

Leaflet

一个可交互的地图工具

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an open-source JavaScript library
for mobile-friendly interactive maps

Trusted by the best

GitHub

FOURSQUARE

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EVERNOTE

Etsy

flickr

500

DATA.GOV



The Washington Post

FT.com
FINANCIAL TIMES

npr

USA TODAY



IGN

Leaflet in R

- RStudio 开发
- 完整的生态链

```
# install.packages("leaflet")
# install.packages("leafletCN")
# devtools::install_github("bhaskarvk/leaflet.extras")
library(leaflet)
library(leaflet.extras)
library(leafletCN)
```

[1] 用R颠覆前端的栗子

一个简单的例子

```
m <- leaflet() %>%
  amap() %>% # Add default OpenStreetMap map tiles
  addMarkers(lng=121.4487756, lat=31.2268300, popup="We are HERE~")
m # Print the map
```

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Leaflet (<http://leafletjs.com>)

Leaflet基本语法

leaflet(data) | leafletProxy() %>%

```
setView(lat, lon, zoom) # Initial View OR  
fitBounds(lat_se, lon_se, latnw, lon_nw) # Initial Bounds  
setMaxBounds(lat_se, lon_se, latnw, lon_nw) # Max Bounds  
addTiles() | addProviderTiles() | addWMSTiles() #Tiles  
addMarkers() | addCircleMarkers() |  
  addAwesomeMarkers() | addLabelOnlyMarkers() # Markers  
addPolylines() | addCircles() |  
addRectangles() | addPolygons() # Shapes  
addRasterImage(image) # Raster Data  
addLegend() | addLayersControl() | addControl() # Controls
```

- leaflet 用于创建一个leaflet对象, 之后用管道函数 %>% 增加新的图层
- leaflet|addXXX 有一个额外的 option 参数调整更细的内容

Leaflet学习路线I

- 视图控制
 - setView
 - fitBounds
 - ...
- 基础地图
 - addTiles
 - addProviderTiles
 - leafletCN::amap
- 增加标注
 - addMarker
 - addAwesomeMarkers
 - addCircleMarker
 - ...

[1] 地图狂魔的养成路线I

Leaflet学习路线II

- shiny使用
 - renderLeaflet , leafletOutput
 - proxyLeaflet
- 叠加区划
 - addTopoJSON
 - addGeoJSON
 - leafletCN
- 添加控制leaflet.extras
 - addLegend
 - addLayersControl
 - addControl
- 其他功能
 - sp包,topojson/geojson
 - leaflet.extras

[1] 地图狂魔的养成路线II

从基础地图聊起

基础地图

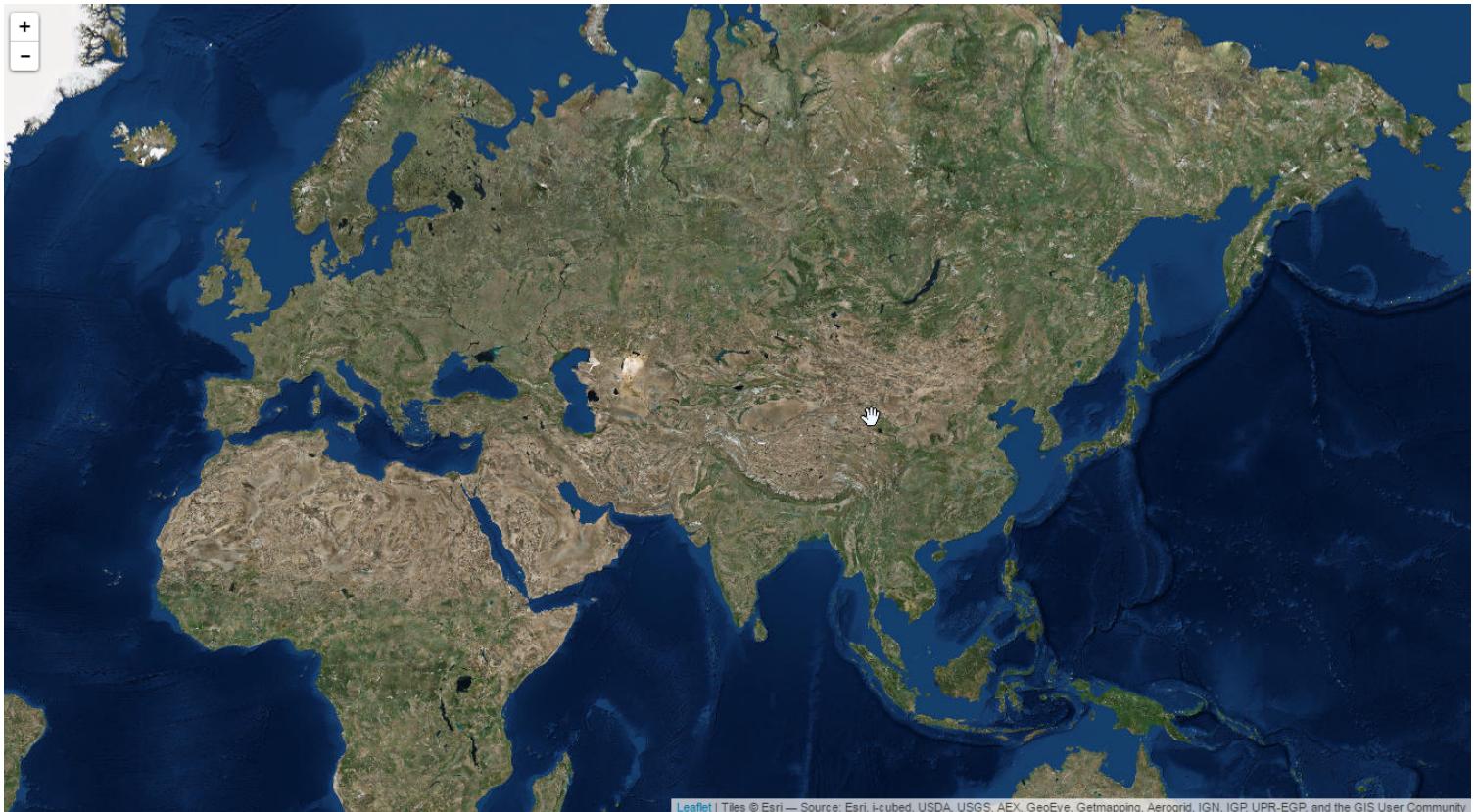
支持从各种源获取底层图形, 如OpenStreet, 高德等... leaflet完整列表见[这里](http://leaflet-extras.github.io/leaflet-providers/preview/index.html)
(<http://leaflet-extras.github.io/leaflet-providers/preview/index.html>)

```
# openStreetMap  
leaflet() %>% addTiles()  
# 高德(leafletCN)  
leaflet() %>% amap()  
# 暗黑风格  
leaflet() %>% addProviderTiles("Thunderforest.SpineMap")  
# 卫星地图  
leaflet() %>% addProviderTiles("Esri.WorldImagery")
```

瓦片图层

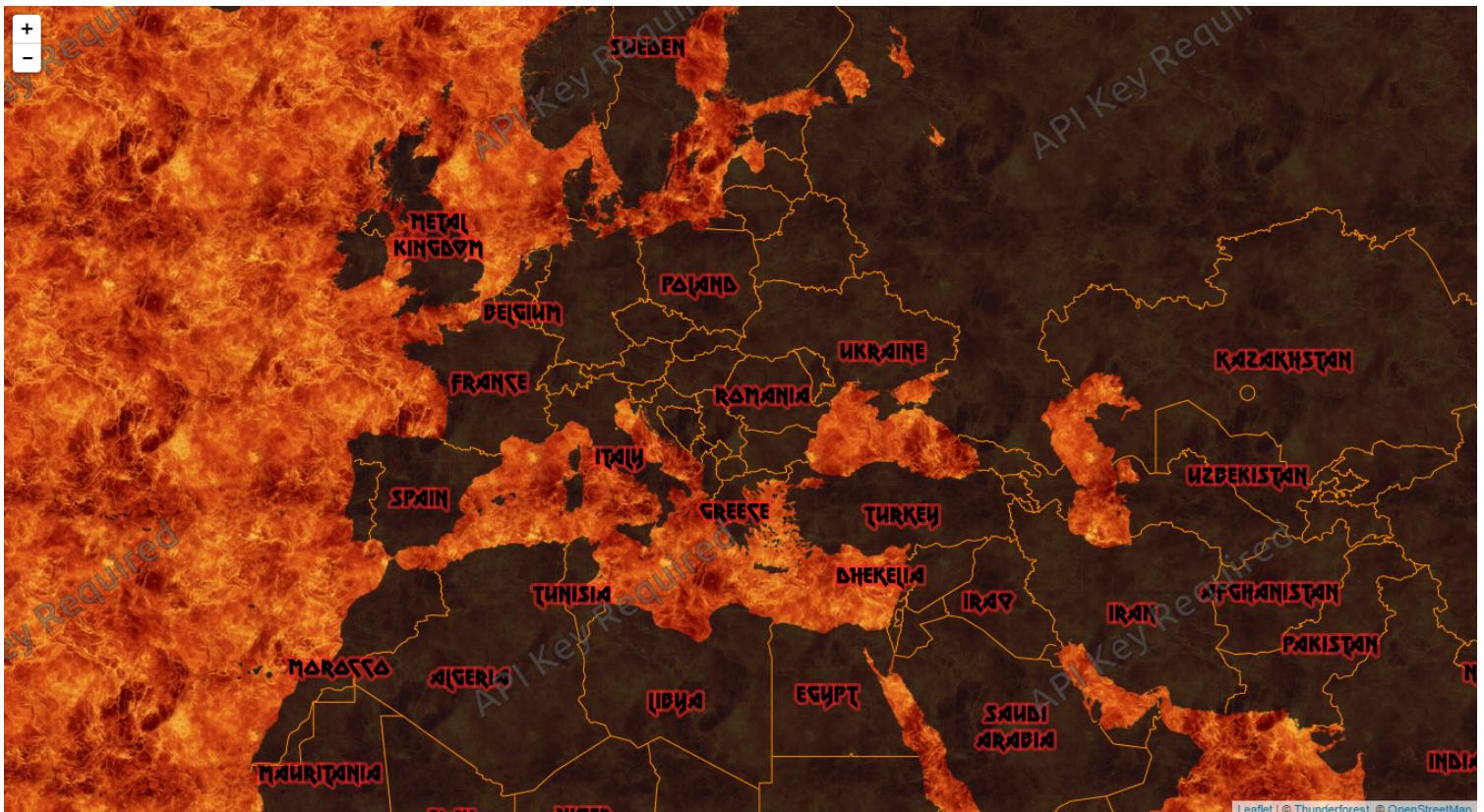
使用 addProviderTiles("XXX") 来调用这些源, 部分源需要注册

- 卫星地图:
 - Esri.WorldImagery
- 暗黑风格:
 - Thunderforest.SpinalMap
- 带海拔的地图:
 - OpenTopoMap
- 黑白地图:
 - Stamen.Toner
- NASA夜景:
 - NASAGIBS.ViirsEarthAtNight2012



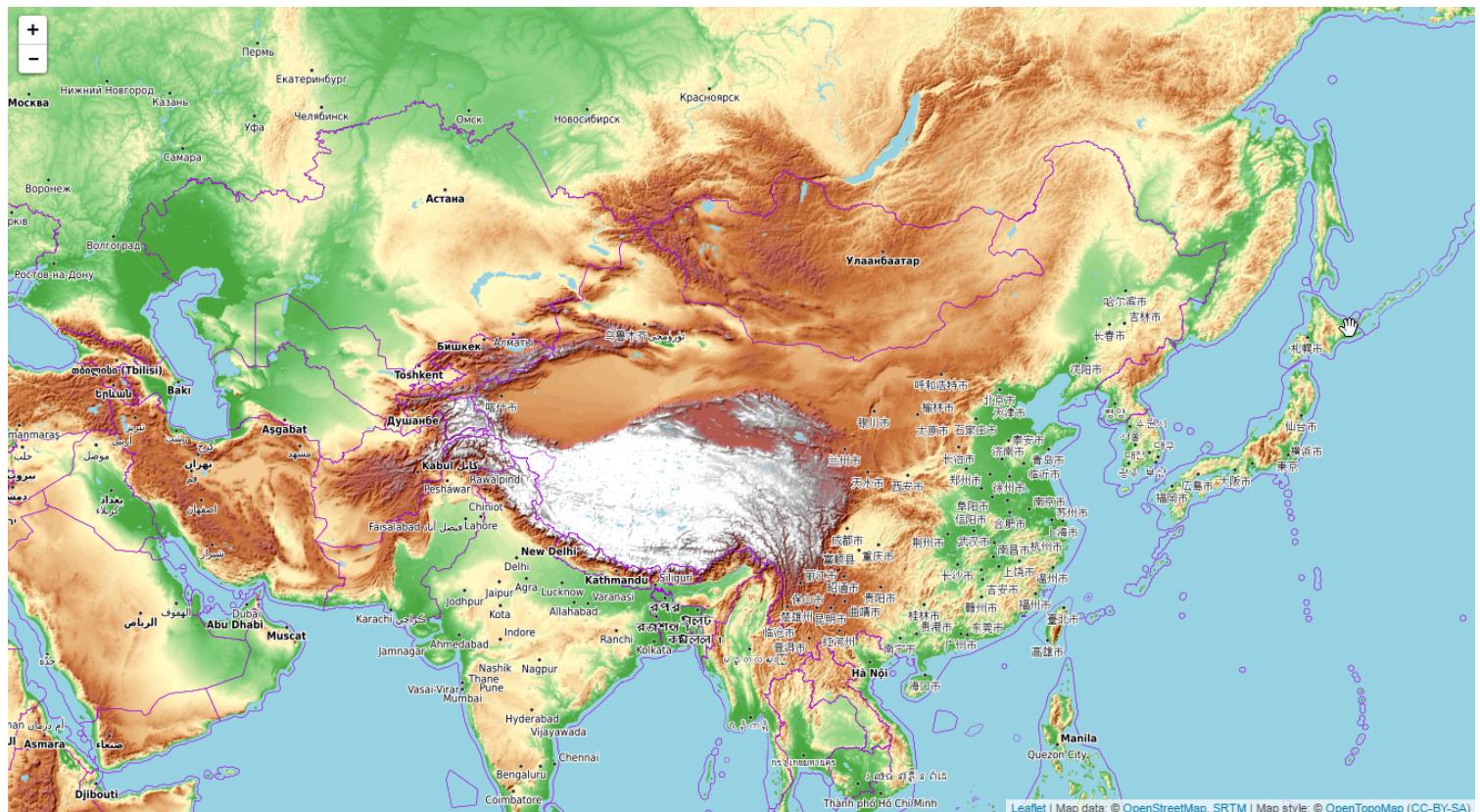
```
leaflet() %>% addProviderTiles("Esri.WorldImagery")
```

[1] 试试放夫子能不能看到家门口



```
leaflet() %>% addProviderTiles("Thunderforest.SpineMap")
```

[1] PRG的风格



```
leaflet() %>% addProviderTiles("OpenTopoMap")
```

[1] 好像回到了十年前的纸质地图



```
leaflet() %>% addProviderTiles("Stamen.Toner")
```

[1] 黑白风,真的不是电脑坏了?



```
leaflet() %>% addProviderTiles("NASAGIBS.ViirsEarthAtNight2012")
```

[1] 完美夜景

leaflet的实现过程

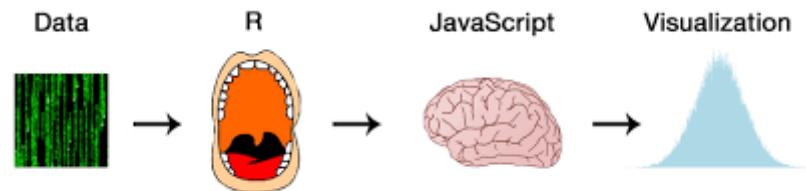
htmlwidgets

一个连接R与JavaScript的桥梁, 实现过程如下:

- 将数据读到R里面
- 在R里面完成数据的处理过程
- 将数据转化为一个JSON文件
- 数据传给JavaScript
- JavaScript处理数据
- JavaScript完成数据的**动态展示**

[1] 下页有讲解图

htmlwidgets



[1] <http://bioconnector.org/workshops/r-interactive-viz.html>
(<http://bioconnector.org/workshops/r-interactive-viz.html>)

[2] 好像还不如看上页

Branch: master ▾ leaflet / inst / htmlwidgets /

Create new file Upload files Find file History

	jcheng5 committed on GitHub Merge pull request #367 from rstudio/joe/feature/multipolythings	...	Latest commit 24a7dfa 7 days ago
..			
	lib Fixes rstudio/leaflet#353		29 days ago
	plugins 4 more options for awesome markers.		23 days ago
	leaflet.js Merge pull request #367 from rstudio/joe/feature/multipolythings		7 days ago
	leaflet.yaml Instanciate map via JS factory method. (#329)		3 months ago

[2] ~~多少R包因为这个问题被认定成了Javascript包~~

一个leaflet对象

```
l1 = leaflet()  
class(l1)
```

```
## [1] "leaflet"  "htmlwidget"
```

```
names(l1)
```

```
## [1] "x"        "width"     "height"    "sizingPolicy"  
## [5] "dependencies" "elementId"  "preRenderHook" "jsHooks"
```

- 一个传统S3对象, 没有存储任何前端的内容

一个leaflet对象

- 增加图层后, 会保存在 l2\$x\$calls 里面
 - 强制为NULL后跟原本未增加的图层一致
- 打印后会传给前端来展示

```
l2 = leaflet() %>% addTiles()  
class(l2)
```

```
## [1] "leaflet"  "htmlwidget"
```

```
names(l2)
```

```
## [1] "x"        "width"     "height"    "sizingPolicy"  
## [5] "dependencies" "elementId"   "preRenderHook" "jsHooks"
```

```
l3 = l2  
l3$x$calls = NULL  
all.equal(l1, l3)
```

addTiles背后的实现

```
methods.addTiles = function (urlTemplate, layerId, group, options) {  
  this.layerManager.addLayer(_leaflet2.default.tileLayer(urlTemplate, options), "tile", layerId, group);  
};
```

```
_createClass(LayerManager, [{  
  key: "addLayer",  
  value: function addLayer(layer, category, layerId, group, ctGroup, ctKey) {  
    var _this = this;  
  
    ....SKIP 500 Lines...  
    return oldLayer;  
  }  
}]
```

[1] 从Github上查到 (<https://github.com/rstudio/leaflet/search?l=JavaScript&q=addTiles&utf8=%E2%9C%93>)

一个例子

例子2

```
library(leaflet)
iconList = awesomeIconList(
  "home" = makeAwesomeIcon(icon = "home",markerColor = "skyblue"),
  "weixin" = makeAwesomeIcon(icon = "cutlery",markerColor = "red"),
  "bank" = makeAwesomeIcon(icon = "plus-sign",markerColor = "orange"),
  "automobile" = makeAwesomeIcon(icon = "trash",markerColor = "purple"),
  "coffee" = makeAwesomeIcon(icon = "book")
)
geo = data.frame(lon = rep(121.44, 5),
  lat = rep(31.22, 5),
  city = rep("Shanghai", 5))
```

例子2

```
geo$lon = geo$lon+rnorm(5,0,0.003)
geo$lat = geo$lat+rnorm(5,0,0.003)
geo$type = c("home",
            "weixin",
            "bank" ,
            "automobile",
            "coffee" )

leaflet(geo) %>% addProviderTiles("CartoDB.Positron") %>%
  addMiniMap() %>%
  addAwesomeMarkers(icon = ~iconList[type])
```

例子2

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-

Leaflet (<http://leafletjs.com>)

leafletCN

中国地图数据(细分到区县)

高德地图底图

一些打包好的函数

函数 功能

常用函数

函数 功能

regionNames 返回某个地图的区域名

demomap 传入地图名绘制示例地图

geojsonMap 将一个分层颜色图绘制在一个实时地图上

amap 在leaflet地图上叠加高德地图

read.geoShape 读取一个geojson的对象,保存成spdataframe,以方便leaflet调用

leafletGeo 用地图名以及一个数据框创建一个sp的对象

[1] 这里查看完整介绍 (<https://github.com/Lchiffon/leafletCN>)

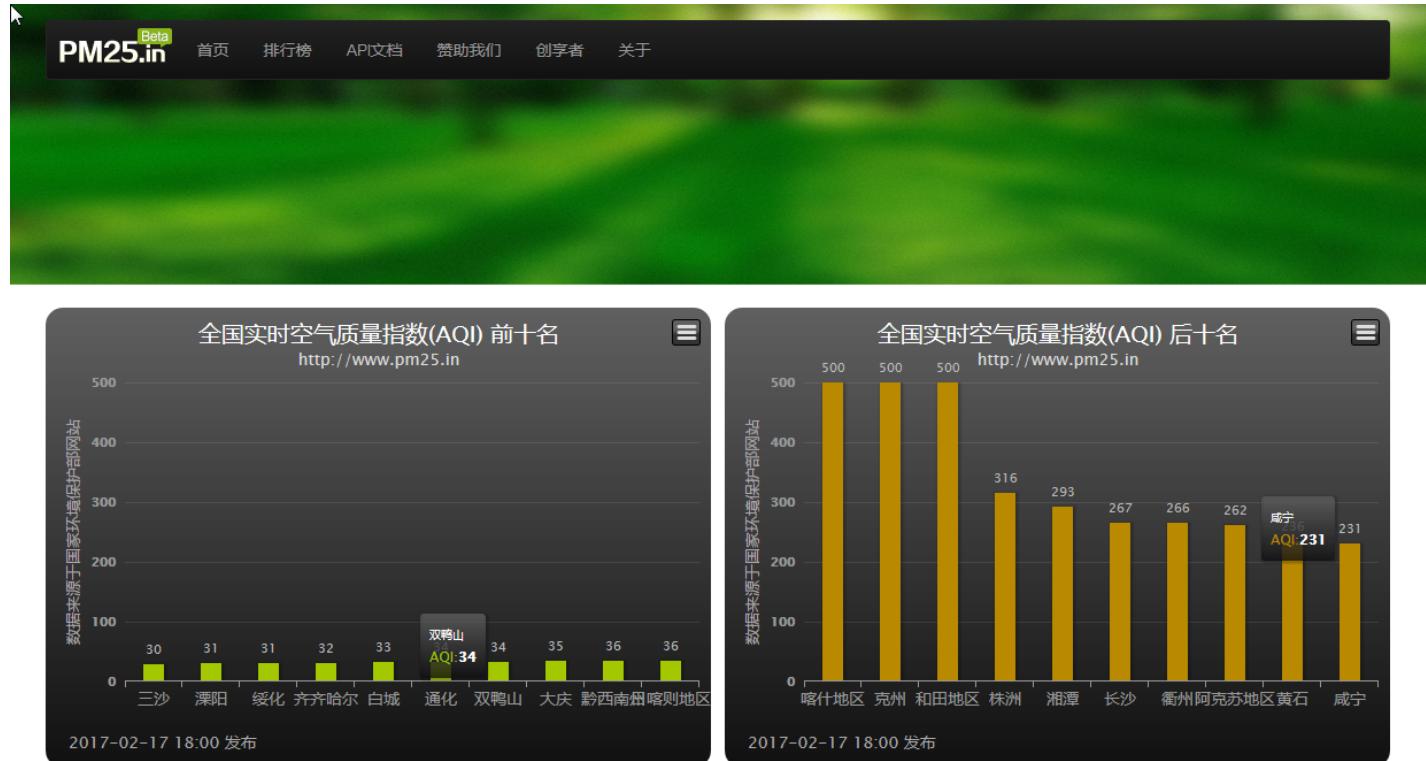
从一个段子讲起

受朋友委托，大家帮个忙：北京人，女，26岁，未婚，1.68米，体重50公斤，英国海归。貌美，爱好健身。目前在一家世界500强做产品经理，工作稳定，年薪近90万。三环内有四套学区房，一套按揭，三套全款。名下有一辆宝马7系，上班时开。父母均是国家领导干部。朋友和家人现在非常着急，
想让介绍一个效果比较好的防霾口罩。

[1] 段网侵删

数据来源

- <http://www.pm25.in/rank> (<http://www.pm25.in/rank>)



空气质量排行榜(根据AQI排序)

[分享到微博](#) [加关注](#) [PM25分享 \(粉丝2.7万\)](#)

数据更新时间：2017-01-04 10:00:00

排名	城市	AQI	空气质量 指数类别	首要污染物	PM 2.5 细颗粒物	PM 10 可吸入颗粒物	CO 一氧化碳	NO2 二氧化氮	O3 臭氧1小时平均	O3_8h 臭氧8小时平均	SO2 二氧化硫
1	三沙	30	优		7	20	0.3	30	51	58	6

leafletCN

```
library(XML)
library(leafletCN)
table = readHTMLTable("http://www.pm25.in/rank",
                      encoding="UTF-8",stringsAsFactors=F)[[1]]
```

```
dat = table[,2:3]
names(dat) = c("city","AQI")
dat$AQI = as.numeric(dat$AQI)
geojsonMap(dat, "city",
            popup = paste0(dat$city, ":", dat$AQI),
            palette = "Reds", legendTitle = "AQI")
```

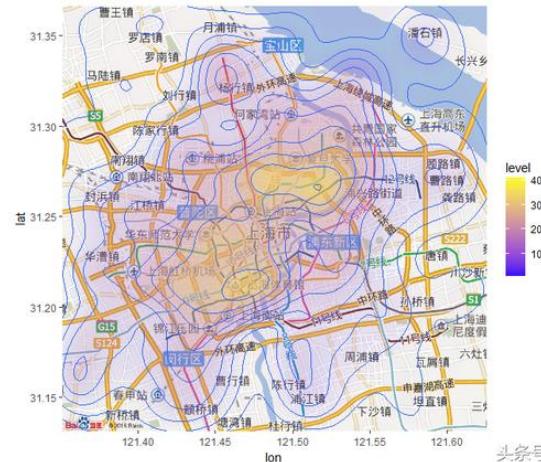
leafletCN



leaflet VS. ggplot2

1. 动态图啊动态图
2. 满足现代各种交互的需求
3. ~~可以用来跟你们家前端工程师Battle~~

1. 静态图啊静态图
2. 方便用ggplot语法修饰
3. 数据较老,需要自己获取靠谱数据(shp, baidumap)



头条号 / DT财经

[1] <http://www.toutiao.com/i6387968890785235458/>
(<http://www.toutiao.com/i6387968890785235458/>)

leaflet VS. REmap

- 1. openstreetMap, mapbox, 高德地图实现
- 2. 完整的生态链, 多个包支持
- 3. 维护团队靠谱
- 1. 好看
- 2. 也是动态效果
- 3. 功能不全面(sp支持, popup等)
- 4. 仅有百度地图支持
- 5. 不是htmlwidgets实现, 难以扩展



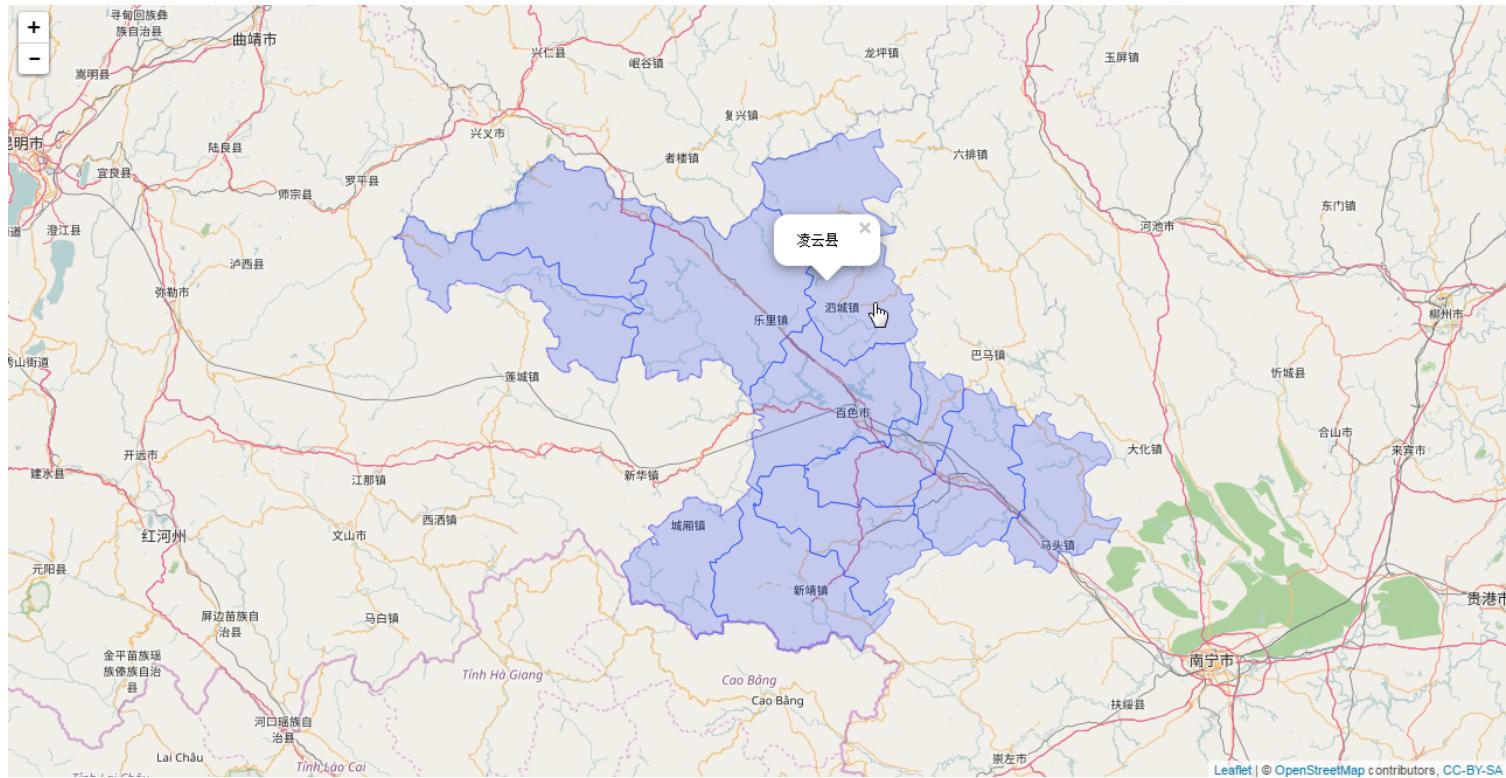
[1] 如果谁有兴趣把REmap重写掉

Other Leaflet

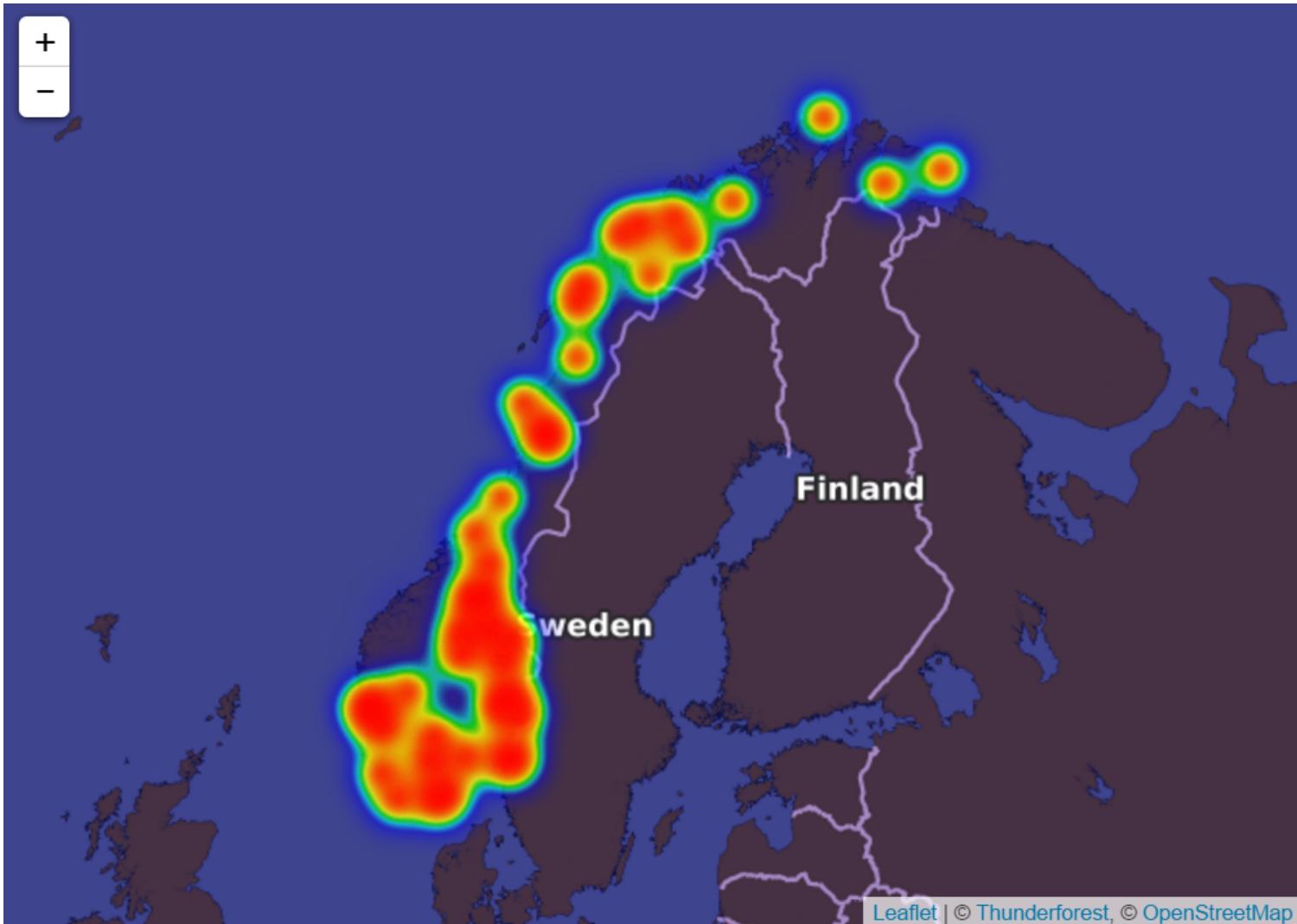


Leaflet | © Thunderforest, © OpenStreetMap

Codes (./Untitled.html#21)



<https://github.com/Lchiffon/leafletCN> (<https://github.com/Lchiffon/leafletCN>)

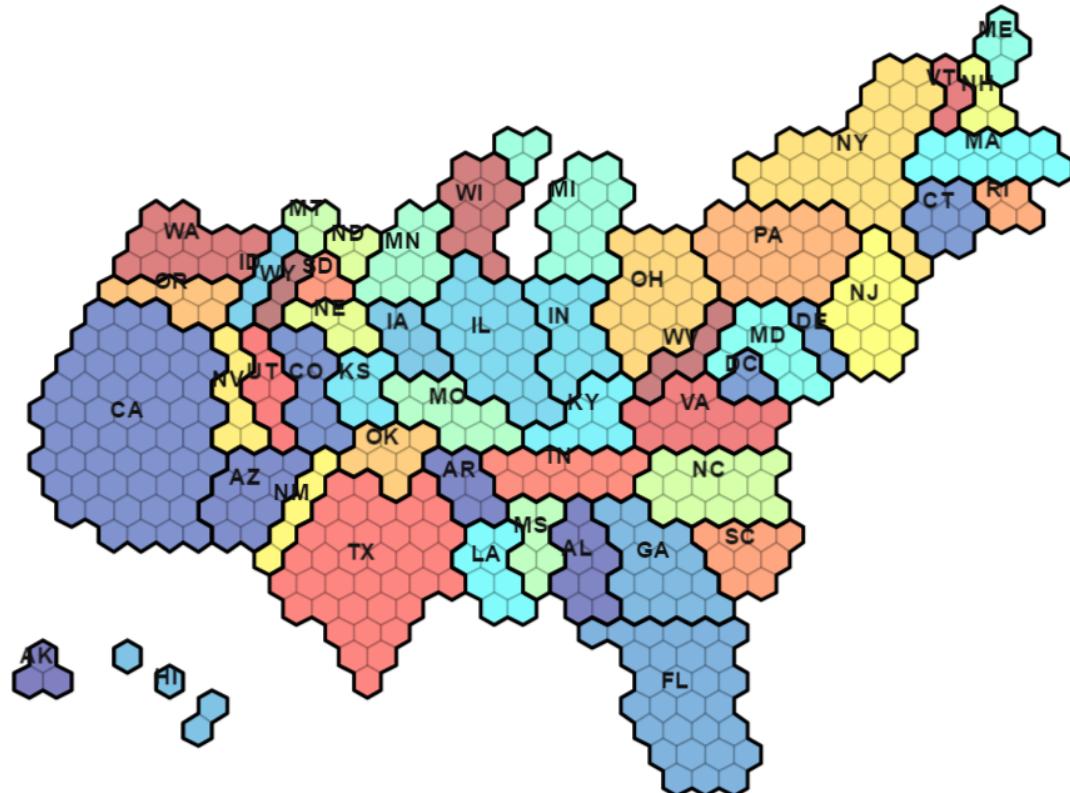


[1] <http://rpubs.com/bhaskarvk/leaflet-heat> (<http://rpubs.com/bhaskarvk/leaflet-heat>)

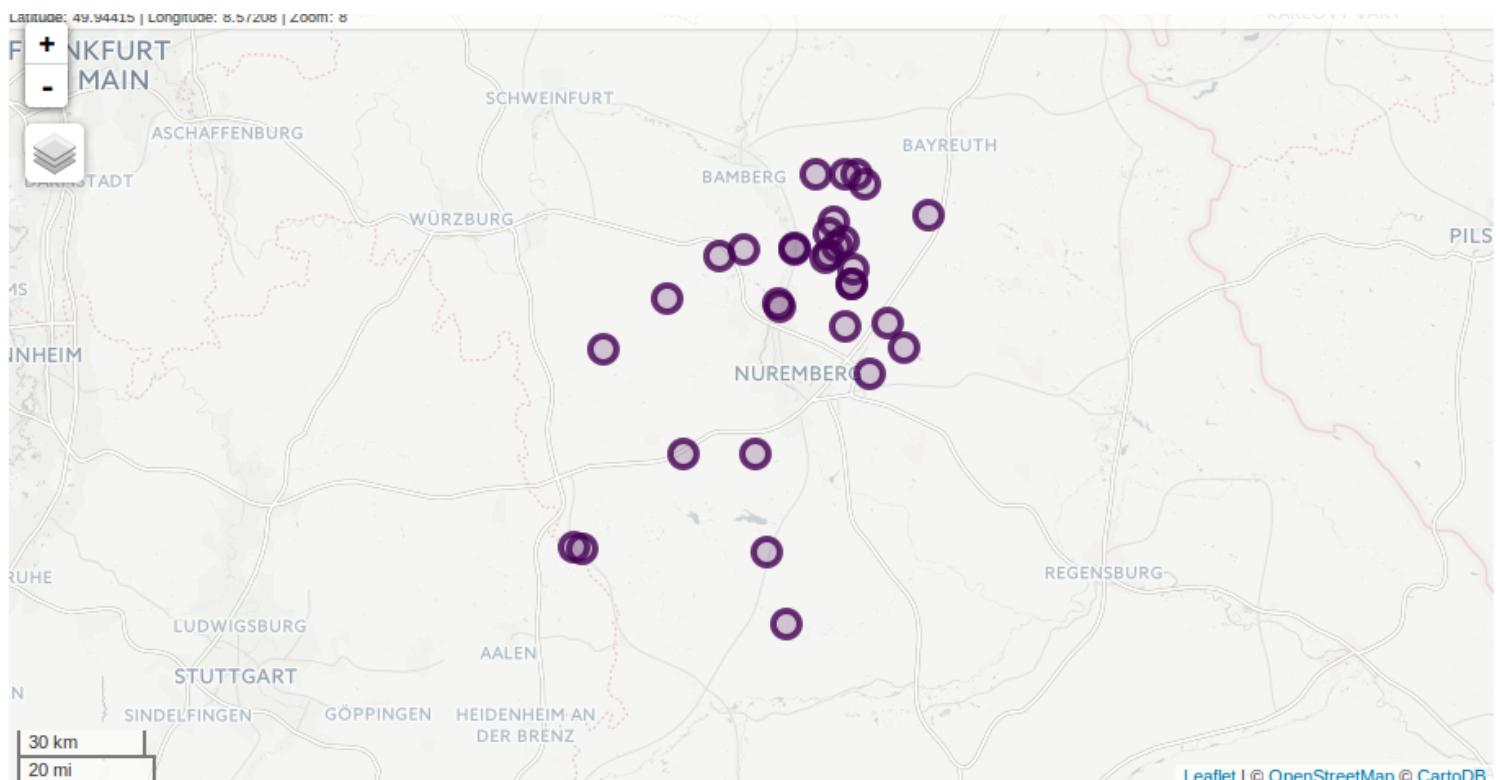


[Leaflet](#) | Imagery provided by services from the Global Imagery Brow se Services (GIBS), operated by the NASA /GSFC/Earth Science Data and Information System ([ESDIS](#)) w ith funding provided by NA SA/HQ.

Codes (. /Untitled.html#23)



[1] <https://bhaskarvk.github.io/leaflet-talk-rstudioconf-2017/RstudioConf2017.html#28>
[\(https://bhaskarvk.github.io/leaflet-talk-rstudioconf-2017/RstudioConf2017.html#28\)](https://bhaskarvk.github.io/leaflet-talk-rstudioconf-2017/RstudioConf2017.html#28)



[1] <http://environmentalinformatics-marburg.github.io/mapview/introduction.html>
(<http://environmentalinformatics-marburg.github.io/mapview/introduction.html>)

Thanks

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