stackBarD(i,j)>0
            key=LineT{i}(j); tmp=prFill(key);
            ypos=tmp/2;
            text(i-0.03,0.035+baseY+ypos,num2str(key));
            text(i-0.15,0.035+baseY+ypos-0.07,[num2str(tmp*100),'%']);
            baseY=baseY+tmp;
        end
    end
end


kHat =

    0.0987


sigmaHat =
```

MATLAB programming course
for beginners, supported by
Wagatsuma Lab@Kyutech

```
    0.7156


kHat =

    0.0987


sigmaHat =

    0.7156


i =

     1


i =

     2


i =

     3


i =

     4


i =

     5


i =

     6


i =

     7


i =

     8
```

MATLAB programming course
for beginners, supported by
Wagatsuma Lab@Kyutech

```
i =

     9


i =

    10


i =

    11


i =

    12


i =

    13


i =

    14


i =

    15


i =

    16


i =

    17


i =

    18


i =

    19
```

```
i =
```

MATLAB programming course
for beginners, supported by
Wagatsuma Lab@Kyutech

```
i =

    20


i =

    21


i =

    22


i =

    23


i =

    24


i =

    25


i =

    26


i =

    27


i =

    28


i =

    29


i =

    30
```

MATLAB programming course
for beginners, supported by
Wagatsuma Lab@Kyutech

```
i =

    31


i =

    32


i =

    33


i =

    34


i =

    35


i =

    36


i =

    37


i =

    38


i =

    39


i =

    40


i =
```

MATLAB programming course
for beginners, supported by
Wagatsuma Lab@Kyutech

```
    41


i =

    42


i =

    43


i =

    44


i =

    45


i =

    46


i =

    47


i =

    48


i =

    49


i =

    50

    0     1     7     4    10     5     8     3     6     9     2
    1    35    34    12     0     4    98    27     0     0     0
    3    14    26     0    15     1     1     0     2    69     8
    2    21    11     5    17     0    51    19    10     0     0
    6    59     0     0    10    25     0     0     0     0     0
    7     0     0    21     0     8     0     0     9     0    52
    5     0     8     0     0     0     0     0     0    69     0
```
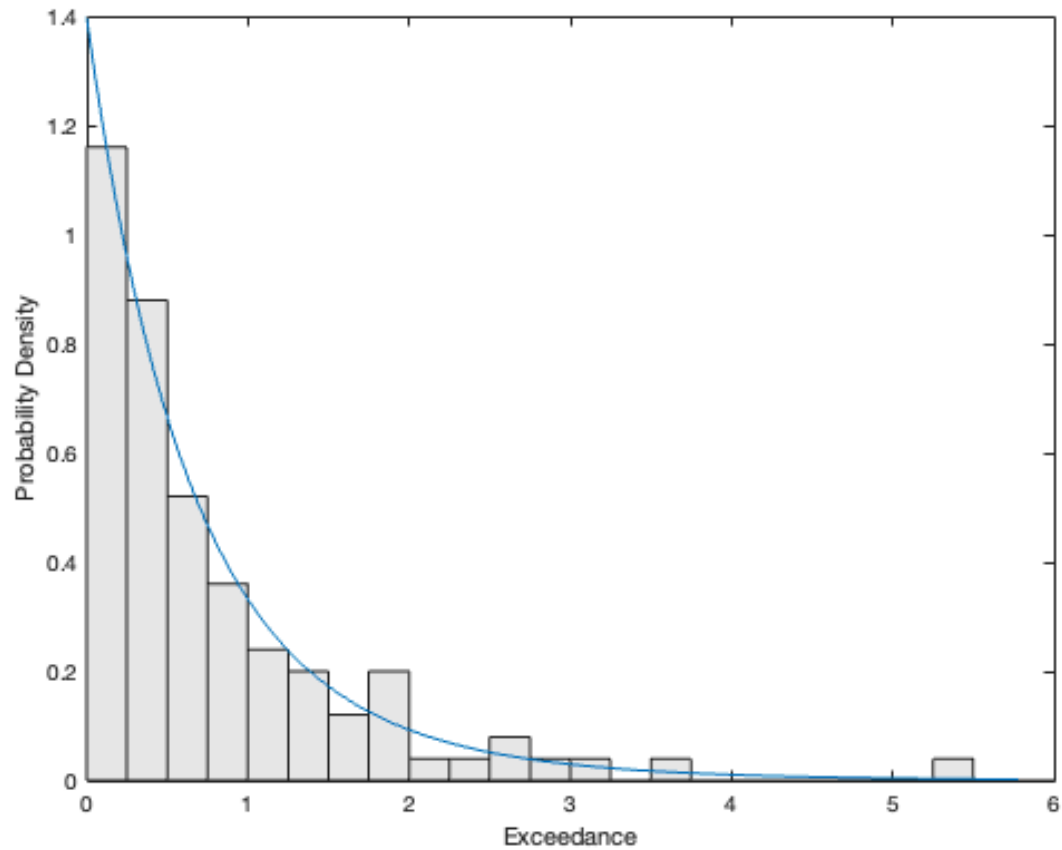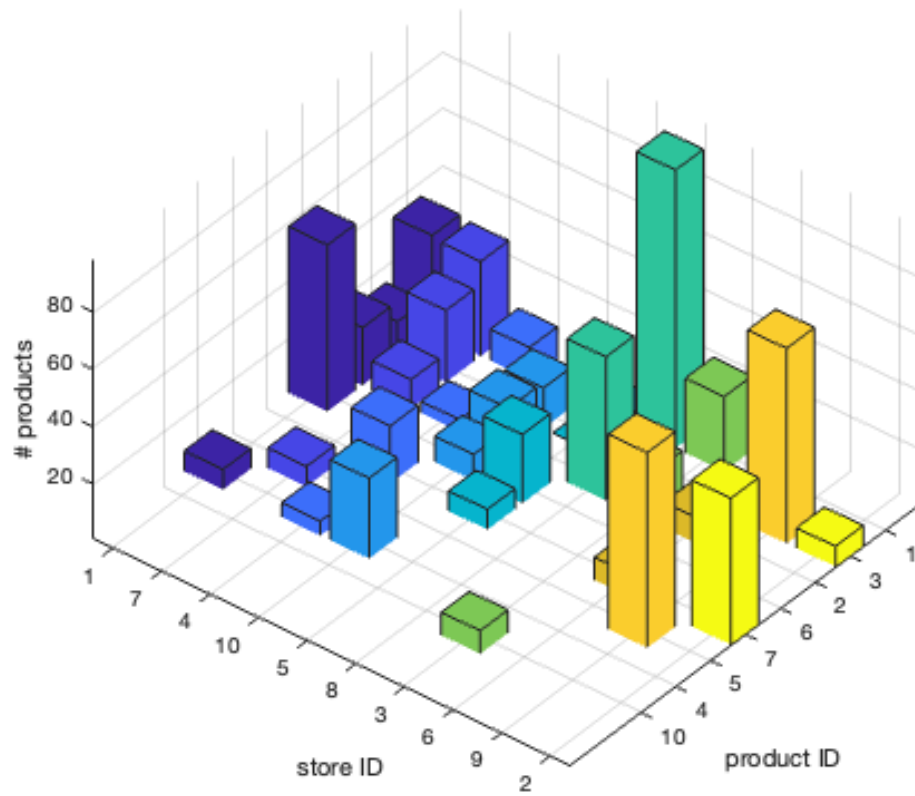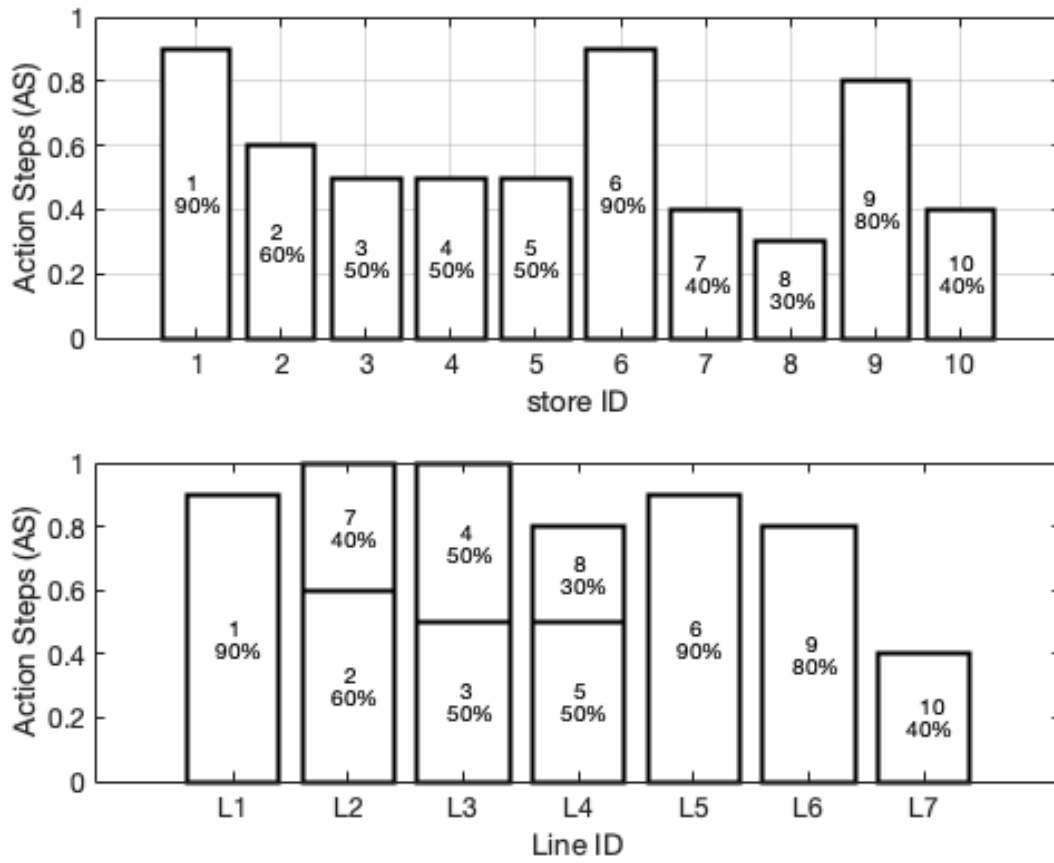
MATLAB programming course
for beginners, supported by
Wagatsuma Lab@Kyutech

| 4 | 8 | 0 | 6 | 29 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 |

Elapsed time is 0.015550 seconds.

barS =

  1×2 Bar array:

    Bar   Bar

MATLAB programming course
for beginners, supported by
Wagatsuma Lab@Kyutech

MATLAB programming course
for beginners, supported by
Wagatsuma Lab@Kyutech

Published with MATLAB® R2022a