

**R Final Project**

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# 1. Initial codes&data

library(RMySQL)

library(ggplot2)

library(xts)

library(DBI)

library(RMySQL)

library(dplyr)

library(plotly)

library(purrr)

library(quantmod)

library(treemapify)

library(ggpubr)

*## Get Tushare Data*

*#SSE Composite Index*

today = format(Sys.Date(),"%Y%m%d")

tushare <- Tushare::pro\_api(token = "a060f5bc02599c4f873ae86e6f9197d83e27469834e3a07be4716df5")

SSE\_Index <- tushare(api\_name = "index\_daily", ts\_code = "000001.SH", start\_date = '20180101', end\_date = today,

fields='trade\_date,open,high,low,close')

head(SSE\_Index)

SSE\_Index$trade\_date<-as.Date(SSE\_Index$trade\_date,"%Y%m%d")

#Get trade dates

trade\_date<-tushare(api\_name = "trade\_cal", start\_date = '20191001', end\_date = today)

trade\_date <- trade\_date[trade\_date$is\_open == 1,]

return\_cal\_dates <- trade\_date$cal\_date[(nrow(trade\_date)-1):nrow(trade\_date)]

*#300 Industry indices*

ind\_returns <- data.frame()

ind\_indices\_code <-paste0(c('000908','000909','000910','000912','000913','000914','000915','000916','000917'),".SH")

for (code in ind\_indices\_code){

ind\_index <- tushare(api\_name = "index\_daily", ts\_code = code, start\_date = '20180830', end\_date = '20180831')

ind\_returns[code,"returns"] <- ind\_index$close[2]/ind\_index$close[1] - 1

}

row.names(ind\_returns)<- c("CSI 300 Energy","CSI 300 Materials","CSI 300 Industrials","CSI 300 Cons Staples",

"CSI 300 Health Care","CSI 300 Financials","CSI 300 Info Tech","CSI 300 Telecom Svc","CSI 300 Utilities")

*#SSE 50 Constituents*

SSE50\_constituents <- read.csv("C:/Users/Administrator/Desktop/final\_project/000016closeweight.csv")

SSE50\_codes <- paste0(SSE50\_constituents$Constituent.Code,".SH")

SSE50\_names <- SSE50\_constituents$Constituent.Name

SSE50\_basics <- data.frame()

SSE50 <- data.frame()

for (code in SSE50\_codes){

stk <- tushare(api\_name = "daily", ts\_code = code, trade\_date = return\_cal\_dates[1])

stk\_mv <- tushare(api\_name = "daily\_basic", ts\_code = code, trade\_date = return\_cal\_dates[1])

SSE50[code,"returns"] <- stk$close/stk$pre\_close -1

SSE50[code,"vol"] <- stk$vol

SSE50[code,"mv"] <- stk\_mv$total\_mv

SSE50\_basics <- rbind(SSE50\_basics,stk\_mv)

}

SSE50$names <- paste0(SSE50\_names,'\n',round(SSE50$returns\*100,2),'%')

SSE50\_basics\_new <- data.frame(row.names = 1:50)

SSE50\_basics\_new$Code <- SSE50\_codes

SSE50\_basics\_new$Company <- SSE50\_names

SSE50\_basics\_new$Exchange <- SSE50\_constituents$Exchange

SSE50\_basics\_new["Market Cap"] <- SSE50\_basics$total\_mv

SSE50\_basics\_new["P/E"] <- SSE50\_basics$pe

SSE50\_basics\_new$Price <- SSE50\_basics$close

SSE50\_basics\_new$Change <- paste0(round(SSE50$returns\*100,2),"%")

SSE50\_basics\_new$Volume <- SSE50$vol

# 2. Candlestick

## 2.1 Codes

*###Draw figures*

*## Plot candlestick*

SSE\_Index <- tail(SSE\_Index,50)

SSE\_candlestick <- SSE\_Index %>%

plot\_ly(x = ~trade\_date, type="candlestick",

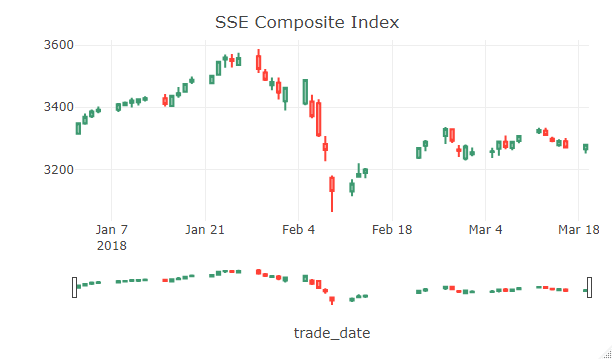
open = ~open, close = ~close,

high = ~high, low = ~low) %>%

layout(title = "SSE Composite Index")

SSE\_candlestick

## 2.2 Figure



# 3. Industry indices barchart

## 3.1 Codes

*## Plot industry indices barchart*

to\_color <- function (x){

if (x > 0){

return(sprintf("rgb(%d,0,0)",floor(255\*(1-exp(-x\*30)))));

}

else if (x<=0){

return(sprintf("rgb(0,%d,0)",ceiling(255\*(1-exp(x\*30)))));

}

}

ind\_returns["color"] = map\_chr(ind\_returns$returns, to\_color)

ind\_indices\_barchart <- plot\_ly(y = reorder(row.names(ind\_returns), ind\_returns$returns),

x = abs(ind\_returns$returns),

marker =list(color = ind\_returns$color),

type = 'bar',orientation = 'h') %>%

add\_annotations(xref = 'x1', yref = 'y',

x = abs(ind\_returns$returns)+0.003 , y = row.names(ind\_returns),

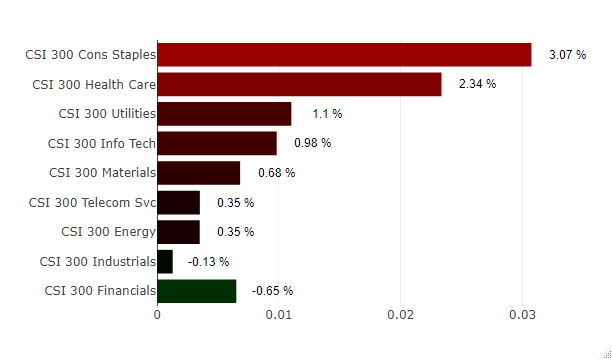
text = paste(round(ind\_returns$returns\*100, 2), '%'),

font = list(family = 'Arial', size = 12, color = 'rgb(0, 0, 0)'),

showarrow = FALSE)

ind\_indices\_barchart

## 3.2 Figure



# 4. SSE50 constituents maps

## 4.1 Codes

*## Plot SSE50 constituents maps*

rgb2hex <- function(rgb){

rgb <- strsplit(substr(rgb,5,nchar(rgb)-1),',')[[1]]

rgb <- as.integer(rgb)

rgb <- as.character(as.hexmode(rgb))

hex <- "#"

for (i in rgb){

if (nchar(i) == 1){i <- paste0('0',i)}

hex <- paste0(hex, i)

}

return(hex)

}

SSE50["color"] = map\_chr(SSE50$returns, to\_color) %>% map\_chr(rgb2hex)

ggplot(SSE50, aes(area = mv, label = names)) +

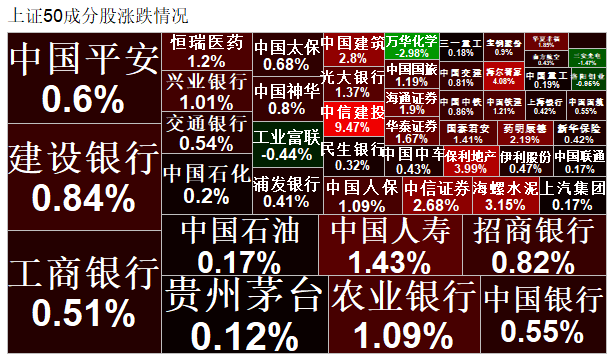
geom\_treemap(fill = SSE50$color) +

geom\_treemap\_text(fontface = "bold", colour = "white", place = "centre",

grow = TRUE) +

ggtitle("上证50成分股涨跌情况")

## 4.2 Figure



# 5. Screener overview

## 5.1 Codes

*## Generate the screener overview*

SSE50\_basics\_new <- head(SSE50\_basics\_new,5)

tbody.style = tbody\_style(color = "black",

fill = c("#bdbdbd","#ededed"), hjust=1, x=0.9)

ggtexttable(SSE50\_basics\_new,

theme = ttheme(

colnames.style = colnames\_style(color = "white", fill = "#7d7d7d"),

tbody.style = tbody.style

))

## 5.2 Figure



# 6. Line graph of individual stock

## 6.1 Codes

*## Generate the line graph of individual stock*

PingAn <- tushare(api\_name = "daily", ts\_code = '000001.SZ', start\_date = '20190405', end\_date = return\_cal\_dates[1])

PingAn\_return = PingAn$close[nrow(PingAn)]/PingAn$pre\_close[nrow(PingAn)] - 1

PingAn\_name <- list(

xref = 'paper',

yref = 'paper',

x = 0.23,

y = 0.99,

xanchor = 'right',

yanchor = 'middle',

text = '平安银行\n',

font = list(family = '楷体',

size = 20,

color = '#efefef'),

showarrow = FALSE)

PingAn\_price <- list(

xref = 'paper',

yref = 'paper',

x = 0.20,

y = 0.85,

xanchor = 'right',

yanchor = 'middle',

text = ~as.character(PingAn$close[nrow(PingAn)]),

font = list(family = 'Arial',

size = 26,

color = '#efefef'),

showarrow = FALSE)

PingAn\_change <- list(

xref = 'paper',

yref = 'paper',

x = 0.84,

y = 0.98,

xanchor = 'right',

yanchor = 'middle',

text = ~paste0(round(PingAn\_return\*100,2),'%'),

font = list(family = 'Arial',

size = 20,

color = '#efefef'),

showarrow = FALSE)

PingAn\_HL <- list(

xref = 'paper',

yref = 'paper',

x = 0.84,

y = 0.80,

xanchor = 'right',

yanchor = 'middle',

text = ~paste0("H ",PingAn$high[nrow(PingAn)],"\nL ",PingAn$low[nrow(PingAn)]),

font = list(family = 'Arial',

size = 16,

color = '#cfcfcf'),

showarrow = FALSE)

PingAn\_plot <- plot\_ly(PingAn, y=~close,x=~paste0(substr(trade\_date,5,6),'-',substr(trade\_date,7,8)),

type = 'scatter', mode = 'lines',

line = list(color = '#adadad')) %>%

layout(paper\_bgcolor=to\_color(PingAn\_return), plot\_bgcolor=to\_color(PingAn\_return),

xaxis = list(title = ""),

yaxis = list(title = "", range=c(min(PingAn$close),max(PingAn$close)\*1.5 - 0.5\*min(PingAn$close))),

margin =list(autoexpand = TRUE, r=10,l=10))%>%

layout(annotations = PingAn\_name)%>%

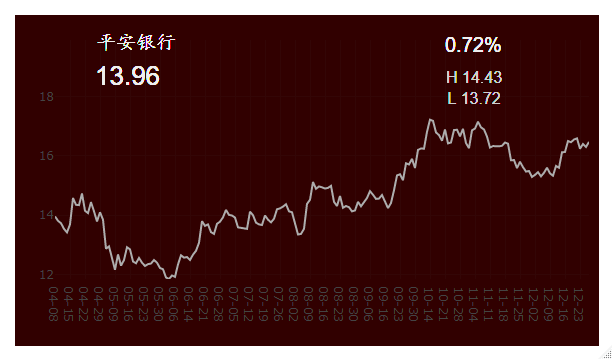
layout(annotations = PingAn\_price)%>%

layout(annotations = PingAn\_change)%>%

layout(annotations = PingAn\_HL)

PingAn\_plot

## 6.2 Figure



# 7. The appendix

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 日期Date | 指数代码Index Code | 指数名称Index Name | 指数英文名称Index Name(Eng.) | Constituent Code | Constituent Name | Constituent Name(Eng.) | Exchange | Weight(%) |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 600000 | 浦发银行 | Shanghai Pudong Development Bank Co Ltd | SHH | 2.58 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 600016 | 民生银行 | China Minsheng Banking Corp Ltd | SHH | 2.69 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 600019 | 宝钢股份 | Baoshan Iron &Steel Co Ltd | SHH | 0.91 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 600028 | 中国石化 | China Petroleum & Chemical Corporation | SHH | 1.15 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 600029 | 南方航空 | China Southern Airlines Co Ltd | SHH | 0.4 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 600030 | 中信证券 | CITIC Securities Co Ltd | SHH | 3.01 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 600031 | 三一重工 | Sany Heavy Industry Co Ltd | SHH | 1.39 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 600036 | 招商银行 | China Merchants Bank Co Ltd | SHH | 6.44 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 600048 | 保利地产 | Poly Developments and Holdings Group Co., Ltd. | SHH | 1.81 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 600050 | 中国联通 | China United Network Communications Co Ltd | SHH | 1.01 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 600104 | 上汽集团 | SAIC Motor Co Ltd | SHH | 1.45 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 600196 | 复星医药 | Shanghai Fosun Pharmaceutical (Group) Co Ltd | SHH | 0.45 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 600276 | 恒瑞医药 | Jiangsu Hengrui Medicine Co Ltd | SHH | 4.95 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 600309 | 万华化学 | Wanhua Chemical Group Co., Ltd. | SHH | 1.26 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 600340 | 华夏幸福 | China Fortune Land Development Co., Ltd. | SHH | 0.91 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 600519 | 贵州茅台 | Kweichow Moutai Co Ltd | SHH | 10.43 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 600585 | 海螺水泥 | Anhui Conch Cement Co Ltd | SHH | 1.48 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 600690 | 海尔智家 | Haier Smart Home Co., Ltd. | SHH | 1.03 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 600703 | 三安光电 | Sanan Optoelectronics Co.,Ltd | SHH | 0.65 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 600837 | 海通证券 | Haitong Securities Company Limited | SHH | 2.01 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 600887 | 伊利股份 | Inner Mongolia Yili Industrial Group Co Ltd | SHH | 3.11 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601066 | 中信建投 | China Securities Co., Ltd. | SHH | 0.18 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601088 | 中国神华 | China Shenhua Energy Co Ltd | SHH | 1.07 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601111 | 中国国航 | Air China Ltd | SHH | 0.44 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601138 | 工业富联 | Foxconn Industrial Internet Co., Ltd. | SHH | 0.32 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601166 | 兴业银行 | Industrial Bank | SHH | 4.79 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601186 | 中国铁建 | China Railway Construction Co Ltd | SHH | 0.76 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601211 | 国泰君安 | Guotai Junan Securities Co., Ltd. | SHH | 1.35 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601229 | 上海银行 | Bank of Shanghai Co., Ltd. | SHH | 1.17 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601288 | 农业银行 | Agricultural Bank of China Co Ltd | SHH | 2.45 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601318 | 中国平安 | Ping An Insurance (Group) Company of China Ltd | SHH | 16.79 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601319 | 中国人保 | The People's Insurance Company (Group) of China Limited | SHH | 0.16 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601328 | 交通银行 | Bank of Communications Co LTD | SHH | 2.71 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601336 | 新华保险 | New China Life Insurance Co Ltd | SHH | 0.7 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601390 | 中国中铁 | China Railway Group Limited | SHH | 0.83 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601398 | 工商银行 | Industrial and Commercial Bank of China Ltd | SHH | 2.24 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601601 | 中国太保 | China Pacific Insurance (Group) Co Ltd | SHH | 1.91 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601628 | 中国人寿 | China Life Insurance Company Limited | SHH | 0.98 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601668 | 中国建筑 | China State Construction Engineering Co Ltd | SHH | 1.94 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601688 | 华泰证券 | Huatai Securities Co Ltd | SHH | 1.12 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601766 | 中国中车 | CRRC Corporation Limited | SHH | 1.23 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601800 | 中国交建 | China Communications Construction Company Limited | SHH | 0.39 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601818 | 光大银行 | China Everbright Bank Co Ltd | SHH | 1.22 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601857 | 中国石油 | PetroChina Co Ltd | SHH | 0.84 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601888 | 中国国旅 | China International Travel Service Co Ltd | SHH | 1.55 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601939 | 建设银行 | China Construction Bank | SHH | 0.86 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601988 | 中国银行 | Bank of China Ltd | SHH | 1.37 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 601989 | 中国重工 | China Shipbuilding Industry Co Ltd | SHH | 0.85 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 603259 | 药明康德 | WuXi AppTec Co., Ltd. | SHH | 0.24 |
| 2019/10/31 | 16 | 上证50 | SSE 50 | 603993 | 洛阳钼业 | China Molybdenum Co., Ltd. | SHH | 0.42 |