BMEG 372 - Project Group Work

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11/12/2020

Layperson & ODL Kit Distribution Data (continuous heatmap)

Importing Data

```
library(readxl)
#layperson_data <- read_excel("/Users/sam/Documents/Temp School/BMEG 372/Group Work/chopped data/Layper
odl_data <- read_excel("/Users/sam/Documents/Temp School/BMEG 372/Group Work/chopped data/Layperson Nal
library(tidyr)
#layperson_df <- data.frame(coords = layperson_data$Location)
df <- data.frame(coords = odl_data$Location) #change to odl_df
#df <- rbind(layperson_df, odl_df)
df <- separate(data=df, col = coords, into = c("lon", "lat"), sep = "\\,")
df$lon <- as.numeric(df$lon)
df$lat <- as.numeric(df$lat)
```

Modified from https://axelhodler.medium.com/creating-a-heat-map-from-coordinates-using-r-780db4901075

```
library(ggplot2)
library(ggmap)
```

```
## Google's Terms of Service: https://cloud.google.com/maps-platform/terms/.
```

```
## Please cite ggmap if you use it! See citation("ggmap") for details.
```

```
library(RColorBrewer)
map_bounds <- c(left = -95, bottom = 35, right = -80.00, top = 45)
dist_coords.map <- get_stamenmap(map_bounds, zoom = 8, maptype = "toner-lite")
```

```
## 120 tiles needed, this may take a while (try a smaller zoom).
```

```
## Source : http://tile.stamen.com/toner-lite/8/60/92.png
```

```
## Source : http://tile.stamen.com/toner-lite/8/61/92.png
```

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## Source : http://tile.stamen.com/toner-lite/8/62/92.png
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## Source : http://tile.stamen.com/toner-lite/8/67/92.png
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## Source : http://tile.stamen.com/toner-lite/8/68/92.png
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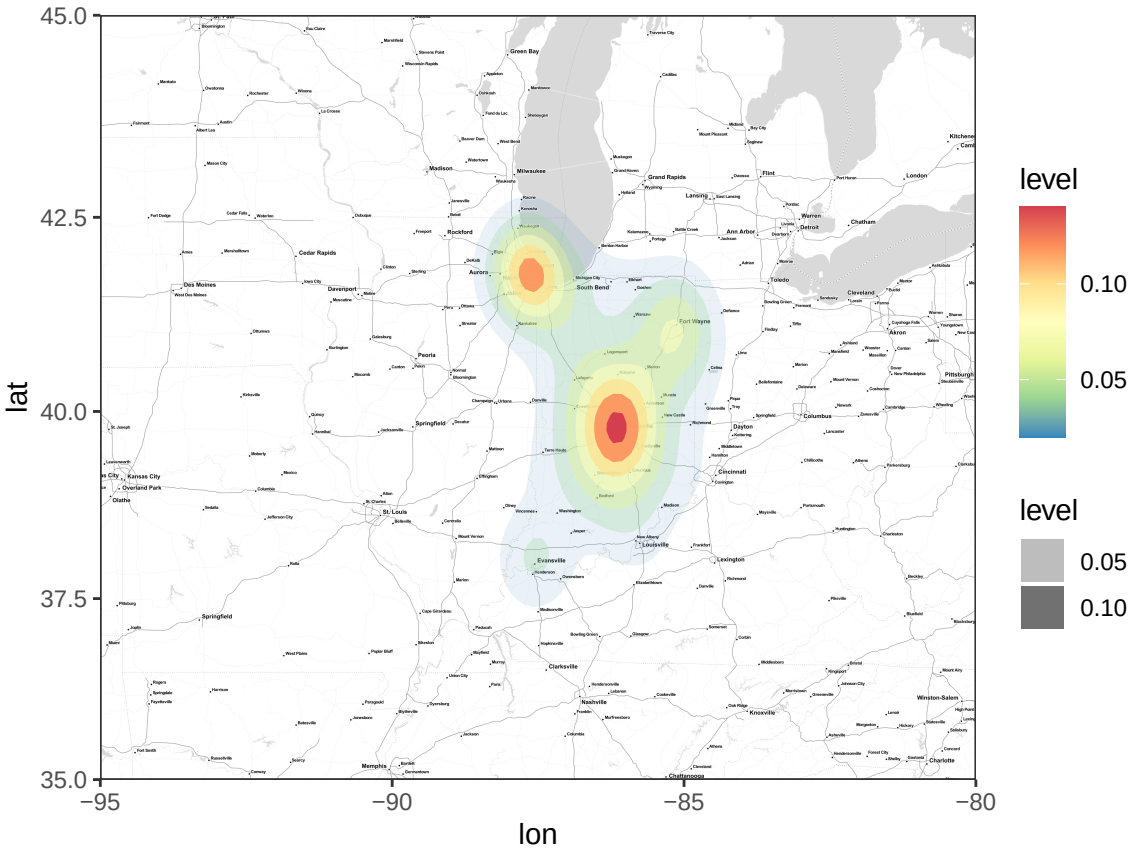
## Source : http://tile.stamen.com/toner-lite/8/70/101.png
## Source : http://tile.stamen.com/toner-lite/8/71/101.png
```

```
dist_coords.map <- ggmap(dist_coords.map, extent="device", legend="none")
dist_coords.map <- dist_coords.map + stat_density2d(data=df, aes(x=lat, y=lon, fill=..level.., alpha=..l
dist_coords.map <- dist_coords.map + scale_fill_gradientn(colours=rev(brewer.pal(7, "Spectral"))) #for
#dist_coords.map <- dist_coords.map + scale_fill_gradientn(colours="green")
dist_coords.map <- dist_coords.map + theme_bw()
plot(dist_coords.map)
```

```
## Warning: Removed 47 rows containing non-finite values (stat_density2d).
```



First Responder and ISDH Naloxone Incident Reports (continuous heatmap)

Importing Data

```
library(readxl)
FR_data <- read_excel("/Users/sam/Documents/Temp School/BMEG 372/Group Work/chopped data/01-Formstack In
library(tidyr)
FR_df <- data.frame(coords = FR_data$Location, count = FR_data$`Number instances naloxone used`)
ISDH_data <- read_excel("/Users/sam/Documents/Temp School/BMEG 372/Group Work/chopped data/01-Formstack
```

```
## New names:
## * `# of Unknown` -> `# of Unknown...21`
## * `# of Other` -> `# of Other...32`
## * `# of Unknown` -> `# of Unknown...33`
## * `# of Other` -> `# of Other...39`
```

```
ISDH_df <- data.frame(coords = ISDH_data$Location, count = ISDH_data$`Number instances naloxone used`)
df <- rbind(FR_df, ISDH_df)
df <- separate(data=df, col = coords, into = c("lon", "lat"), sep = "\\,")
df$lon <- as.numeric(as.character(df$lon))
df$lat <- as.numeric(as.character(df$lat))
```

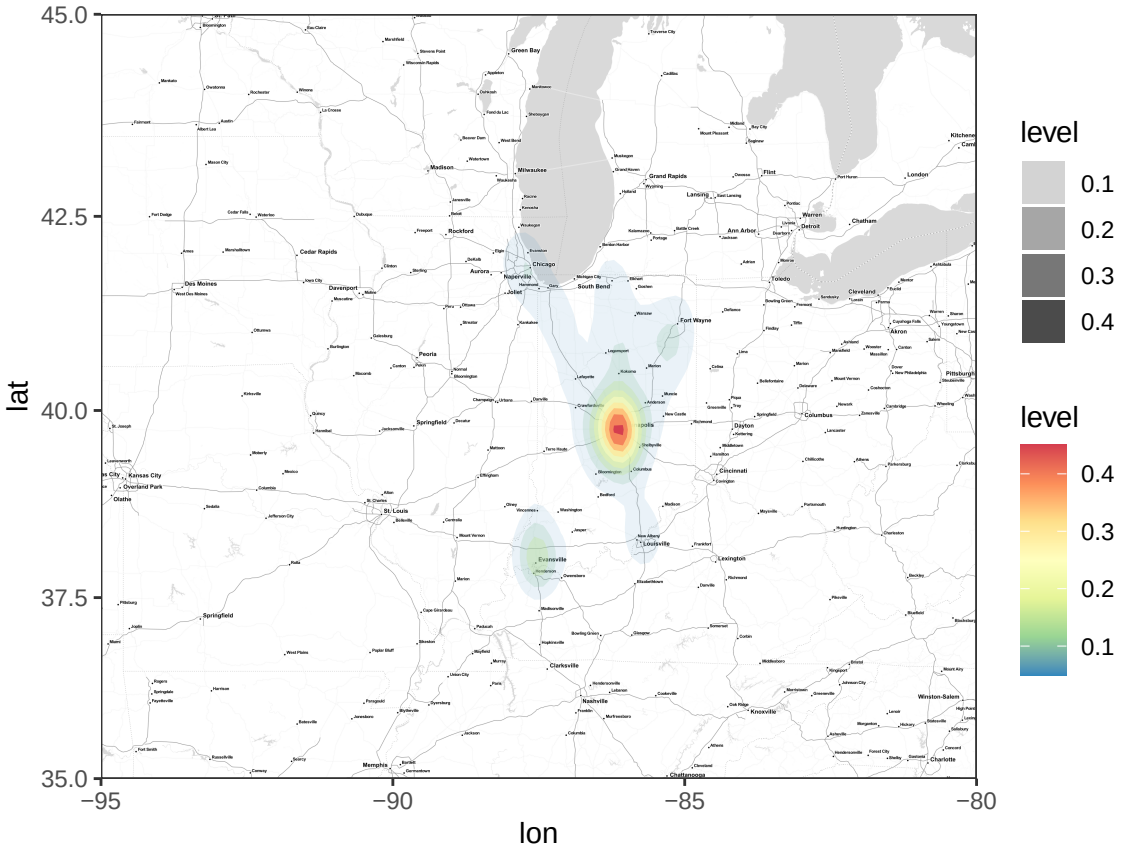
Modified from https://axelhodler.medium.com/creating-a-heat-map-from-coordinates-using-r-780db4901075

```
library(ggplot2)
library(ggmap)
library(RColorBrewer)
map_bounds <- c(left = -95, bottom = 35, right = -80.00, top = 45)
od_coords.map <- get_stamenmap(map_bounds, zoom = 8, maptype = "toner-lite")
```

```
## 120 tiles needed, this may take a while (try a smaller zoom).
```

```
od_coords.map <- ggmap(od_coords.map, extent="device", legend="none")
od_coords.map <- od_coords.map + stat_density2d(data=df, aes(x=lat, y=lon, fill=..level.., alpha=..level
od_coords.map <- od_coords.map + scale_fill_gradientn(colours=rev(brewer.pal(7, "Spectral")))
od_coords.map <- od_coords.map + theme_bw()
plot(od_coords.map)
```

```
## Warning: Removed 198 rows containing non-finite values (stat_density2d).
```



First Responder and ISDH Naloxone Incident Reports (discretized heatmap)

Code modified from http://rstudio-pubs-static.s3.amazonaws.com/140202_529bec3c57004e3da55f3df889b59c62.html

```
library(readxl)
library(dplyr)
```

```
##
## Attaching package: 'dplyr'
## The following objects are masked from 'package:stats':
##
##     filter, lag
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
library(choroplethr)
```

```
## Loading required package: acs
## Loading required package: stringr
## Loading required package: XML
##
```

```
## Attaching package: 'acs'

## The following object is masked from 'package:dplyr':
##
##     combine

## The following object is masked from 'package:base':
##
##     apply
```

```
library(choroplethrMaps)
library(ggplot2)
library(plotly)
```

```
##
## Attaching package: 'plotly'

## The following object is masked from 'package:ggmap':
##
##     wind

## The following object is masked from 'package:ggplot2':
##
##     last_plot

## The following object is masked from 'package:stats':
##
##     filter

## The following object is masked from 'package:graphics':
##
##     layout
```

```
library(plyr)
```

```
## ------------------------------------------------------------------------------

## You have loaded plyr after dplyr - this is likely to cause problems.
## If you need functions from both plyr and dplyr, please load plyr first, then dplyr:
## library(plyr); library(dplyr)

## ------------------------------------------------------------------------------

##
## Attaching package: 'plyr'

## The following objects are masked from 'package:plotly':
##
##     arrange, mutate, rename, summarise

## The following objects are masked from 'package:dplyr':
##
##     arrange, count, desc, failwith, id, mutate, rename, summarise,
##     summarize
```

```
data(county.regions)

FR_data<-read_excel("/Users/sam/Documents/Temp School/BMEG 372/Group Work/chopped data/01-Formstack Inc
FR_data<-FR_data[,c(5,8)]
FR_data$County <- tolower(FR_data$County)
FRregioncodes <- left_join(FR_data, county.regions, by = c("County" = "county.name"))
```

```
FR_df <- data.frame((as.character(FRregioncodes$region)), as.numeric(FRregioncodes$`Number instances nal
colnames(FR_df) <- c("region", "value")

ISDH_data<-read_excel("/Users/sam/Documents/Temp School/BMEG 372/Group Work/chopped data/01-Formstack In
```

```
## New names:
## * `# of Unknown` -> `# of Unknown...21`
## * `# of Other` -> `# of Other...32`
## * `# of Unknown` -> `# of Unknown...33`
## * `# of Other` -> `# of Other...39`
```

```
ISDH_data<-ISDH_data[,c(5,8)]
data(county.regions)
county.regions <- filter(county.regions, state.name == "indiana")
ISDH_data$County <- tolower(ISDH_data$County)
regioncodes <- left_join(ISDH_data, county.regions, by = c("County" = "county.name"))
ISDH_df <- data.frame((as.character(regioncodes$region)), as.numeric(regioncodes$`Number instances nalo
colnames(ISDH_df) <- c("region", "value")

df <- rbind(FR_df, ISDH_df)

colnames(df) <- c("region", "value")
library(plyr)
df <- ddply(df,"region",numcolwise(sum))
df <- data.frame((as.numeric(df$region)), as.numeric(df$value))
colnames(df) <- c("region", "value")
county_map <- county_choropleth(df, title ="Number of incidentsof naloxone usage in Indiana between 2018
```

```
## Warning in super$initialize(map.df, user.df): Your data.frame contains the
## following regions which are not mappable: NA
```

```
## Warning in self$bind(): The following regions were missing and are being set to
## NA: 18115, 18125, 18139, 18009, 18011, 18033, 18113, 18145, 18027, 18171, 18177,
## 18081, 18083, 18107, 18111, 18129, 18147, 18155, 18029, 18039, 18117, 18149,
## 18151, 18181, 18091, 18101, 18007, 18013, 18015, 18045
```

```
county_map
```

Number of incidentsof naloxone usage in Indiana between 2018