Course 2 Section 2.10 - Spatial point data

Jiaying Wu

12/10/2020

```
# library
library(tidyverse)
library(here)

# Load plane_N4YRAA (plane_N4YRAA.rda is an R object that we're loading into the R environment)
load(here("data", "plane_N4YRAA.rda"))

# Read airports
airports <- read_csv(here("data", "airports.csv"))
```

```
## Warning: Missing column names filled in: 'X29' [29]
```

Join the two tables

```
# Select airport code, location and airport name but filter only for the latest airport
airports <- airports %>%
  select(AIRPORT, LATITUDE, LONGITUDE, AIRPORT_IS_LATEST, DISPLAY_AIRPORT_NAME) %>%
  filter(AIRPORT_IS_LATEST == 1) %>%
  select(-AIRPORT_IS_LATEST)

# First join: Join airports to plane_N4YRAA to add origin location info
N4YRAA_latlon <- plane_N4YRAA %>%
  left_join(airports, by = c("ORIGIN" = "AIRPORT")) %>%
  rename(ORIGIN_LATITUDE = LATITUDE,
         ORIGIN_LONGITUDE = LONGITUDE)

# Second join: Join airports to N4YRAA_latlon to add destination location info
N4YRAA_latlon <- N4YRAA_latlon %>%
  left_join(airports, by = c("DEST" = "AIRPORT")) %>%
  rename(DEST_LATITUDE = LATITUDE,
         DEST_LONGITUDE = LONGITUDE) %>%
  # Arrange N4YRAA_latlon by flight date and departure time
  arrange(FL_DATE, DEP_TIME)
```

Map it with ggmap

```
# Load ggmap
library(ggmap)
```

```
# Load ggthemes
library(ggthemes)

# Enable Google services (need to obtain your Google Map API key first)
register_google(key = "Insert_your_API_key")
```

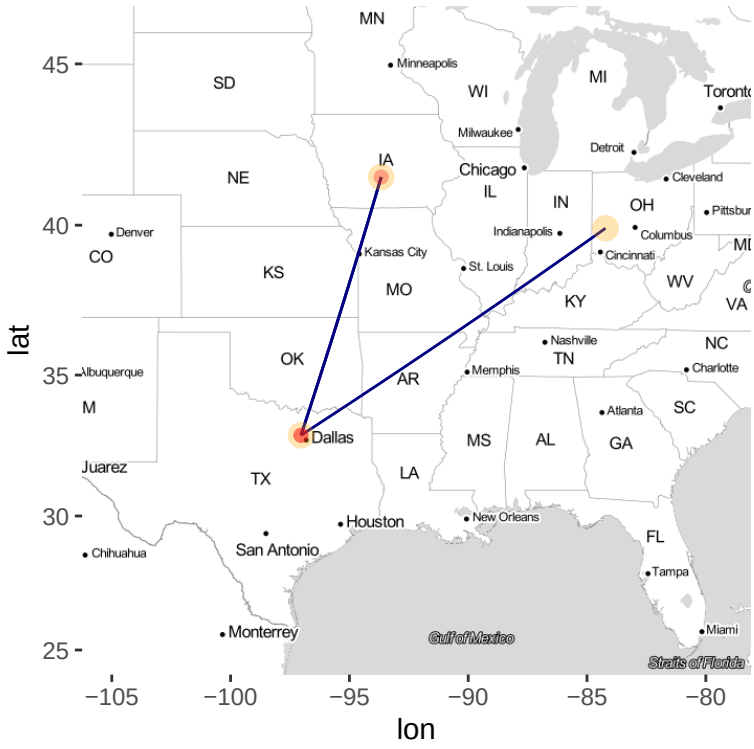
Give it a go!

```
# Geographical coordinates of a location in decimal degrees
arkansas <- c(lon = -92.20562, lat = 36.20259)

# Download Stamen map of Arkansas with toner-lite map type
map_toner_lite <- get_map(location = arkansas, zoom = 5, source = "stamen", maptype = "toner-lite")
```

greyscale map with minimal geographical features

```
# Flights from N4YRAA on 2017-05-06
ggmap(map_toner_lite, base_layer = ggplot(data = filter(N4YRAA_latlon, FL_DATE == "2017-05-06"))) +
  geom_segment(aes(x = ORIGIN_LONGITUDE,
                   y = ORIGIN_LATITUDE,
                   xend = DEST_LONGITUDE,
                   yend = DEST_LATITUDE),
               color = "navyblue") +
  geom_point(aes(x = ORIGIN_LONGITUDE,
                 y = ORIGIN_LATITUDE),
             color = "orange",
             alpha = 0.3,
             size = 4) +
  geom_point(aes(x = DEST_LONGITUDE,
                 y = DEST_LATITUDE),
             color = "red",
             alpha = 0.3,
             size = 2) +
  labs(x = "lon", y = "lat")
```



plot of N4YRAA's flights each day.

```
# Map with flight origin and destination points: 2017-05
ggmap(map_toner_lite, base_layer = ggplot(data = N4YRAA_latlon)) +
  geom_segment(aes(x = ORIGIN_LONGITUDE,
                   y = ORIGIN_LATITUDE,
                   xend = DEST_LONGITUDE,
                   yend = DEST_LATITUDE),
               color = "navyblue") +
  geom_point(aes(x = ORIGIN_LONGITUDE,
                 y = ORIGIN_LATITUDE),
             color = "orange",
             alpha = 0.3,
             size = 4) +
  geom_point(aes(x = DEST_LONGITUDE,
                 y = DEST_LATITUDE),
             color = "red",
             alpha = 0.3,
             size = 2) +
  theme_map() +
  facet_wrap(~ FL_DATE) +
  labs(title = "Plane N4YRAA's flights on May, 2017")
```

```
## Warning: Removed 13 rows containing missing values (geom_segment).
```

```
## Warning: Removed 7 rows containing missing values (geom_point).
```

```
## Warning: Removed 6 rows containing missing values (geom_point).
```

Plane N4YRAA's flights on May, 2017