

Combining_H07_June20

Hainan Xu

20/06/2022

The files 42 image samples of “H07-0500_79205589_179_MBP” and 42 ROI(return of information) tables.
Here we convert the local coordinate to a global coordinate.

```
library(dplyr)
library(readr)
library(tidyverse)

#first row
df1<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._01_analysis_results.csv")%>%se

#x axis + 500
df2<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._02_analysis_results.csv")%>%se
#x axis + 1000
df3<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._03_analysis_results.csv")%>%se

#second row
df4<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._04_analysis_results.csv")%>%se
#x axis + 500
df5<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._05_analysis_results.csv")%>%se
#x axis + 1000
df6<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._06_analysis_results.csv")%>%se

#third row
df7<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._07_analysis_results.csv")%>%se
#x axis + 500
df8<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._08_analysis_results.csv")%>%se
#x axis + 1000
df9<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._09_analysis_results.csv")%>%se

#fourth row
df10<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._10_analysis_results.csv")%>%se
#x axis + 500
df11<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._11_analysis_results.csv")%>%se
#x axis + 1000
df12<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._12_analysis_results.csv")%>%se

#fifth row
df13<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._13_analysis_results.csv")%>%se
#x axis + 500
df14<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._14_analysis_results.csv")%>%se
#x axis + 1000
```

```
df15<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._15_analysis_results.csv")%>%s

#sixth row
df16<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._16_analysis_results.csv")%>%s
dim(df1)
```

```
## [1] 36 3
```

```
#x axis + 500
df17<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._17_analysis_results.csv")%>%s
#x axis + 1000
df18<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._18_analysis_results.csv")%>%s

#seventh row
df19<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._19_analysis_results.csv")%>%s
dim(df1)
```

```
## [1] 36 3
```

```
#x axis + 500
df20<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._20_analysis_results.csv")%>%s
#x axis + 1000
df21<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._21_analysis_results.csv")%>%s

#eighth row
df22<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._22_analysis_results.csv")%>%s
#x axis + 500
df23<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._23_analysis_results.csv")%>%s
#x axis + 1000
df24<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._24_analysis_results.csv")%>%s

#ninth row
df25<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._25_analysis_results.csv")%>%s
#x axis + 500
df26<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._26_analysis_results.csv")%>%s
#x axis + 1000
df27<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._27_analysis_results.csv")%>%s

#tenth row
df28<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._28_analysis_results.csv")%>%s
#x axis + 500
df29<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._29_analysis_results.csv")%>%s
#x axis + 1000
df30<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._30_analysis_results.csv")%>%s

#row 11
df31<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._31_analysis_results.csv")%>%s
#x axis + 500
df32<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._32_analysis_results.csv")%>%s
#x axis + 1000
df33<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._33_analysis_results.csv")%>%s
```

```

#row 12
df34<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._34_analysis_results.csv")%>%select(
#x axis + 500
df35<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._35_analysis_results.csv")%>%select(
#x axis + 1000
df36<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._36_analysis_results.csv")%>%select(

#row 13
df37<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._37_analysis_results.csv")%>%select(
#x axis + 500
df38<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._38_analysis_results.csv")%>%select(
#x axis + 1000
df39<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._39_analysis_results.csv")%>%select(

#row 14
df40<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._40_analysis_results.csv")%>%select(
#x axis + 500
df41<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._41_analysis_results.csv")%>%select(
#x axis + 1000
df42<-read_csv("data/H07-0500_79205589_179_MBP/H07-0500_79205589_179_MBP._42_analysis_results.csv")%>%select(

```

```

# there are 3604 points in total, 3604/36 \approx 100

```

```

df_full=rbind(df1,df2,df3,
              df4,df5,df6,
              df7,df8,df9,
              df10,df11,df12,
              df13,df14,df15,
              df16,df17,df18,
              df19,df20,df21,
              df22,df23,df24,
              df25,df26,df27,
              df28,df29,df30,
              df31,df32,df33,
              df34,df35,df36,
              df37,df38,df39,
              df40,df41,df42
            )

```

```

dim(df_full)

```

```

## [1] 3604    3

```

```

df_upper=rbind(df1,df2,df3,
               df4,df5,df6,
               df7,df8,df9,
               df10,df11,df12,
               df13,df14,df15,
               df16,df17,df18,
               df19,df20,df21)

```

```

dim(df_upper)

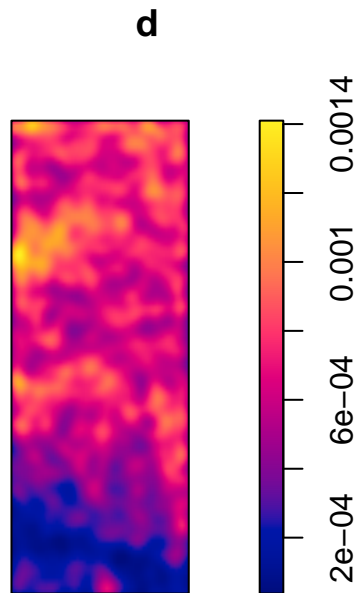
```

```

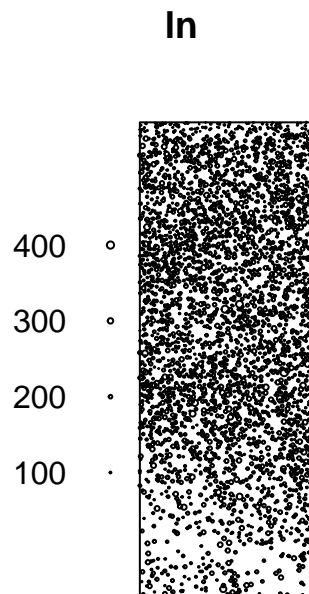
## [1] 1491    3

```

```
library("spatstat")
ln = with(df_full,
  ppp(x = com_x, y = com_y, marks = pixel_area, xrange = range(com_x), yrange = range(com_y)))
d = density(subset(ln), edge=TRUE, diggle=TRUE, sigma=60)
plot(d)
```



```
plot(ln)
```



```
ln_upper = with(df_upper,
  ppp(x = com_x, y = com_y, marks = pixel_area, xrange = range(com_x), yrange = range(com_y)))
```

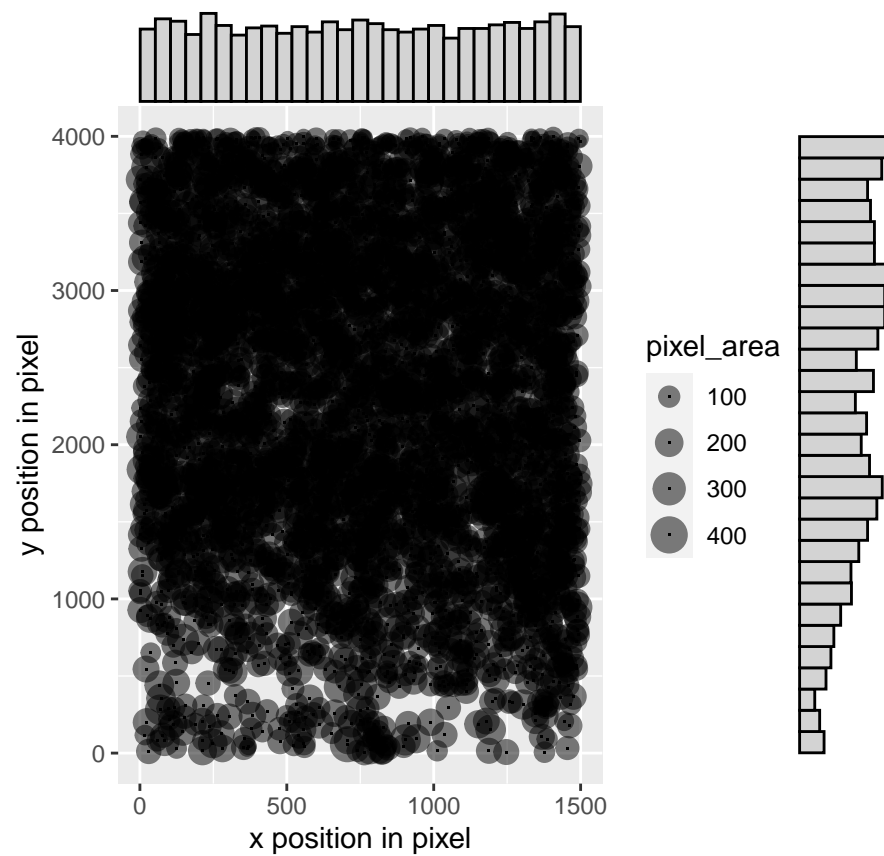
```
#marginal distribution
```

```
library(ggExtra)
```

```
a<-ggplot(df_full,
```

```
  aes( com_x, com_y,size=pixel_area))+ geom_point(shape = ".")+xlab("x position in pixel")+ylab("y position in pixel")
```

```
ggMarginal(a,type="histogram",fill = "lightgrey")
```



It seems that there are some variation within different layers. For the whole image, it is definitely not poisson process. However, the MBP cells in upper part may be a completely random process.

```
#quadratcount
library(spatstat)
qq=quadratcount(ln,nx=3,ny=12)
plot(qq)
```

qq

140	130	137
102	117	133
141	143	111
172	126	120
110	100	116
109	94	104
133	134	99
112	112	126
73	88	100
46	59	87
19	39	61
39	45	27

```
quadrat.test(qq)
```

```
##
## Chi-squared test of CSR using quadrat counts
##
## data:
## X2 = 483.24, df = 35, p-value < 2.2e-16
## alternative hypothesis: two.sided
##
## Quadrats: 3 by 12 grid of tiles
```

```
qq_u=quadratcount(ln_upper,nx=1,ny=6)
plot(qq_u)
```

qq_u

363
380
292
212
131
113

```
quadrat.test(ln_upper)
```

```
##  
## Chi-squared test of CSR using quadrat counts  
##  
## data: ln_upper  
## X2 = 319.08, df = 24, p-value < 2.2e-16  
## alternative hypothesis: two.sided  
##  
## Quadrats: 5 by 5 grid of tiles
```

```
quadrat.test(qq_u)
```

```
##  
## Chi-squared test of CSR using quadrat counts  
##  
## data:  
## X2 = 264.76, df = 5, p-value < 2.2e-16  
## alternative hypothesis: two.sided  
##  
## Quadrats: 1 by 6 grid of tiles
```

```
qq_u=quadratcount(ln_upper,nx=3,ny=1)  
plot(qq_u)
```


qq_u

448	506	537
-----	-----	-----

```
quadrat.test(ln_upper)
```

```
##  
## Chi-squared test of CSR using quadrat counts  
##  
## data: ln_upper  
## X2 = 319.08, df = 24, p-value < 2.2e-16  
## alternative hypothesis: two.sided  
##  
## Quadrats: 5 by 5 grid of tiles
```

```
quadrat.test(qq_u)
```

```
##  
## Chi-squared test of CSR using quadrat counts  
##  
## data:  
## X2 = 8.2133, df = 2, p-value = 0.03293  
## alternative hypothesis: two.sided  
##  
## Quadrats: 3 by 1 grid of tiles
```