AIT580_Final Project

2023-05-04

```
library(tidyverse)
```

```
## ── Attaching packages ─────────────────────────────────────── tidyverse 1.3.2 ──
## ✔ ggplot2 3.4.2     ✔ purrr   1.0.1
## ✔ tibble  3.2.1     ✔ dplyr   1.1.0
## ✔ tidyr   1.3.0     ✔ stringr 1.5.0
## ✔ readr   2.1.4     ✔ forcats 1.0.0
## ── Conflicts ────────────────────────────────────────── tidyverse_conflicts() ──
## ✖ dplyr::filter() masks stats::filter()
## ✖ dplyr::lag()    masks stats::lag()
```

```
library(sf)
```

```
## Linking to GEOS 3.10.2, GDAL 3.4.2, PROJ 8.2.1; sf_use_s2() is TRUE
```

```
library(ggplot2)
library(ggmap)
```

```
## ℹ Google's Terms of Service: ]8;;https://mapsplatform.google.com<https://mapsplatform.google.com>]8;;
## ℹ Please cite ggmap if you use it! Use `citation("ggmap")` for details.
```

```
library(viridis)
```

```
## Loading required package: viridisLite
```

```
library(mapdata)
```

```
## Loading required package: maps
##
## Attaching package: 'maps'
##
## The following object is masked from 'package:viridis':
##
##     unemp
##
## The following object is masked from 'package:purrr':
##
##     map
```

```
library(sp)
library(RColorBrewer)
library(maps)
library(plotly)
```

```
##
## Attaching package: 'plotly'
##
## The following object is masked from 'package:ggmap':
##
##     wind
##
## The following object is masked from 'package:ggplot2':
##
##     last_plot
##
## The following object is masked from 'package:stats':
##
##     filter
##
## The following object is masked from 'package:graphics':
##
##     layout
```

```
ev_data <- read.csv("/Users/niveditaj/Desktop/final_AIT/Electric_Vehicle_Population_Data.csv")
head(ev_data)
```

	VIN..1.10. <chr>	County <chr>	City <chr>	State <chr>	Postal.Code <int>	Model.Year <int>	Make <chr>	Model <chr>
1	5YJ3E1EB2J	Suffolk	Suffolk	VA	23435	2018	TESLA	MODEL 3
2	5YJ3E1ECXL	Yakima	Yakima	WA	98908	2020	TESLA	MODEL 3
3	WA1LAAGE7M	Yakima	Yakima	WA	98908	2021	AUDI	E-TRON
4	5YJ3E1EA1K	Danville	Danville	VA	24541	2019	TESLA	MODEL 3
5	1FADP5CU9E	Norfolk	Norfolk	VA	23518	2014	FORD	C-MAX
6	1N4AZ0CP1F	Thurston	Olympia	WA	98502	2015	NISSAN	LEAF

6 rows | 1-9 of 18 columns

```
# Group data by county and find the most popular make
MN1 <- ev_data %>%
  group_by(County, Make) %>%
  summarise(count = n()) %>%
  top_n(1, count) %>%
  ungroup()
```

```
# Convert county names to lowercase
MN1$County <- tolower(MN1$County)
head(MN1)
```

County <chr>	Make <chr>	count <int>
	TESLA	2
adams	TESLA	15
alameda	TESLA	3
alexandria	CHEVROLET	1
alexandria	JEEP	1
alexandria	KIA	1

6 rows

```
# Get the state and county boundaries for Washington state
wa_state_map <- map_data("state", "washington")
wa_county_map <- map_data("county", "washington")
head(wa_state_map)
```

	long <dbl>	lat <dbl>	group <dbl>	order <int>	region <chr>	subregion <chr>
1	-123.0198	48.56963	1	1	washington	san juan island
2	-123.0542	48.61547	1	2	washington	san juan island
3	-123.0943	48.60974	1	3	washington	san juan island
4	-123.0943	48.58109	1	4	washington	san juan island
5	-123.1172	48.56390	1	5	washington	san juan island
6	-123.1114	48.53526	1	6	washington	san juan island

6 rows

```
head(wa_county_map)
```

	long <dbl>	lat <dbl>	group <dbl>	order <int>	region <chr>	subregion <chr>
1	-118.2356	46.73617	1	1	washington	adams
2	-119.3700	46.74190	1	2	washington	adams
3	-119.3700	46.74190	1	3	washington	adams
4	-119.3757	46.90232	1	4	washington	adams
5	-118.9804	46.90805	1	5	washington	adams
6	-118.9804	47.25756	1	6	washington	adams

6 rows

```
# Join the data to the county map
county_ev_data <- left_join(wa_county_map, MN1, by = c("subregion" = "County"))

# Set colors for each Make using RColorBrewer
colors <- brewer.pal(length(unique(county_ev_data$Make)), "Set1")

county_names <- county_ev_data %>%
  group_by(subregion) %>%
  summarise(long = mean(long), lat = mean(lat)) %>%
  ungroup()
county_names
```

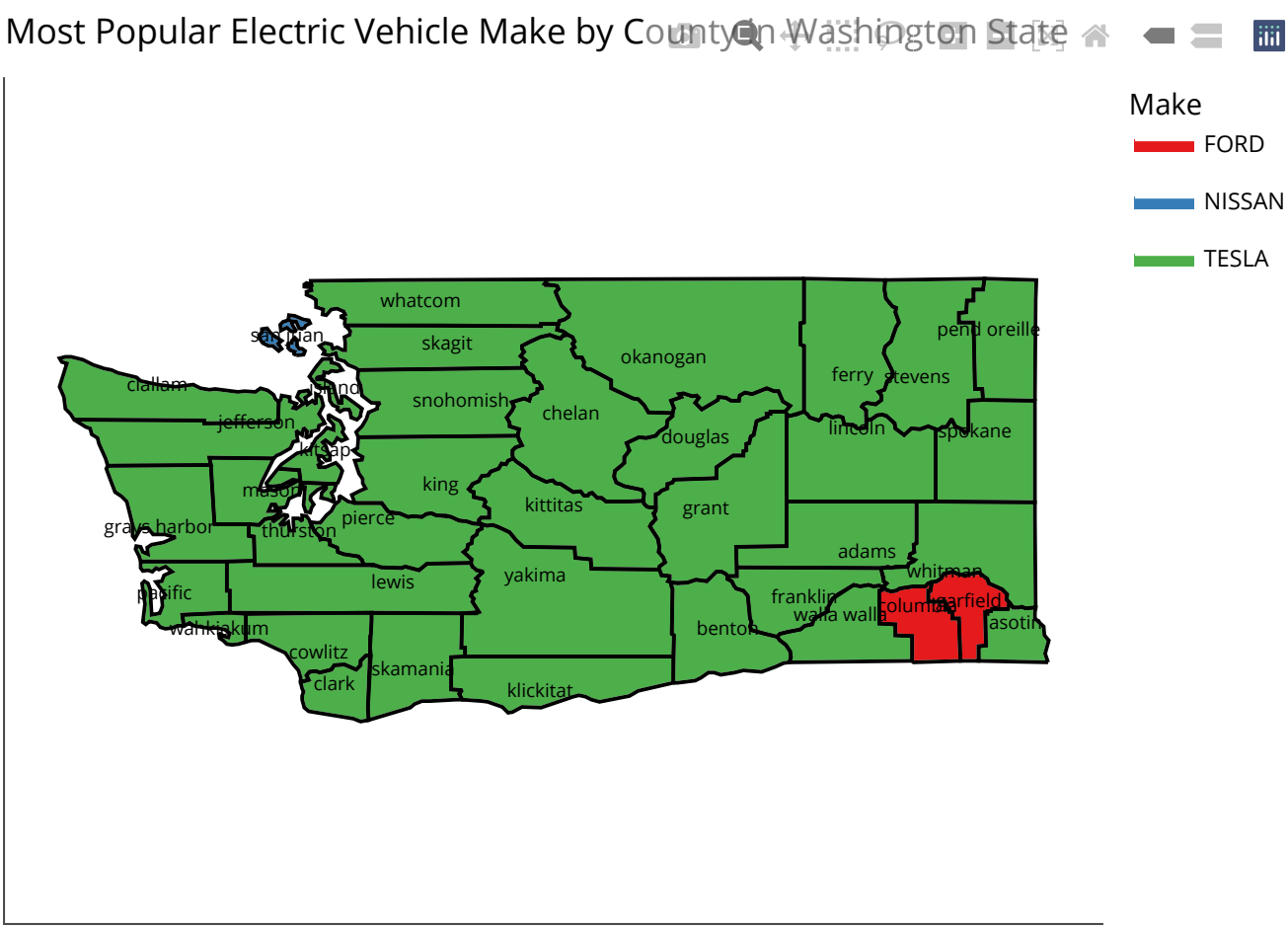
subregion <chr>	long <dbl>	lat <dbl>
adams	-118.3470	46.84961
asotin	-117.1830	46.29809
benton	-119.4402	46.25244
chelan	-120.6702	47.93874
clallam	-123.9146	48.16004
clark	-122.5258	45.81424
columbia	-117.9526	46.42578
cowlitz	-122.6499	46.06008
douglas	-119.6941	47.75474
ferry	-118.4615	48.23919

1-10 of 39 rows Previous **1** 2 3 4 Next

```
p <- ggplot() +
  geom_polygon(data = county_ev_data, aes(x = long, y = lat, group = group, fill =
Make, tooltip = paste("<b>County: </b>", subregion, "<br><b>Make: </b>", Make, "<b
r><b>Count: </b>", count)), color = "white") +
  geom_polygon(data = county_ev_data, aes(x = long, y = lat, group = group), fill
 = NA, color = "black") +
  geom_text(data = county_names, aes(x = long, y = lat, label = subregion), size =
2.5, fontface = "bold", color = "black") +
  scale_fill_manual(values = colors) +
  labs(title = "Most Popular Electric Vehicle Make by County in Washington State")
+
  coord_map() +
  theme_void()
```

```
## Warning in geom_polygon(data = county_ev_data, aes(x = long, y = lat, group =
## group, : Ignoring unknown aesthetics: tooltip
```

```
ggplotly(p)
```


Most Popular Electric Vehicle Make by County in Washington State
Make
FORD
NISSAN
TESLA
whatcom
skagit
okanogan
pend oreille
ferry
stevens
clallam
snohomish
chelan
jefferson
douglas
lincoln
spokane
king
kittitas
grant
mason
pierce
grays harbor
thurston
adams
whitman
lewis
yakima
franklin
garfield
pacific
walla walla
columbia
asotin
wahkiakum
benton
cowlitz
skamania
clark
klickitat