

Turtle Ant Video Data Analysis

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Install/library in Packages and Load Data from GDrive

```
setwd('../turtleAnt_dataAnalysis/')
library(ggplot2)
library(gsheet)
library(reshape2)
urls=c(
  # 'https://docs.google.com/spreadsheets/d/10CKoUgQ_A-do18Uc_ulIzoQ_P22nb8lim9wBlwROR4c/edit#gid=184902',
  'https://docs.google.com/spreadsheets/d/10CKoUgQ_A-do18Uc_ulIzoQ_P22nb8lim9wBlwROR4c/edit#gid=0',
  'https://docs.google.com/spreadsheets/d/10CKoUgQ_A-do18Uc_ulIzoQ_P22nb8lim9wBlwROR4c/edit#gid=4338196',
  'https://docs.google.com/spreadsheets/d/10CKoUgQ_A-do18Uc_ulIzoQ_P22nb8lim9wBlwROR4c/edit#gid=1138436'

)

colData=data.frame()
colonies=c('V1','V2','V3')
for(i in 1:length(urls)){
  coli=read.csv(text=gsheet2text(urls[i], format='csv'))[-1,1:14]
  coli$colony=colonies[i]
  print(names(coli))
  colData=rbind(colData,coli)
}
```

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```
## [1] "Name"          "Date"          "VideoStart"
## [4] "VideoTime.Start" "Time"         "Box"
## [7] "Nest"          "Enter.Box"     "Exit.Box"
## [10] "Enter.Nest"    "Exit.Nest"     "Looking.in.Nest"
## [13] "Brood.Enter.Nest" "Brood.Exit.Nest" "colony"
```

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## [13] "Brood.Enter.Nest" "Brood.Exit.Nest" "colony"
```

Clean Up and Add Time Data

```
colData=na.omit(colData)
colData$Posix=as.POSIXct(colData$Time , format = "%I:%M:%S")
colData$Enter.Box=as.numeric(as.character(colData$Enter.Box))
colData$Box=as.factor(colData$Box)
colData$colony=as.factor(colData$colony)
colData=na.omit(colData)
summary(colData)
```

```
##      Name      Date      VideoStart VideoTime.Start      Time
## Joanna :100  7/11/17:99  8:00:00:72  0:00:00: 42  8:10:00: 36
## Matthew: 82  7/7/17 :60  8:16:21:38  0:10:00: 30  8:30:00: 30
## Anthony: 72  7/10/17:48  8:16:19:36  0:20:00: 18  8:40:00: 30
## John   : 42  7/12/17:41  8:03:56:35  0:03:39: 18  9:00:00: 30
## Rajan  :  6  7/13/17:37  8:31:44:35  0:13:39: 18  9:10:00: 30
## Matt   :  6  7/14/17:23  8:31:46:33  0:30:00: 12  9:20:00: 30
## (Other):  6  (Other):  6  (Other):65  (Other):176  (Other):128
##      Box      Nest      Enter.Box      Exit.Box
## 1      : 29  None   :159  Min.    : 0.00  Min.    : 0.00
## 2      : 29  R1     : 29  1st Qu.: 2.25  1st Qu.: 2.00
## 3      : 29  R2     : 29  Median : 8.00  Median : 7.00
## 4      : 29  R3     : 28  Mean    :10.99  Mean    :10.33
## 5      : 29  D1     : 24  3rd Qu.:16.00  3rd Qu.:15.00
## 6      : 28  D2     : 23  Max.    :63.00  Max.    :56.00
## (Other):141  (Other): 22
##      Enter.Nest      Exit.Nest      Looking.in.Nest      Brood.Enter.Nest
## Min.    : 0.0000  Min.    :0.0000  Min.    :0.0000  Min.    :0
## 1st Qu.: 0.0000  1st Qu.:0.0000  1st Qu.:0.0000  1st Qu.:0
## Median : 0.0000  Median :0.0000  Median :0.0000  Median :0
## Mean    : 0.7484  Mean    :0.5382  Mean    :0.5669  Mean    :0
## 3rd Qu.: 0.0000  3rd Qu.:0.0000  3rd Qu.:0.0000  3rd Qu.:0
## Max.    :12.0000  Max.    :9.0000  Max.    :8.0000  Max.    :0
##
##      Brood.Exit.Nest colony      Posix
## Min.    :0      V1: 65  Min.    :2017-07-20 08:00:00
## 1st Qu.:0      V2:130  1st Qu.:2017-07-20 08:20:00
## Median :0      V3:119  Median :2017-07-20 08:40:00
## Mean    :0      Mean    :2017-07-20 08:44:48
## 3rd Qu.:0      3rd Qu.:2017-07-20 09:10:00
## Max.    :0      Max.    :2017-07-20 09:50:00
##
```

```
colData$Enter.Nest=as.numeric(as.character(colData$Enter.Nest))
colData$Exit.Nest=as.numeric(as.character(colData$Exit.Nest))
```

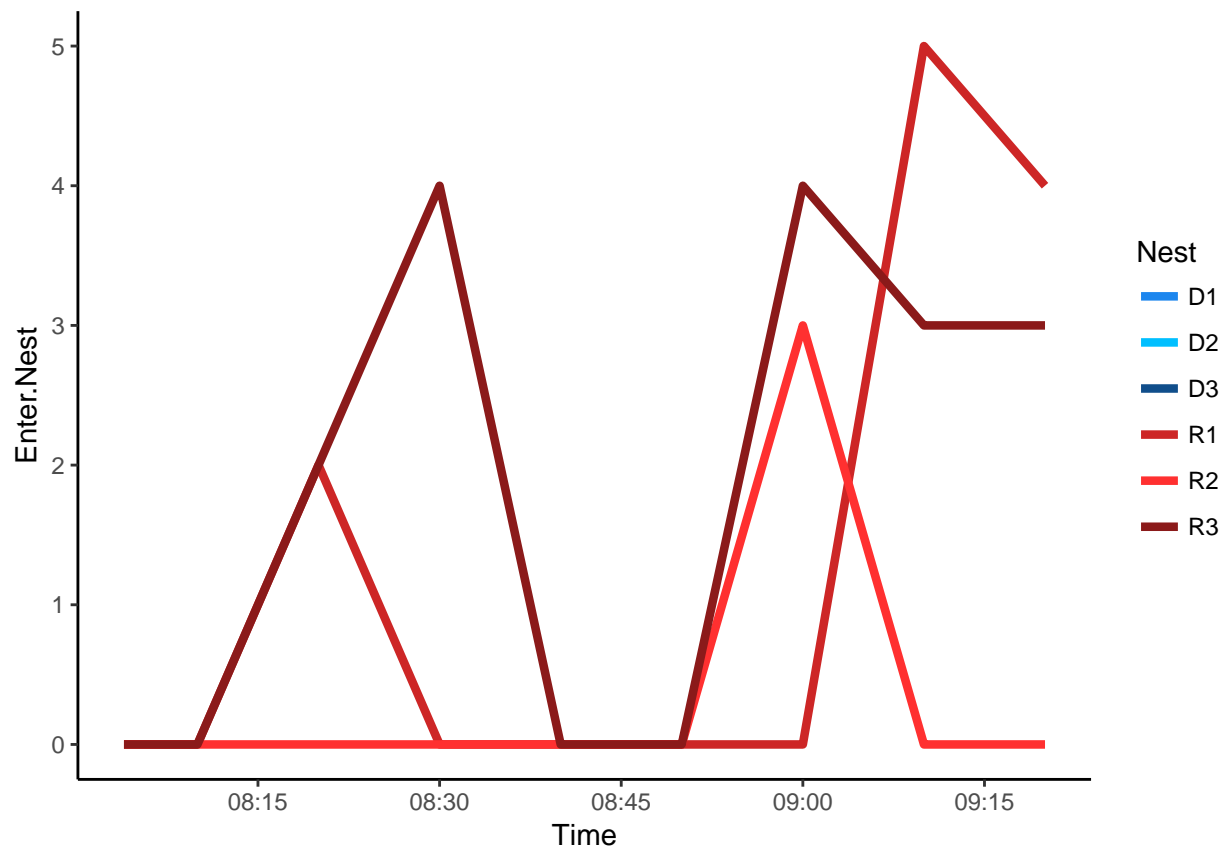
Plot # of Entries into Nest Over Time for Each Colony

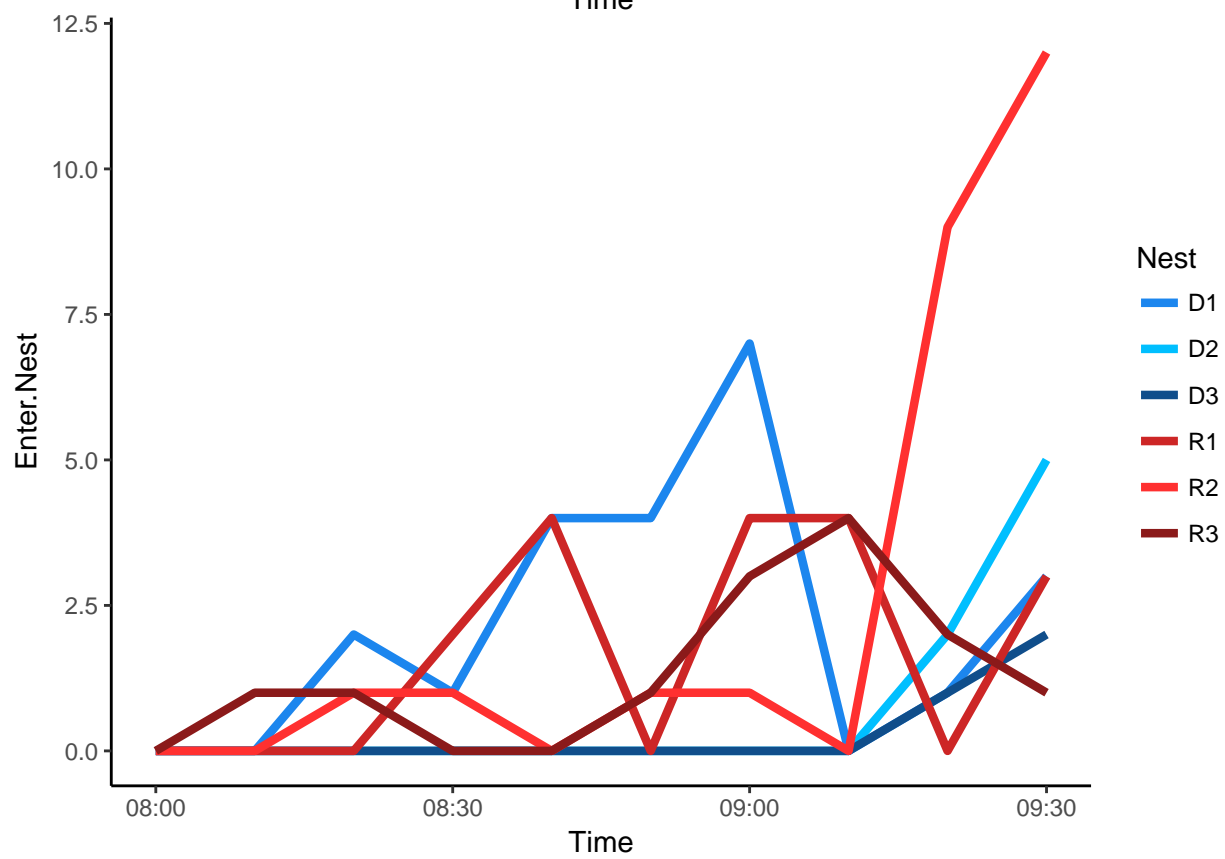
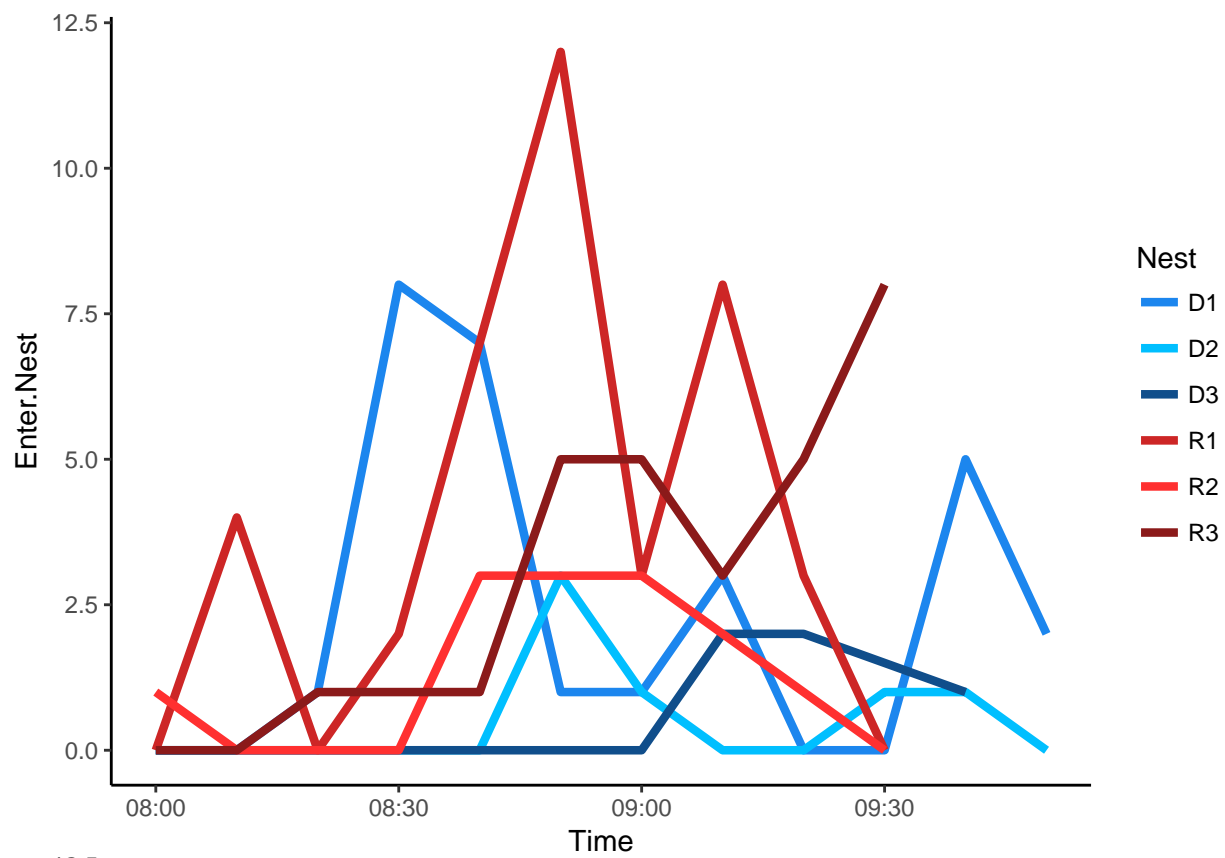
```
#system('mkdir 7-17-17')
for(i in colonies){
  #png(paste0('7-17-17/enterNest_col',i,'png'))
  p=ggplot(colData[c(colData$colony==i&colData$Nest!=colData$Nest[1]),], aes(y=Enter.Nest, x=Posix, fill=
```

```

#geom_bar(stat='identity')+
geom_line(size=1.5)+
labs(x='Time')+
scale_colour_manual(values=c( 'dodgerblue2','deepskyblue1','dodgerblue4', 'firebrick3', 'firebrick1',
theme(axis.title=element_text(size=14), legend.title=element_text(size=14),legend.text=element_text(s
theme_classic()
plot(p)
#graphics.off()
}

```





Add a Column for Which Section (R or D)

```
r=c(2,3,5,6)
d=c(7,8,9,10,11,12)

for(i in 1:nrow(colData)){
  if(colData$Box[i]%in%r){
    colData$Section[i]='R'
  }
  else if(colData$Box[i]%in%d){
    colData$Section[i]='D'
  }
}
colData_sec=colData[!is.na(colData$Section),]

#Make new, shortened dataframe
colData_s=colData_sec[,c('Posix','Section','Enter.Box','Exit.Box','colony')]
#colData_s=colData_s[colData_s$Box!=colData_s$Box[1],]
colData_s$Enter.Box=as.numeric(as.character(colData_s$Enter.Box))
colData_s$Exit.Box=as.numeric(as.character(colData_s$Exit.Box))
colData_s$colony=as.factor(colData_s$colony)

colData_split=split(colData_s, colData_s$colony)
```

Add up the total number of entries and exits every 10 minutes

```
cols=c('V1','V2','V3')
fullSum=data.frame()
for(i in 1:length(colData_split)){
  sumdf=cbind(melt(acast(colData_split[[i]][,c(1,2,3)], Section~Posix, sum)),
              melt(acast(colData_split[[i]][,c(1,2,4)], Section~Posix, sum))$value)
  sumdf$Colony=cols[i]
  names(sumdf)=c('Section','Time','Exit','Enter','Colony')
  fullSum=rbind(fullSum,sumdf)
}
```

Using Enter.Box as value column: use value.var to override.

Using Exit.Box as value column: use value.var to override.

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```
fullSum=melt(fullSum, id.vars=c('Section','Colony','Time'))
```

```
fullSum$Time=as.POSIXct(fullSum$Time)
```

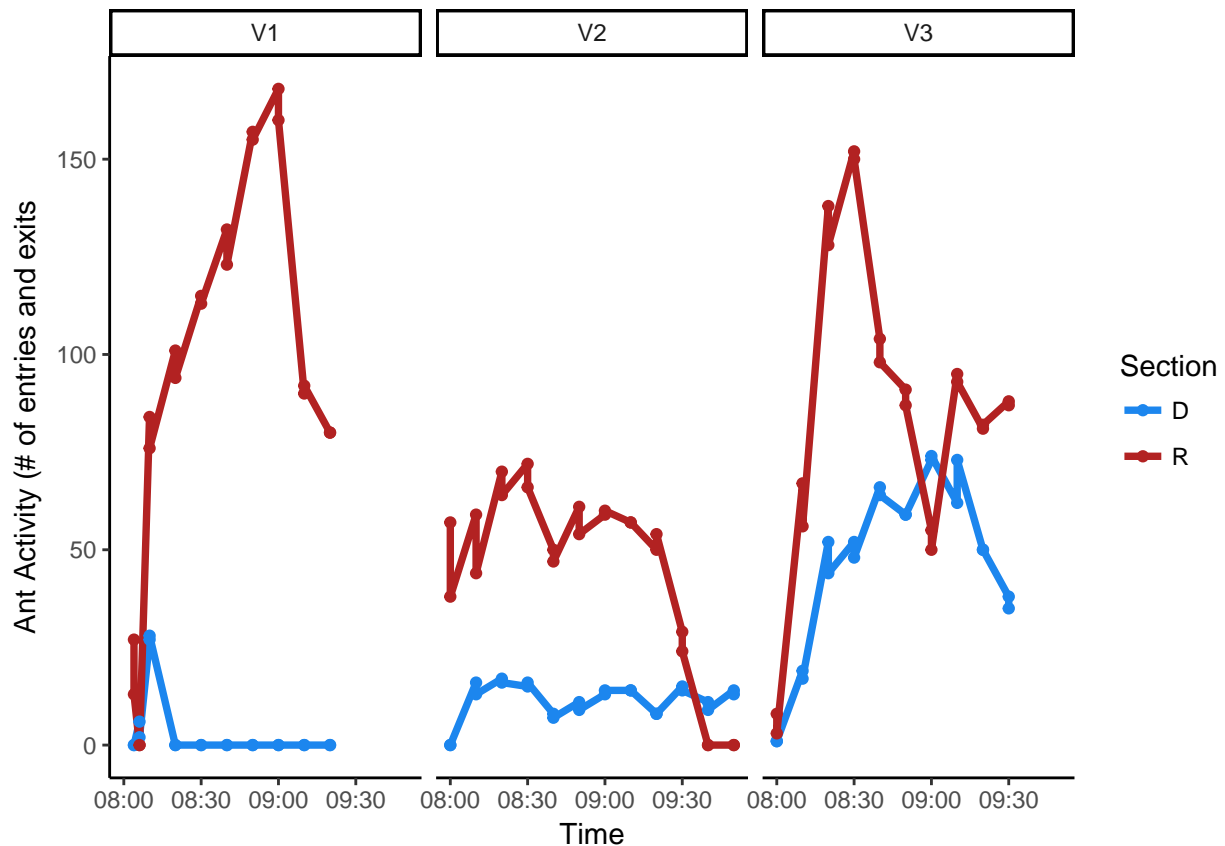
```
head(fullSum)
```

```
##   Section Colony      Time variable value
## 1      D      V1 2017-07-20 08:03:56   Exit      0
## 2      R      V1 2017-07-20 08:03:56   Exit     27
## 3      D      V1 2017-07-20 08:06:05   Exit      6
```

```
## 4      R      V1 2017-07-20 08:06:05      Exit      0
## 5      D      V1 2017-07-20 08:10:00      Exit      27
## 6      R      V1 2017-07-20 08:10:00      Exit      84
```

Plot the results

```
#png('finalPoster/activity_ct.png')
ggplot(fullSum,aes(y=value, x=Time, color=Section, group=Section))+
  geom_line(size=1.3)+
  geom_point()+
  facet_wrap(~Colony)+
  scale_color_manual(values=c('dodgerblue2','firebrick'),name=c('Section'))+
  theme(title=element_text(size=14, face='bold'),axis.title=element_text(size=13),
        axis.text=element_text(size=12, angle=45, hjust=1),
        legend.title=element_text(size=13),legend.text=element_text(size=12))+
  labs(y='Ant Activity (# of entries and exits)')+
  theme_classic()
```



```
#graphics.off()
##
```

Plot Movment from O to R and O to D

```
colData=data.frame()
colonies=c(4,5,6)
for(i in 1:length(urls)){
  coli=read.csv(text=gsheet2text(urls[i], format='csv'))[-1,c(2,5,16:17)]
  coli$colony=colonies[i]
  print(names(coli))
  colData=rbind(colData,coli)
}

## No encoding supplied: defaulting to UTF-8.
## [1] "Date"          "Time"          "From.O.to.R"  "From.O.to.D"  "colony"
## No encoding supplied: defaulting to UTF-8.
## [1] "Date"          "Time"          "From.O.to.R"  "From.O.to.D"  "colony"
## No encoding supplied: defaulting to UTF-8.
## [1] "Date"          "Time"          "From.O.to.R"  "From.O.to.D"  "colony"

colDataOR=na.omit(colData[,-3])
colDataOD=na.omit(colData[,-4])

colData$Posix=as.POSIXct(colData$Time , format = "%I:%M:%S")

#colData$Enter.Box=as.numeric(as.character(colData$Enter.Box))
#colData$Box=as.factor(colData$Box)
colData$colony=as.factor(colData$colony)

dts=na.omit(melt(colData[,-c(1:2)], id.vars=c("Posix",'colony'))))

ggplot(dts, aes(x=Posix,y=value, color=as.factor(variable)))+
  geom_point()+
  geom_line(size=1.3)+
  facet_wrap(~colony)+
  scale_color_manual(values=c('dodgerblue2','firebrick'),name=c('Section'))+
  theme(title=element_text(size=14, face='bold'),axis.title=element_text(size=13), legend.title=element_text(size=13),
  theme_classic()
```

