TAPASIN.m

Calls im2curv.m

Script

A = imread('AAL2 test.gif');

image(A)

y = im2curv(A(16:268,:), 1, 1);

x = 1:length(y);

%%

minRange=[1 50;1 100;1 170];

n = size(minRange,1);

xm = zeros(1,n);

for k=1:n

[~, xm(k)]=min(y(minRange(k,1):minRange(k,2)));

end

xm = [x(1) xm x(end)];

z = y;

for k=2:n+2

L=xm(k-1):xm(k);

g = (y(xm(k))-y(xm(k-1)))/(L(end)-L(1));

z(L) = y(xm(k-1)) + (L-xm(k-1))\*g;

end

dy = y - z;

[~,fpk] = max(dy(110:125)); fpk = fpk + 110 - 1;

[~,mx1]=min(dy(125:135));

mx1 = mx1 + 125 - 1;

subplot(312)

plot(x,dy,'-',[mx1 mx1],[0 dy(mx1)],'linewidth',1)

grid

S0=sum(dy(xm(2)+1:xm(3)));

S1=sum(dy(xm(3)+1:mx1));

S2=sum(dy(mx1+1:xm(4)));

disp([S0 S1 S2])

text(45,50,'TAPASIN')

text(110,50,'B15')

text(135,50,'A68')

text(45,20,strcat('(',num2str(S0,'%0.1f'),')'))

text(102,20,strcat('(',num2str(S1,'%0.1f'),')'))

text(130,20,strcat('(',num2str(S2,'%0.1f'),')'))

axis([1 length(x) 0 200])

title('Cy5 Densitometry (SNA)')

text(180,150,'WT')

ylabel('Intensity')

%%

y2 = im2curv(A(269:512,:), 1, 1);

x = 1:length(y2);

minRange2=[1 50;50 100;1 200;];

n = size(minRange2,1);

xm2 = zeros(1,n);

%%

for k=1:n

[~, s]=min(y2(minRange2(k,1):minRange2(k,2)));

xm2(k) = s + minRange2(k,1) - 1;

end

xm2 = [x(1) xm2 x(end)];

z2 = y2;

z2(xm2(1):xm(2))=y2(xm2(2));

for k=3:n+2

L=xm2(k-1):xm2(k);

g = (y2(L(end))-y2(L(1)))/(L(end)-L(1));

z2(L) = y2(L(1)) + (L-L(1))\*g;

end

dy2 = y2 - z2;

[~,fpk2] = max(dy2(xm2(3):xm2(4))); fpk2 = fpk2 + xm2(3) - 1;

df12 = fpk - fpk2;

if df12<0

dy2 = [dy2(-df12+1:end) dy2(end)\*ones(1,-df12)];

elseif df12>0

dy2 = [dy2(ones(1,df12)) dy2(1:end-df12)];

end

xm2(2:end-1) = max(1,min(xm2(end),xm2(2:end-1) + df12));

subplot(311)

plot(x,dy2,[mx1 mx1],[0 dy2(mx1)],'linewidth',1)

axis([1 length(x) 0 200])

grid

S0=sum(dy2(xm2(2)+1:xm2(3)));

S1=sum(dy2(xm2(3)+1:mx1));

S2=sum(dy2(mx1+1:xm2(4)));

disp([S0 S1 S2])

text(40,50,'TAPASIN')

text(106,50,'B15')

text(135,50,'A68')

text(40,20,strcat('(',num2str(S0,'%0.1f'),')'))

text(102,20,strcat('(',num2str(S1,'%0.1f'),')'))

text(130,20,strcat('(',num2str(S2,'%0.1f'),')'))

text(180,150,'KO')

ylabel('Intensity')

%%

y3 = im2curv(A(520:end-1,:), 1, 1);

x = 1:length(y3);

minRange3=[1 50;50 100;1 200];

n = size(minRange3,1);

xm3 = zeros(1,n);

%%

for k=1:n

[~, s]=min(y3(minRange3(k,1):minRange3(k,2)));

xm3(k) = s + minRange3(k,1) - 1;

end

xm3 = [x(1) xm3 x(end)];

z3 = y3;

z3(xm3(1):xm3(2))=y3(xm3(2));

for k=3:n+2

L=xm3(k-1):xm3(k);

g = (y3(L(end))-y3(L(1)))/(L(end)-L(1));

z3(L) = y3(L(1)) + (L-L(1))\*g;

end

dy3 = y3 - z3;

[~,fpk3] = max(dy3(xm3(3):xm3(4))); fpk3 = fpk3 + xm3(3) - 1;

df13 = fpk - fpk3;

if df13<0

dy3 = [dy3(-df13+1:end) dy3(end)\*ones(1,-df13)];

elseif df13>0

dy3 = [dy3(ones(1,df13)) dy3(1:end-df13)];

end

xm3(2:end-1) = max(1,min(xm3(end),xm3(2:end-1) + df13));

subplot(313)

plot(x,dy3,[mx1 mx1],[0,dy3(mx1)],'linewidth',1)

axis([1 length(x) 0 200])

grid

S0=sum(dy3(xm3(2)+1:xm3(3)));

S1=sum(dy3(xm3(3)+1:mx1));

S2=sum(dy3(mx1+1:xm3(4)));

disp([S0 S1 S2])

text(40,50,'TAPASIN')

text(106,50,'B15')

text(135,50,'A68')

text(40,20,strcat('(',num2str(S0,'%0.1f'),')'))

text(102,20,strcat('(',num2str(S1,'%0.1f'),')'))

text(130,20,strcat('(',num2str(S2,'%0.1f'),')'))

text(180,150,'C94A')

ylabel('Intensity')

xlabel('Gel Position')

im2curv.m

function y = im2curv( imdata, n, r0)

%IM2CURV Convert given image file to curves it contains

[r,c] = size(imdata);

dr = r / n;

y = zeros(n, c);

for k = 2:c-1

r1 = r0;

r2 = dr;

for f = 1:n

idx = find(~imdata(r1:r2,k),1);

if ~isempty(idx)

y(f,k) = dr-idx;

end

if ~y(f,k)

y(f,k)=y(f,k-1);

end

r1=r2+1;

r2=dr\*f;

end

end

y=y(:,2:end-1);

end

TAPBPR.m

A = imread('AAL2 test.gif');

image(A)

%%

y = im2curv(A(16:340,:), 1, 1);

x = 1:length(y);

plot(x,y);

grid

%%

% [~,fpk] = max(y(100:120)); fpk = fpk + 100 - 1;

minRange=[30 100;300 400;400 460;460 500];

n = size(minRange,1);

xm = zeros(1,n);

for k=1:n

[~, s]=min(y(minRange(k,1):minRange(k,2)));

xm(k) = s + minRange(k,1) - 1;

end

xm = [x(1) xm x(end)];

z = y;

for k=2:n+2

L=xm(k-1):xm(k);

g = (y(xm(k))-y(xm(k-1)))/(L(end)-L(1));

z(L) = y(xm(k-1)) + (L-xm(k-1))\*g;

end

dy = y - z;

plot(x,dy)

grid

%%

T = sum(dy(xm(2):xm(3)-1));

H = sum(dy(xm(5):xm(6)-1));

%%

y2 = im2curv(A(342:664,:), 1, 1);

plot(x,y2)

grid

%%

minRange2=[1 100;200 350;415 460;460 500];

n = size(minRange2,1);

xm2 = zeros(1,n);

for k=1:n

[~, s]=min(y2(minRange2(k,1):minRange2(k,2)));

xm2(k) = s + minRange2(k,1) - 1;

end

xm2 = [x(1) xm2 x(end)];

z2 = y2;

z2(xm2(1):xm(2))=y2(xm2(2));

for k=3:n+2

L=xm2(k-1):xm2(k);

g = (y2(L(end))-y2(L(1)))/(L(end)-L(1));

z2(L) = y2(L(1)) + (L-L(1))\*g;

end

dy2 = y2 - z2;

plot(x,dy2)

grid

%%

T2 = sum(dy2(xm2(2):xm2(3)-1));

H2 = sum(dy2(xm2(5):xm2(6)-1));

%%

y3 = im2curv(A(666:end-1,:), 1, 1);

plot(x,y3)

grid

%%

minRange3=[1 100;300 400;420 470;470 500];

n = size(minRange3,1);

xm3 = zeros(1,n);

for k=1:n

[~, s]=min(y3(minRange3(k,1):minRange3(k,2)));

xm3(k) = s + minRange3(k,1) - 1;

end

xm3 = [x(1) xm3 x(end)];

z3 = y3;

z3(xm3(1):xm3(2))=y3(xm3(2));

for k=3:n+2

L=xm3(k-1):xm3(k);

g = (y3(L(end))-y3(L(1)))/(L(end)-L(1));

z3(L) = y3(L(1)) + (L-L(1))\*g;

end

dy3 = y3 - z3;

plot(x,dy3)

grid

%%

T3 = sum(dy3(xm3(2):xm3(3)-1));

H3 = sum(dy3(xm3(5):xm3(6)-1));

%%

subplot(312)

plot(x,dy)

grid

Tstr = ['T = ',num2str(T)];

text(100,-4,Tstr)

Hstr = ['L = ',num2str(H)];

text(500,-4,Hstr)

text(300,250,'WT')

subplot(311)

plot(x,dy2)

grid

T2str = ['T = ',num2str(T2)];

text(100,-4,T2str)

H2str = ['L = ',num2str(H2)];

text(500,-4,H2str)

text(300,250,'KO')

subplot(313)

plot(x,dy3)

grid

T3str = ['T = ',num2str(T3)];

text(100,-4,T3str)

H3str = ['L = ',num2str(H3)];

text(500,-4,H3str)

text(300,250,'C94A')

set(gcf,'Position',[5 46 560 639])