Post 1

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Title: More About Visualization: `ggmap` and a bit `gghalt`

Introduction and Motivation

It is my first time to do programming stuff, so R is a little bit challenging to me. I suffer a lot of pain when pushing myself coding, but at the same time, I enjoy the time learning something totally new to me. During the first six weeks, I was attracted to making bunches of pictures, like scatterplot, boxplot histogram and etc. I played around a bit when adjusting arguments, like size, color, limit and etc. Thus, after spending some time on searching online, I decided to explore more deeply into R visualization.

Also, it is my first semester here as a transfer student. Hmm….I have to say that Berkeley campus is much larger than my previous college. To some extent, Berkeley campus is too big for me that I am still using Google Map to find the exact location of a certain building even though the half of semester has passed (Yeah..I know I have a bad sense of directions, but I am sure some of you guys share the same feeling with me). Since I can't live without Google Map, I have the motivation to find something that can relate Google Map with R application. And luckily, I find `ggmap`, probably the most useful R package in the world, which makes my dream come true.

About `ggmap`

`ggmap` is an extremely useful tool that combines spatial data with `ggplot2`. In another word, you can make your own maps or routes on Google Maps, OpenStreetMap, Stamen Maps or CloudMade Maps using `ggplot2`. The output is exactly a screenshot from Google maps with added-on points, lines and etc. It is easy to obtain some conclusion observing the resulting picture.

About `gghalt`

`gghalt` is a package about Extra Coordinate Systems, 'Geoms', Statistical Transformations, Scales and Fonts for `ggplot2`. It is more like an extension. In my post, I will only use `geom_encircle` to circle the five neighbour buildings.

Examples

Since most of my day is on campus, I decided to pick one building to be the center of my maps and five other buildings around it. This semester, I take all classes in Cory Hall, Wheeler Hall, Dwinelle Hall and Valley Life Sciences Building. Usually, I park my car in Lower Hearst Parking Structure. And I spend the most time studying at Moffitt. So, Moffitt would be the center. And by pointing out all the locations above on Google Map and connecting the five points around Moffitt, you guys will know why I would choose Moffitt to be the place to "rest".

Preparation

First, be sure to install packages you needed

```
# install.packages(c("ggmap", "ggalt"))
```

Then, load all the packages needed

```
# load packages
library(ggplot2)
library(ggmap)
library(ggalt)
```

Here is the real stuff

```
# Assign five neighbours to a vector
moffitt_neighbour <- c("Cory Hall",
                       "Wheeler Hall",
                       "Dwinelle Hall",
                       "Valley Life Sciences Bldg",
                       "Cory Hall",
                       "Wheeler Hall",
                       "Dwinelle Hall",
                       "Lower Hearst Parking Structure")

# geocode() gets their longitudes and latitudes and assign them to a vector
places_loc <- geocode(moffitt_neighbour)
```

```
## Information from URL : http://maps.googleapis.com/maps/api/geocode/json?address=Cory%20Hall&sensor=false
```

```
## Information from URL : http://maps.googleapis.com/maps/api/geocode/json?address=Wheeler%20Hall&sensor=false
```

```
## Information from URL : http://maps.googleapis.com/maps/api/geocode/json?address=Dwinelle%20Hall&sensor=false
```

```
## Information from URL : http://maps.googleapis.com/maps/api/geocode/json?address=Valley%20Life%20Sciences%20Bldg
&sensor=false
```

```
## Information from URL : http://maps.googleapis.com/maps/api/geocode/json?address=Cory%20Hall&sensor=false
```

```
## Information from URL : http://maps.googleapis.com/maps/api/geocode/json?address=Wheeler%20Hall&sensor=false
```

```
## Information from URL : http://maps.googleapis.com/maps/api/geocode/json?address=Dwinelle%20Hall&sensor=false
```

```
## Information from URL : http://maps.googleapis.com/maps/api/geocode/json?address=Lower%20Hearst%20Parking%20Stru
cture&sensor=false
```

```
dat <- geocode(c("Moffitt Library", moffitt_neighbour))
```

```
## Information from URL : http://maps.googleapis.com/maps/api/geocode/json?address=Moffitt%20Library&sensor=false
```

```
## Information from URL : http://maps.googleapis.com/maps/api/geocode/json?address=Cory%20Hall&sensor=false
```

```
## .Information from URL : http://maps.googleapis.com/maps/api/geocode/json?address=Wheeler%20Hall&sensor=false
## .Information from URL : http://maps.googleapis.com/maps/api/geocode/json?address=Dwinelle%20Hall&sensor=false
## .Information from URL : http://maps.googleapis.com/maps/api/geocode/json?address=Valley%20Life%20Sciences%20Bld
g&sensor=false
## .Information from URL : http://maps.googleapis.com/maps/api/geocode/json?address=Cory%20Hall&sensor=false
## .Information from URL : http://maps.googleapis.com/maps/api/geocode/json?address=Wheeler%20Hall&sensor=false
## Information from URL : http://maps.googleapis.com/maps/api/geocode/json?address=Dwinelle%20Hall&sensor=false
## Information from URL : http://maps.googleapis.com/maps/api/geocode/json?address=Lower%20Hearst%20Parking%20Stru
cture&sensor=false
```

Example 1: Google Road Map

```
# Get a Google Road Map by using qmap()
road_map <- qmap("Moffitt Library", zoom = 16, source = "google", maptype="roadmap")
```

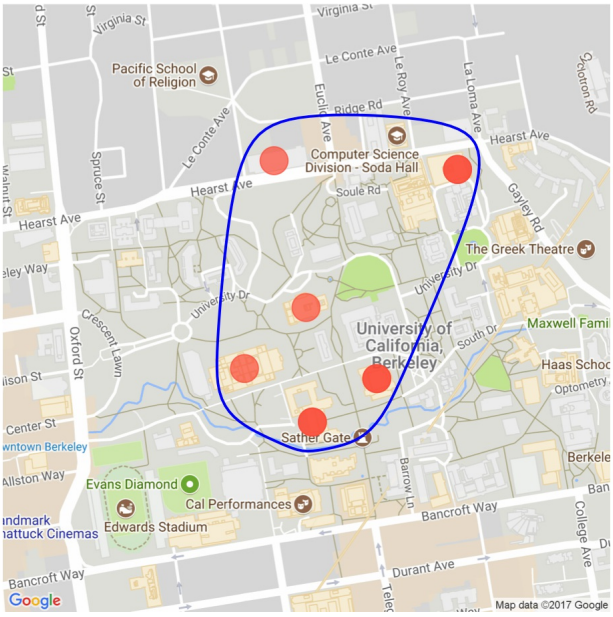
```
## Map from URL : http://maps.googleapis.com/maps/api/staticmap?center=Moffitt+Library&zoom=16&size=640x640&scale=
2&maptype=roadmap&language=en-EN&sensor=false
```

```
## Information from URL : http://maps.googleapis.com/maps/api/geocode/json?address=Moffitt%20Library&sensor=false
```

```
## Warning: `panel.margin` is deprecated. Please use `panel.spacing` property
## instead
```

```
# Plot Google Road Map
road_map + geom_point(aes(x=lon, y=lat),
                      data = dat,
                      alpha = 0.7,
                      size = 7,
                      color = "tomato") +
           ggtitle("Google Road Map")+
           geom_encircle(aes(x=lon, y=lat),data = places_loc, size = 2,color = "blue")
```

Google Road Map



Example 2: Google Hybrid Map

```
# Get a Google Hybrid Map by using qmap()
hybrid_map <- qmap("Moffitt Library", zoom = 16, source = "google", maptype="hybrid")
```

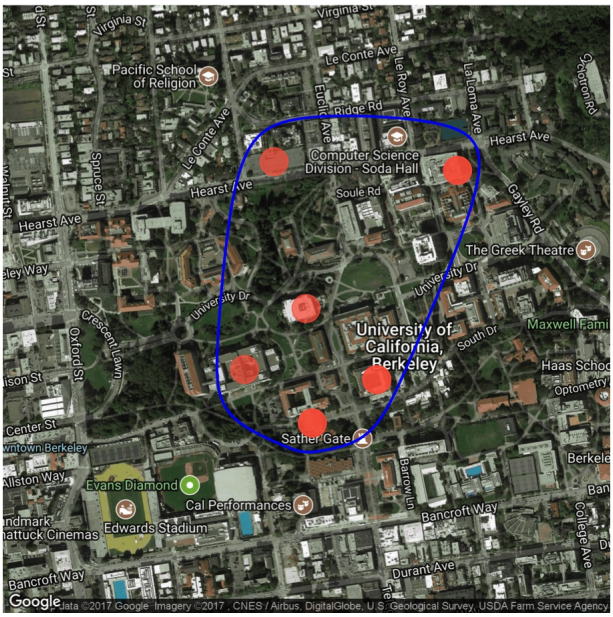
```
## Map from URL : http://maps.googleapis.com/maps/api/staticmap?center=Moffitt+Library&zoom=16&size=640x640&scale=
2&maptype=hybrid&language=en-EN&sensor=false
```

```
## Information from URL : http://maps.googleapis.com/maps/api/geocode/json?address=Moffitt%20Library&sensor=false
```

```
## Warning: `panel.margin` is deprecated. Please use `panel.spacing` property
## instead
```

```
# Plot Google Hybrid Map
hybrid_map + geom_point(aes(x=lon, y=lat),
                                    data = dat,
                                    alpha = 0.7,
                                    size = 7,
                                    color = "tomato")+
             ggtitle("Google Hybrid Map")+
             geom_encircle(aes(x=lon, y=lat),data = places_loc, size = 2, color = "blue")
```

Google Hybrid Map



Conclusion

As you can see in my maps, the distances between the buildings are really long, I have to rush if I have next class in ten minutes. Since Moffitt is in the center, it certainly would be my first choice to stay during break.

Take Home Message

Thank you to everyone who takes time to read my post, does not give up and reach here. Here are some key points you don't want to miss at the end of the post:

- We human are all visual creatures, so R visualization helps us extract data information much more directly than plain code does.
- There are more interesting applicatons in `ggplot2`. If you have time, be sure to have a look. It definitely worths the time.
- Be sure to check classroom locations before you select courses for next semester. Otherwise, you gonna cry.

Reference

1. http://theberry.com/2017/08/28/13-faces-only-people-who-are-terrible-with-directions-will-recognize/
2. https://journal.r-project.org/archive/2013-1/kahle-wickham.pdf
3. https://www.google.com/maps/preview
4. https://www.youtube.com/watch?v=hDy0y-H_HRQ
5. https://www.rstudio.com/wp-content/uploads/2015/03/ggplot2-cheatsheet.pdf
6. https://www.facebook.com/groups/1717731545171536/
7. http://r-statistics.co/Top50-Ggplot2-Visualizations-MasterList-R-Code.html
8. https://github.com/hrbrmstr/ggalt