

# Data Analysis

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**Add 1 paragraph describing your data set and 1 paragraph outlining your proposed in-class and out-of-class methods.**

The Dialect Survey uses a series of questions, including rhyming word pairs and vocabulary words, to explore the distribution of dialects in American. We have 122 survey responses from 47,472 people from different city, state and zip code areas. The majority of participants were from the east coast, and approximately a third of the participants were in the 20-29 age range.

In this project, we would use these data to fit a KNN classification model showing predicted class membership at each location in the US based on dialect. Our explanatory variable is zipcode and response is dialect. In addition, our second analysis will be based on a topic we haven't learned in class such as, neural networks to help us cluster, classify and recognize patterns of the data.

```
# Libraries
library(ggplot2)

## Registered S3 methods overwritten by 'ggplot2':
##   method      from
##   [.quosures   rlang
##   c.quosures   rlang
##   print.quosures rlang

## Registered S3 method overwritten by 'dplyr':
##   method      from
##   as.data.frame.tbl_df tibble

library(dplyr)

##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##   filter, lag

## The following objects are masked from 'package:base':
##
##   intersect, setdiff, setequal, union

library(readr)
dialect_survey<-read_csv("dialect_survey.csv")

## Parsed with column specification:
## cols(
##   .default = col_integer(),
##   ID = col_character(),
##   CITY = col_character(),
##   STATE = col_character(),
##   ZIP = col_character()
## )
```

```

## See spec(...) for full column specifications.
zip_codes<-read_csv("zipcodes.csv")

## Parsed with column specification:
## cols(
##   ZIP = col_character(),
##   LAT = col_double(),
##   LNG = col_double()
## )

##dataset with only ID, state, city, zip code, and answer to lawyer question
lawyer_response<-dialect_survey[,c(1:4, 18)]

for(i in seq_len(ncol(lawyer_response))){
  print(names(lawyer_response)[i])
  print(sum(is.na(lawyer_response[[i]])))
}

## [1] "ID"
## [1] 0
## [1] "CITY"
## [1] 537
## [1] "STATE"
## [1] 3
## [1] "ZIP"
## [1] 0
## [1] "Q014"
## [1] 0

##we examined whether there are missing values and found 3 pieces of missing data for state, and 537 for

##cleaned up our data: got rid of city and ID
lawyer_response<-dialect_survey[,c(3, 4, 18)]

lawyer_response_cleaned<-mutate(lawyer_response, ZIP=substr(ZIP, 2, 6))
lawyer_response_cleaned

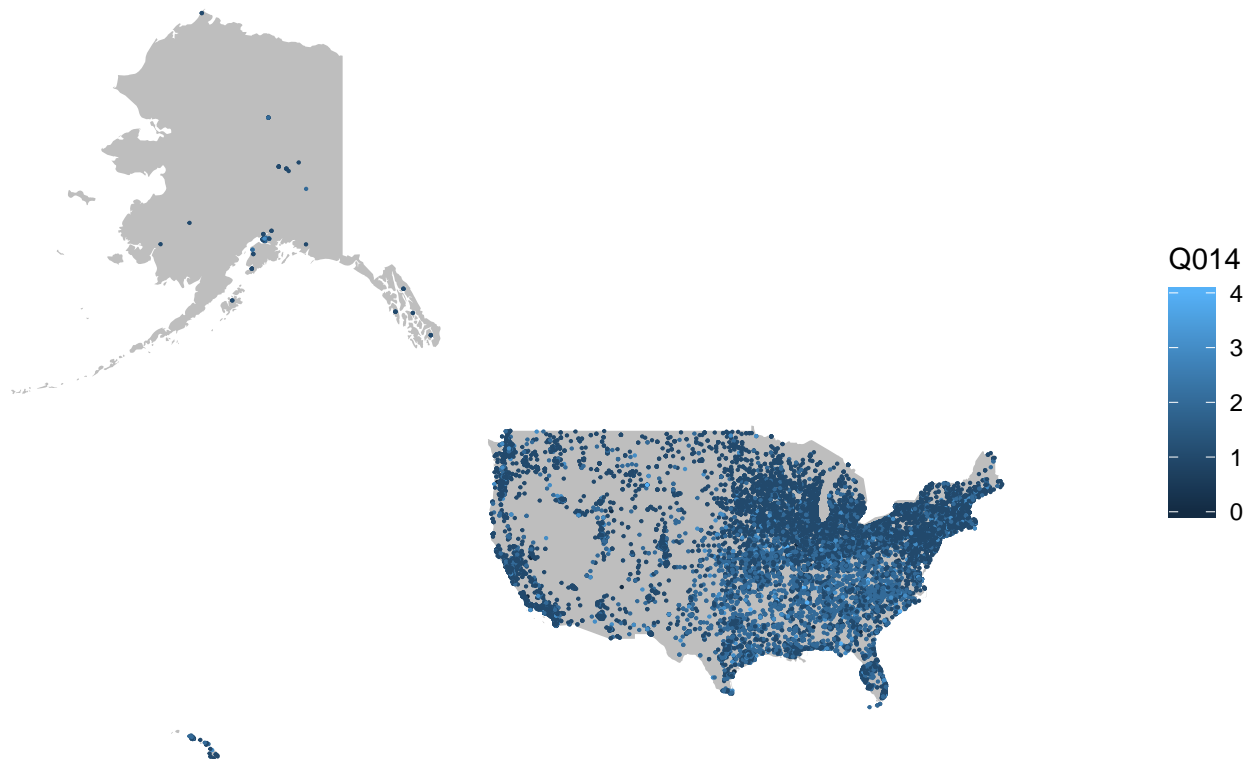
## # A tibble: 47,471 x 3
##   STATE ZIP    Q014
##   <chr> <chr> <int>
## 1 ID    83704    0
## 2 MA    01201    1
## 3 VT    05401    1
## 4 PA    18042    1
## 5 MA    01730    1
## 6 TX    77479    2
## 7 MA    02066    1
## 8 MD    21044    1
## 9 MN    56150    1
## 10 MA   01033    1
## # ... with 47,461 more rows

results<-left_join(x=lawyer_response_cleaned, y=zip_codes, by="ZIP", copy=FALSE)
results<-results[!is.na(results$LAT) & !is.na(results$LNG), ]

```

```
# Get the world polygon and extract USA
library(maps)
USA <- map_data("world") %>% filter(region=="USA")

# Left chart
g<-ggplot() +
  geom_polygon(data = USA, aes(x=long, y = lat, group = group), fill="grey") +
  geom_point(data=results, aes(x=LNG, y=LAT, color=Q014), size=0.1) +
  theme_void()+coord_map(xlim = c(-180, -50),ylim = c(18, 72))
g
```



```
results %>% group_by(Q014)%>% count()
```

```
## # A tibble: 5 x 2
## # Groups:   Q014 [5]
##   Q014     n
##   <int> <int>
## 1     0   426
## 2     1 33083
## 3     2 10414
## 4     3  2376
## 5     4   136
```

<https://www.r-graph-gallery.com/330-bubble-map-with-ggplot2.html>