

EE492 Senior Design II - Weekly Report 8

Group Number: May1634	Date: 3/3/16 - 3/10/16
Project Name: Studying cell behaviors in 3D microtissues using a LabChip	
Advisor: Long Que	
Client: Long Que	

The team

Role	Group Member
Group leader	Jonathan Yackoske
Team Webmaster	Yaxiong Zhang
	Chun-Hao Lo
Team Communication Leader	Yuqian Hu
Team Key Concept Holder	Kaiyu Xu

Attendance (meeting date: Mar. 10nd 2016)

Jonathan Yackoske	In person
Chun-Hao Lo	In person
Yaxiong Zhang	In person
Kaiyu Xu	Absent
Yuqian Hu	In person

Accomplishments of past week

Wrap up the 2D code. Prepare for the meeting with advisor

Below is the code we came up for cell tracking so far:

Input file: tif file

```
close all
```

```
clear all
```

```
filename = uigetfile('*.tif');
```

```
info = imfinfo(filename);
```

```
num_images = numel(info);
```

```
bit_depth = info.BitDepth;
```

```
test = 0;
```

```

data={};

radius = 57;

for k = 1:num_images
    X = imread(filename, k);

    if bit_depth == 24
        X = rgb2gray(X);
    end

    [centers, radii] = imfindcircles(X, [40 120], 'Method', 'TwoStage');

    %figure(1), imshow(X), viscircles(centers, radii);

    if not(isempty(centers))
        rect = [centers(1,1)-radii(1) centers(1,2)-radii(1) 2*radii(1)
2*radii(1)];
        X2{1} = imresize(imcrop(X, rect),2.9,'bilinear');
        %figure(2), imshow(X2{1});

        [~, threshold] = edge(X2{1}, 'canny');
        fudgeFactor = 0.9;
        BWs = edge(X2{1}, 'canny', threshold*fudgeFactor);
        %figure(3), imshow(BWs);

        se90 = strel('line',3,90);
        se0 = strel('line',3,0);

        BWsdil = imdilate(BWs, [se90,se0]);
        %figure(4), imshow(BWsdil), title('dilated');

        BWdfill = imfill(BWsdil, 'holes');
        %figure(5), imshow(BWdfill), title('filled');

        BWnobord = imclearborder(BWdfill, 4);
        %figure(6), imshow(BWnobord), title('no border');

        seD = strel('diamond',1);
        BWsmooth = imerode(BWnobord,seD);
        BWsmooth = imerode(BWsmooth,seD);
        %figure(7), imshow(BWsmooth), title('segmented image');

        BW_final = bwareaopen(BWsmooth, 300);

```

```

figure(8), subplot(2,2,1), subimage(X), viscircles(centers,radii);
subplot(2,2,2), subimage(X2{1});
subplot(2,2,3), subimage(BW_final);
stats = regionprops(BW_final, 'Centroid');
data{k} = stats;
else
    data{k} = [];
end
pause(0.25);
end

x_traj = [data{1}(1).Centroid(1)];
y_traj = [data{1}(1).Centroid(2)];

for j = 2:k
    if not isempty(data{j})
        x_traj = [x_traj data{j}(1).Centroid(1)];
    end
    if not isempty(data{j})
        y_traj = [y_traj data{j}(1).Centroid(2)];
    end
end

subplot(2,2,4), plot(x_traj,y_traj,'ro-');

```

Plan for coming week

1. Perfect the method we use for 2D plotting, find a decent way to show our results.
2. Meet with advisor and present what we got.

Pending issues

None

Individual contributions

Jonathan Yatckoske	perfect 2D code
Chun-Hao Lo	website maintenance; work on coding
Yaxiong Zhang	website maintenance; work on coding

Kaiyu Xu	Take down meeting notes
Yuqian Hu	work on weekly report; find coding method

Individual hourly contributions

Name	Week Hours	Cumulative Hours
Jonathan Yatckoske	6	57.5
Chun-Hao Lo	4	50.5
Yaxiong Zhang	4	51
Kaiyu Xu	1	30
Yuqian Hu	3	46.5