# Maps with R Leaflet

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## Create maps

- **Taipei**
- **Alaska**

```
(map_Alaska <- leaflet() %>%
  addTiles() %>%
  setView(lat = 64.2008, lng = -149.4937, zoom = 4))
```



```
(map_Taipei <- leaflet() %>%
  addTiles() %>%
  setView(lat = 25.04776, lng = 121.53185, zoom = 11))
```

## Adding Shape files

```
Taipei_region <- readOGR("Taipei_region\\Taipei_region.shp")

## OGR data source with driver: ESRI Shapefile
## Source: "D:\Programming\R\(Udemy) Maps with R Leaflet\Maps with R Le
aflet\Taipei_region\Taipei_region.shp", layer: "Taipei_region"
## with 456 features
## It has 16 fields
## Integer64 fields read as strings:  Count_

ak_counties <- readOGR("D:\\Programming\\R\\(Udemy) Maps with R Leaflet
\\R Leaflet\\data\\tl_2013_02_cousub\\tl_2013_02_cousub.shp")

## OGR data source with driver: ESRI Shapefile
## Source: "D:\Programming\R\(Udemy) Maps with R Leaflet\R Leaflet\data
\tl_2013_02_cousub\tl_2013_02_cousub.shp", layer: "tl_2013_02_cousub"
## with 37 features
## It has 18 fields
## Integer64 fields read as strings:  ALAND AWATER

#(map_Alaska <- leaflet() %>%
#    addProviderTiles(providers$Esri.NatGeoWorldMap) %>%
#    setView(lat = 64.2008, lng = -149.4937, zoom = 4))


(map_Alaska <- leaflet() %>%
    addProviderTiles(providers$Stamen.Toner) %>%
```
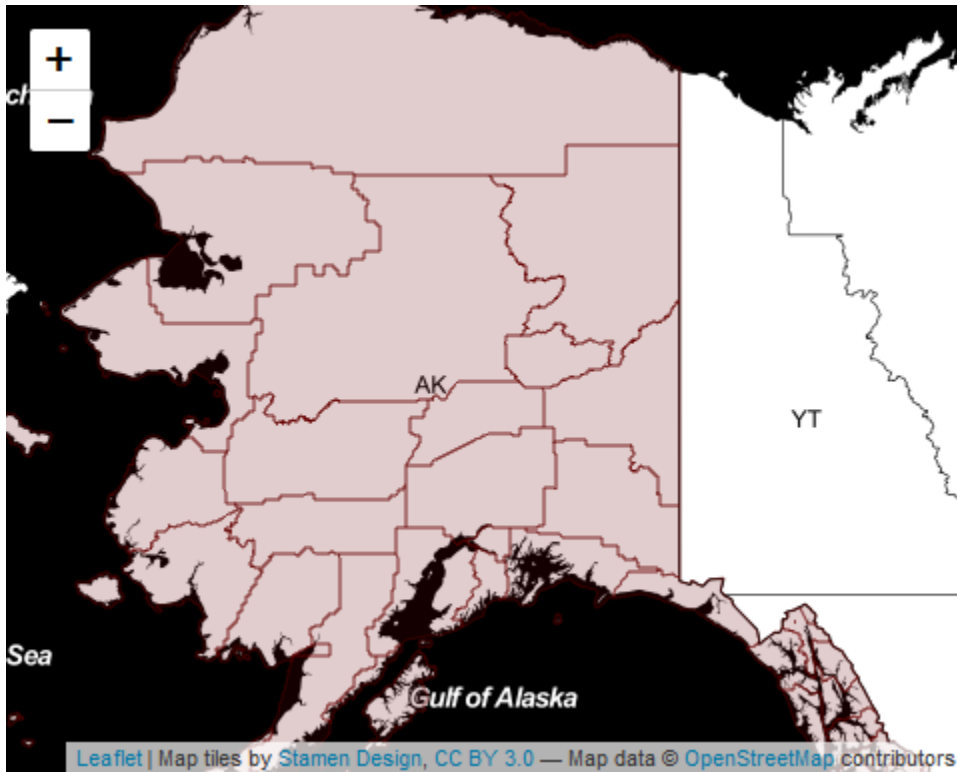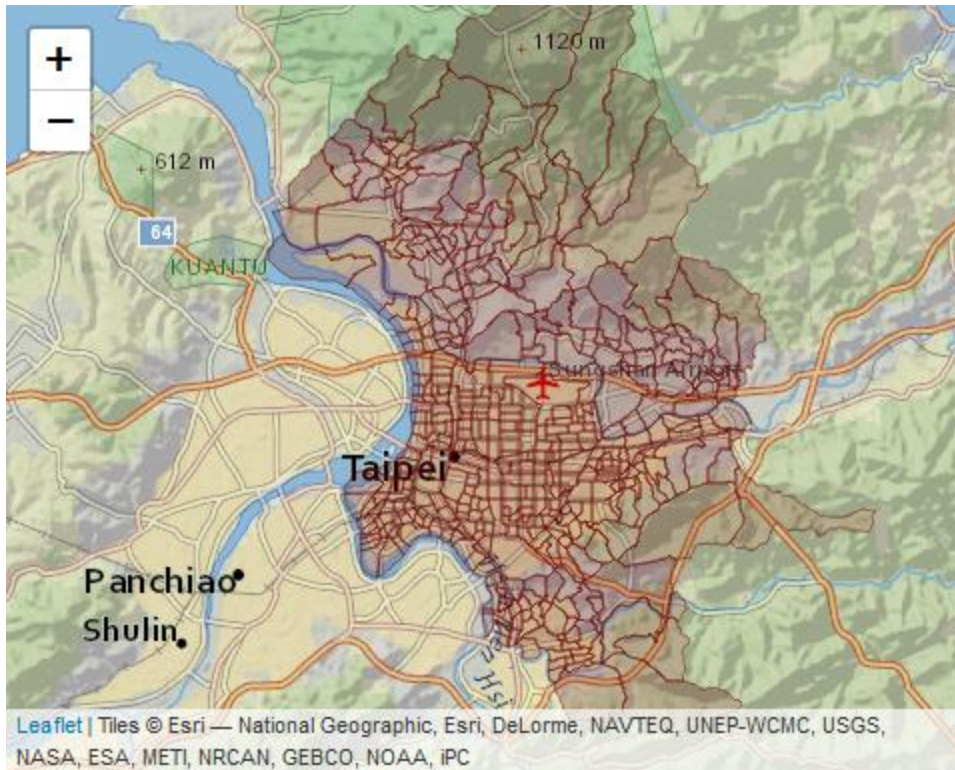
```
    setView(lat = 64.2008, lng = -149.4937, zoom = 4) %>%
    addPolygons(data = ak_counties, color = "#660000",
                weight = 1, smoothFactor = 0.5))
```



```
(map_Taipei <- leaflet() %>%
    addProviderTiles(providers$Esri.NatGeoWorldMap) %>%
    setView(lat = 25.06776, lng = 121.53185, zoom = 11) %>%
    addPolygons(data = Taipei_region, color = "#660000",
                weight = 1, smoothFactor = 0.5))
```

## Custom Base Maps

```r
(map_Taipei <- leaflet() %>%
    addProviderTiles(providers$Wikimedia) %>%
    setView(lat = 25.06776, lng = 121.53185, zoom = 11) %>%
    addPolygons(data = Taipei_region, color = "#660000",
                weight = 1, smoothFactor = 0.5))
```

## data preparation

```
housingData <- fread("NEW_data_housing_prices_0811_morning.csv")
housingData <- housingData[, 1:44]

#simplified_housingData <- housingData %>% select(lat = "緯度 (WGS84)",
 long = "經度 (WGS84)", V1)
housingData_random <- housingData[sample(nrow(housingData)), ]

housingData_randomPart <- housingData_random[c(1:round(0.1*nrow(housing
Data_random))), ][, 1:44]
```

## Adding points onto the map

Removing the NA values for our dataset

```
miss_var_summary(housingData_randomPart)

## # A tibble: 44 x 3
##    variable              n_miss pct_miss
##    <chr>                  <int>    <dbl>
## 1 建築完成年月             904    11.4
## 2 屋齡                    904    11.4
## 3 主要用途                239     3.02
## 4 area_square_kilometre    18     0.228
## 5 人口密度                 18     0.228
## 6 交易年月日                8     0.101
```

```
##  7 單價(元/平方公尺)              5    0.0633
##  8 戶數                          1    0.0127
##  9 人口數                        1    0.0127
## 10 V1                           0    0
## # ... with 34 more rows

housingData_randomPart_naOmit <- housingData_randomPart %>% na.omit()

housingData_randomPart_naOmit <- housingData_randomPart_naOmit %>%
  mutate(year = year(housingData_randomPart_naOmit$"交易年月日")) %>%
  filter(year %in% c(2016:2020))

housingData_randomPart_naOmit$label <- paste("<p>", housingData_randomP
art_naOmit$"區域&里別", "</p>",
                                             "<p>", "總價(元): ", housi
ngData_randomPart_naOmit$"總價(元)", "</p>",
                                             "<p>", "單價(元): ", housi
ngData_randomPart_naOmit$"單價(元/平方公尺)", "</p>",
                                             "<p>", "屋齡(年): ", housi
ngData_randomPart_naOmit$"屋齡", "</p>",
                                             "<p>", "樓層(樓): ", housi
ngData_randomPart_naOmit$trade_floor_revision, "</p>",
                                             "<p>", "面積(建物): ", hous
ingData_randomPart_naOmit$"建物移轉總面積(平方公尺)", "</p>",
                                             "<p>", "面積(土地): ", hous
ingData_randomPart_naOmit$"土地移轉總面積(平方公尺)", "</p>",
                                             "<p>", "交易日期(年月日): ",
 housingData_randomPart_naOmit$"交易年月日", "</p>")

(map_Taipei <- leaflet() %>%
    addProviderTiles(providers$Wikimedia) %>%
    setView(lat = 25.06776, lng = 121.53185, zoom = 11) %>%
    addPolygons(data = Taipei_region, color = "#660000",
                weight = 1, smoothFactor = 0.5) %>%
    addCircleMarkers(lat = housingData_randomPart_naOmit$"緯度 (WGS84)",
                     lng = housingData_randomPart_naOmit$"經度 (WGS84)",
                     color = "#484891",
                     weight = 1,
                     radius = 5,
                     ## adding a label on each point
                     label = lapply(housingData_randomPart_naOmit$label,
 HTML),

                     ## for clustrering
                     clusterOptions = markerClusterOptions(showCoverage
OnHover = FALSE)))
```

## Interactive Control by year

Nervertheless, we need to deal with data first.

```r
housingData_2016 <- housingData_randomPart_naOmit %>% filter(year == 2016)
housingData_2017 <- housingData_randomPart_naOmit %>% filter(year == 2017)
housingData_2018 <- housingData_randomPart_naOmit %>% filter(year == 2018)
housingData_2019 <- housingData_randomPart_naOmit %>% filter(year == 2019)
housingData_2020 <- housingData_randomPart_naOmit %>% filter(year == 2020)


housingData_2016$label <- paste("<p>", housingData_2016$"區域&里別", "</p>",
                                "<p>", "總價(元): ", housingData_2016$"總價(元)", "</p>",
                                "<p>", "單價(元): ", housingData_2016$"單價(元/平方公尺)", "</p>",
                                "<p>", "屋齡(年): ", housingData_2016$"屋齡", "</p>",
                                "<p>", "樓層(樓): ", housingData_2016$trade_floor_revision, "</p>",
```

```r
                                                        "<p>", "面積(建物): ", hous
ingData_2016$"建物移轉總面積(平方公尺)", "</p>",
                                                        "<p>", "面積(土地): ", hous
ingData_2016$"土地移轉總面積(平方公尺)", "</p>",
                                                        "<p>", "交易日期(年月日): ",
 housingData_2016$"交易年月日", "</p>")

housingData_2017$label <- paste("<p>", housingData_2017$"區域&里別", "</
p>",
                                                        "<p>", "總價(元): ", housi
ngData_2017$"總價(元)", "</p>",
                                                        "<p>", "單價(元): ", housi
ngData_2017$"單價(元/平方公尺)", "</p>",
                                                        "<p>", "屋齡(年): ", housi
ngData_2017$"屋齡", "</p>",
                                                        "<p>", "樓層(樓): ", housi
ngData_2017$trade_floor_revision, "</p>",
                                                        "<p>", "面積(建物): ", hous
ingData_2017$"建物移轉總面積(平方公尺)", "</p>",
                                                        "<p>", "面積(土地): ", hous
ingData_2017$"土地移轉總面積(平方公尺)", "</p>",
                                                        "<p>", "交易日期(年月日): ",
 housingData_2017$"交易年月日", "</p>")

housingData_2018$label <- paste("<p>", housingData_2018$"區域&里別", "</
p>",
                                                        "<p>", "總價(元): ", housi
ngData_2018$"總價(元)", "</p>",
                                                        "<p>", "單價(元): ", housi
ngData_2018$"單價(元/平方公尺)", "</p>",
                                                        "<p>", "屋齡(年): ", housi
ngData_2018$"屋齡", "</p>",
                                                        "<p>", "樓層(樓): ", housi
ngData_2018$trade_floor_revision, "</p>",
                                                        "<p>", "面積(建物): ", hous
ingData_2018$"建物移轉總面積(平方公尺)", "</p>",
                                                        "<p>", "面積(土地): ", hous
ingData_2018$"土地移轉總面積(平方公尺)", "</p>",
                                                        "<p>", "交易日期(年月日): ",
 housingData_2018$"交易年月日", "</p>")

housingData_2019$label <- paste("<p>", housingData_2019$"區域&里別", "</
p>",
                                                        "<p>", "總價(元): ", housi
ngData_2019$"總價(元)", "</p>",
```

```r
                                                    "<p>", "單價(元): ", housi
ngData_2019$"單價(元/平方公尺)", "</p>",
                                                    "<p>", "屋齡(年): ", housi
ngData_2019$"屋齡", "</p>",
                                                    "<p>", "樓層(樓): ", housi
ngData_2019$trade_floor_revision, "</p>",
                                                    "<p>", "面積(建物): ", hous
ingData_2019$"建物移轉總面積(平方公尺)", "</p>",
                                                    "<p>", "面積(土地): ", hous
ingData_2019$"土地移轉總面積(平方公尺)", "</p>",
                                                    "<p>", "交易日期(年月日): ",
 housingData_2019$"交易年月日", "</p>")

housingData_2020$label <- paste("<p>", housingData_2020$"區域&里別", "</
p>",
                                                    "<p>", "總價(元): ", housi
ngData_2020$"總價(元)", "</p>",
                                                    "<p>", "單價(元): ", housi
ngData_2020$"單價(元/平方公尺)", "</p>",
                                                    "<p>", "屋齡(年): ", housi
ngData_2020$"屋齡", "</p>",
                                                    "<p>", "樓層(樓): ", housi
ngData_2020$trade_floor_revision, "</p>",
                                                    "<p>", "面積(建物): ", hous
ingData_2020$"建物移轉總面積(平方公尺)", "</p>",
                                                    "<p>", "面積(土地): ", hous
ingData_2020$"土地移轉總面積(平方公尺)", "</p>",
                                                    "<p>", "交易日期(年月日): ",
 housingData_2020$"交易年月日", "</p>")


map_Taipei_year <- leaflet() %>%
  addProviderTiles(providers$Wikimedia) %>%
  setView(lat = 25.06776, lng = 121.53185, zoom = 11) %>%
  addPolygons(data = Taipei_region, color = "#660000",
              weight = 1, smoothFactor = 0.5) %>%
  addCircleMarkers(lat = housingData_2016$"緯度 (WGS84)",
                   lng = housingData_2016$"經度 (WGS84)",
                   color = "#484891",
                   weight = 1,
                   radius = 5,
                   group = "2016",
                   label = lapply(housingData_2016$label, HTML)) %>%
  addCircleMarkers(lat = housingData_2017$"緯度 (WGS84)",
                   lng = housingData_2017$"經度 (WGS84)",
                   color = "blue",
```
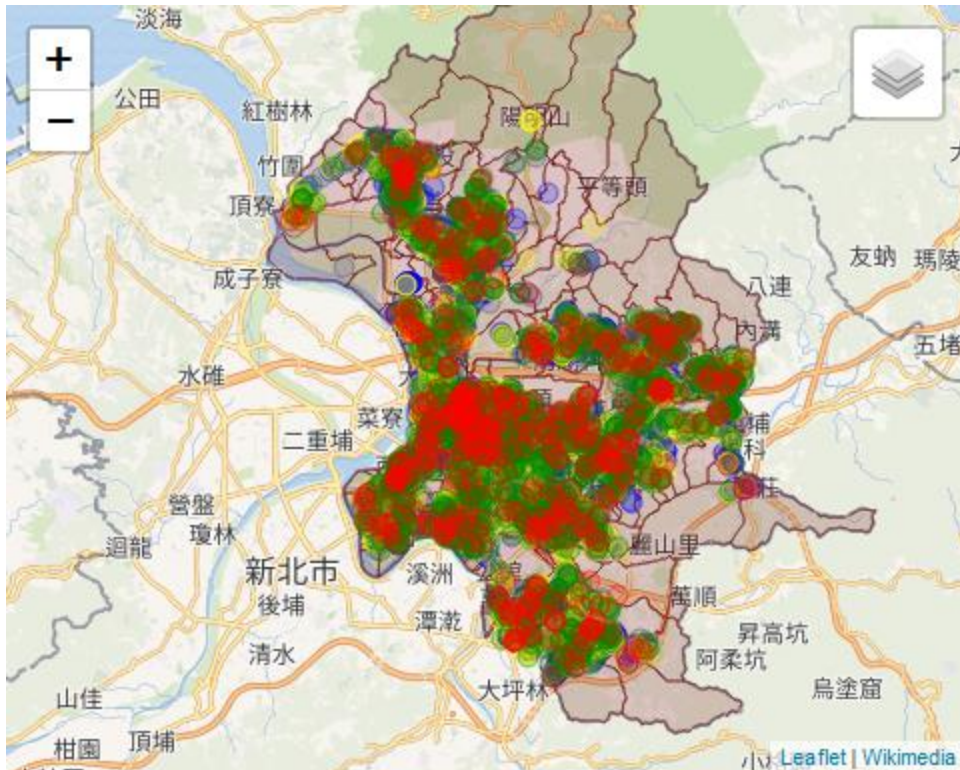
```r
                    weight = 1,
                    radius = 5,
                    group = "2017",
                    label = lapply(housingData_2017$label, HTML)) %>%
  addCircleMarkers(lat = housingData_2018$"緯度 (WGS84)",
                    lng = housingData_2018$"經度 (WGS84)",
                    color = "yellow",
                    weight = 1,
                    radius = 5,
                    group = "2018",
                    label = lapply(housingData_2018$label, HTML)) %>%
  addCircleMarkers(lat = housingData_2019$"緯度 (WGS84)",
                    lng = housingData_2019$"經度 (WGS84)",
                    color = "green",
                    weight = 1,
                    radius = 5,
                    group = "2019",
                    label = lapply(housingData_2019$label, HTML)) %>%
  addCircleMarkers(lat = housingData_2020$"緯度 (WGS84)",
                    lng = housingData_2020$"經度 (WGS84)",
                    color = "red",
                    weight = 1,
                    radius = 5,
                    group = "2020",
                    label = lapply(housingData_2020$label, HTML)) %>%
  addLayersControl(overlayGroups = c("2016", "2017", "2018", "2019", "2
020"),
                    options = layersControlOptions(collapesed = FALSE))
map_Taipei_year
```

## Choropleths by `Population Density`

```
#taipei_region <- readOGR("Taipei_region\\Taipei_region.shp", encoding
= "UTF-8")

tp <- housingData_randomPart_naOmit %>%
  select(`人口密度`, `里別`, `區域&里別`) %>%
  group_by(`區域&里別`, `里別`) %>%
  summarise(PopulationDensity = mean(`人口密度`))
#tp
#is.element(taipei_region$V_Name, tp$"里別")

#x = tp$"區域&里別"
#taipei_region.df <- as(taipei_region, "data.frame")
#taipei_region.df <- taipei_region.df %>%
#  mutate(NAME = paste0(T_Name,V_Name)) %>%
#  filter(NAME %in% x)

#taipei_region_csv <- read.csv("taipei_region_df.csv", encoding = "Big5
")

#taipei_region_shp <- taipei_region_csv
#coordinates(taipei_region_shp) = ~ long + lat

#is.element(taipei_region.df.shp$NAME, tp$"區域&里別")
#taipei_region_shp <- subset(taipei_region.df.shp, is.element(taipei_re
```
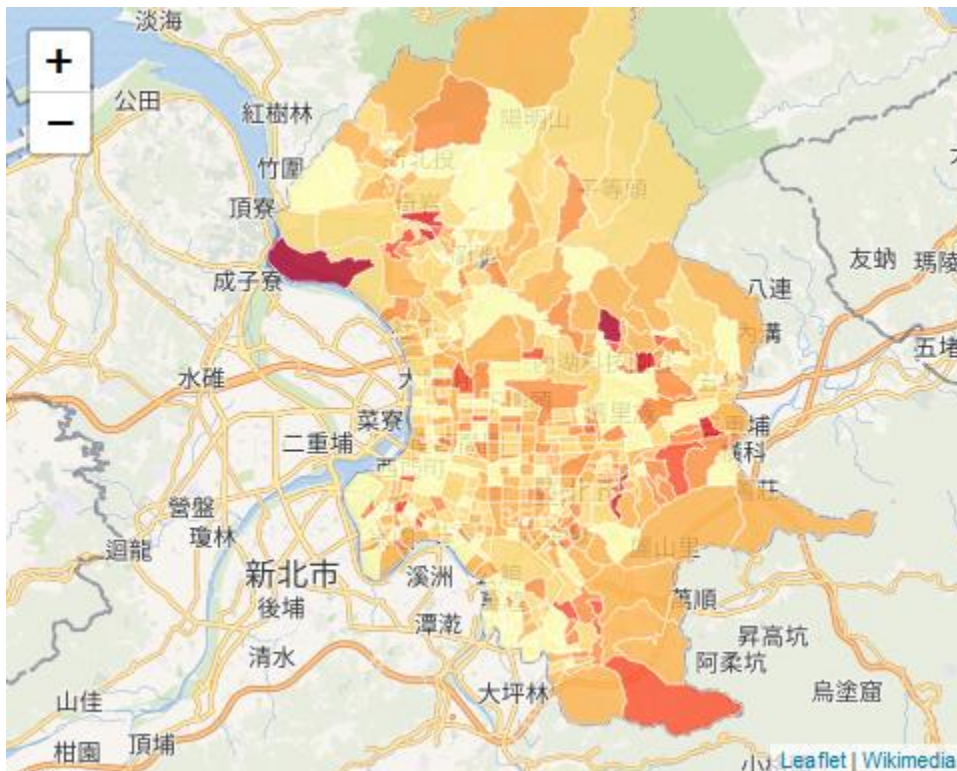
```
gion.df.shp$NAME, tp$"區域&里別"))


bins <- seq(0, 110000, 15000)
pal <- colorBin("YlOrRd", domain = tp$PopulationDensity, bins = bins)

(mapChropleths <- leaflet() %>%
  setView(lat = 25.06776, lng = 121.53185, 11) %>%
  addProviderTiles(providers$Wikimedia) %>%
  addPolygons(data = Taipei_region, color = "white",
              weight = 1, smoothFactor = 0.5, fillOpacity = 0.8,
              fillColor = pal(tp$PopulationDensity)))

## Warning in pal(tp$PopulationDensity): Some values were outside the c
olor scale
## and will be treated as NA
```



```
labels <- paste("<p>", tp$`區域&里別`, "</p>",
                "<p>", "人口密度: ", tp$PopulationDensity, "</p>",
                sep = "")


mapChropleths <- leaflet() %>%
  setView(lat = 25.06776, lng = 121.53185, 11) %>%
  addProviderTiles(providers$Wikimedia) %>%
  addPolygons(data = Taipei_region, color = "white",
```

```
              weight = 1, smoothFactor = 0.5, fillOpacity = 0.8,
              fillColor = pal(tp$PopulationDensity),
              highlight = highlightOptions(weight = 5, color = "#666666
",
                                           fillOpacity = 0.5, bringToFr
ont = TRUE),
              label = lapply(labels, HTML)) %>%
  addLegend(pal = pal, values = tp$PopulationDensity,
            opacity = 0.7, position = "topright")
```

```
## Warning in pal(tp$PopulationDensity): Some values were outside the c
olor scale
## and will be treated as NA
```

mapChoropleths