



Appendix

MATLAB Source Code

MATLAB Code to read the Light Intensity of Different Parts of Lung

```
function data = read_a_file_BN5207
```

```
A = imread('Patient 22.jpg')
```

```
% To read the light intensity of bottom left lung
```

```
row_lower = 100;
```

```
row_upper = 140;
```

```
column_lower = 60;
```

```
column_upper = 125;
```

```
signal_A = read_fluorescence(A, row_lower, row_upper, column_lower, column_upper);
```

```
% To read the light intensity of top right lung
```

```
row_lower = 60;
```

```
row_upper = 100;
```

```
column_lower = 180;
```

```
column_upper = 240;
```

```
signal_B = read_fluorescence(A, row_lower, row_upper, column_lower, column_upper);
```

```
% To read the light intensity of top left lung
```

```
row_lower = 50;
```

```
row_upper = 80;
```

```
column_lower = 80;
```

```
column_upper = 130;
```

```
signal_C = read_fluorescence(A, row_lower, row_upper, column_lower, column_upper);
```

```
% To read the light intensity of heart
```

```
row_lower = 120;
```

```
row_upper = 160;
```

```
column_lower = 130;
```

```
column_upper = 180;
```

```
signal_D = read_fluorescence(A, row_lower, row_upper, column_lower, column_upper);
```

```
data(1).signal = signal_A;
```

```
data(2).signal = signal_B;
```

```
data(3).signal = signal_C;
```

```
data(4).signal = signal_D;
```

```

data_table = struct2table(data);
writetable(data_table, 'Light intensity reading of different parts of lung P22.xlsx')

end

function signal = read_fluorescence(A, row_lower, row_upper, column_lower, column_upper)

count = 0;
signal = 0;

for i = row_lower:1:row_upper
    for j = column_lower:1:column_upper
        num = A(i,j);
        num_64 = uint64(num);
        count = count + num_64;
    end
end

signal = count;
end

```

Software to Quantify Infected Area

```

function Bacterial_count_BN5207

A = imread('Patient 22.jpg')
k1 = length(A);

image(A)

% To read the bacterial count of bottom left lung
row_lower = 100;
row_upper = 140;
column_lower = 60;
column_upper = 125;
signal_A = read_fluorescence_level(A, row_lower, row_upper, column_lower, column_upper);

% To read the bacterial count of top right lung
row_lower = 60;
row_upper = 100;
column_lower = 180;
column_upper = 240;

```

```
signal_B = read_fluorescence_level(A, row_lower, row_upper, column_lower, column_upper);

% To read the bacterial count of top left lung
row_lower = 50;
row_upper = 80;
column_lower = 80;
column_upper = 130;
signal_C = read_fluorescence_level(A, row_lower, row_upper, column_lower, column_upper);

% To read the light intensity of heart
row_lower = 120;
row_upper = 160;
column_lower = 130;
column_upper = 180;
signal_D = read_fluorescence_level(A, row_lower, row_upper, column_lower, column_upper);

% To generate data variable
signalA_table = struct2table(signal_A);
signalB_table = struct2table(signal_B);
signalC_table = struct2table(signal_C);
signalD_table = struct2table(signal_D);

writetable(signalA_table, 'Bacterial count of bottom left lung P22.xlsx')
writetable(signalB_table, 'Bacterial count of top right lung P22.xlsx')
writetable(signalC_table, 'Bacterial count of top left lung P22.xlsx')

end

function signal_count = read_fluorescence_level(A, row_lower, row_upper, column_lower, column_upper)

bacterial_count = 0;
pixel_count = 0;

for i = row_lower:1:row_upper
    for j = column_lower:1:column_upper
        num = A(i,j);
        num_64 = uint64(num);

        if num_64 > 150
```

```

    bacterial_count = bacterial_count + 1;
end

    pixel_count = pixel_count + 1;

end

end

    signal_count(1).value = bacterial_count;
    signal_count(2).value = pixel_count;

end

```

Histogram Analysis of Different Parts of the Lung

```
function Fluorescence_distribution_BN5207
```

```

A = imread('Patient 2.jpg')
k1 = length(A);

```

```
image(A)
```

```
% To read the light intensity of bottom left lung
```

```

row_lower = 100;
row_upper = 140;
column_lower = 60;
column_upper = 125;
signal_A = read_fluorescence_dist(A, row_lower, row_upper, column_lower, column_upper);

```

```
% To read the light intensity of top right lung
```

```

row_lower = 60;
row_upper = 100;
column_lower = 180;
column_upper = 240;
signal_B = read_fluorescence_dist(A, row_lower, row_upper, column_lower, column_upper);

```

```
% To read the light intensity of top left lung
```

```

row_lower = 50;
row_upper = 80;
column_lower = 80;
column_upper = 130;

```

```
signal_C = read_fluorescence_dist(A, row_lower, row_upper, column_lower, column_upper);

% To read the light intensity of heart
row_lower = 120;
row_upper = 160;
column_lower = 130;
column_upper = 180;
signal_D = read_fluorescence_dist(A, row_lower, row_upper, column_lower, column_upper);

% To generate data variable
signalA_table = struct2table(signal_A);
signalB_table = struct2table(signal_B);
signalC_table = struct2table(signal_C);
signalD_table = struct2table(signal_D);

writetable(signalA_table, 'Light intensity dist of bottom left lung P2.xlsx')
writetable(signalB_table, 'Light intensity dist of top right lung P2.xlsx')
writetable(signalC_table, 'Light intensity dist of top left lung P2.xlsx')
writetable(signalD_table, 'Light intensity dist of heart P2.xlsx')

end
```