

# Zip Code Mapping

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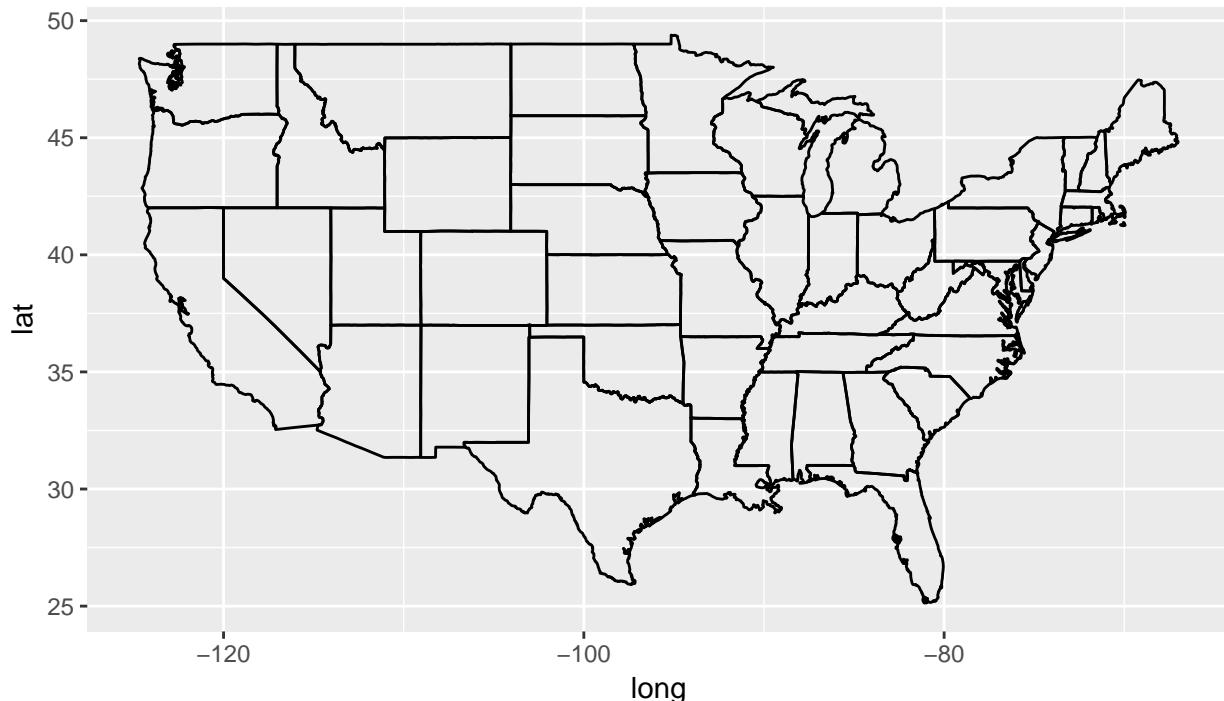
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## Zip Codes in USA with Longitudes and Latitudes

Using data from Eric Hurst's US zip code dataset, I was looking to plot distances from Nashville to anywhere within the contiguous United States. This is a first attempt at making maps in R.

```
library(ggplot2)
library(ggmap)
library(maps)
library(mapdata)

usa <- map_data("usa")
states <- map_data("state")
ggplot() + geom_polygon(data = states, aes(x = long, y = lat, group = group),
fill = NA, color = "black") + coord_fixed(1.3)
```



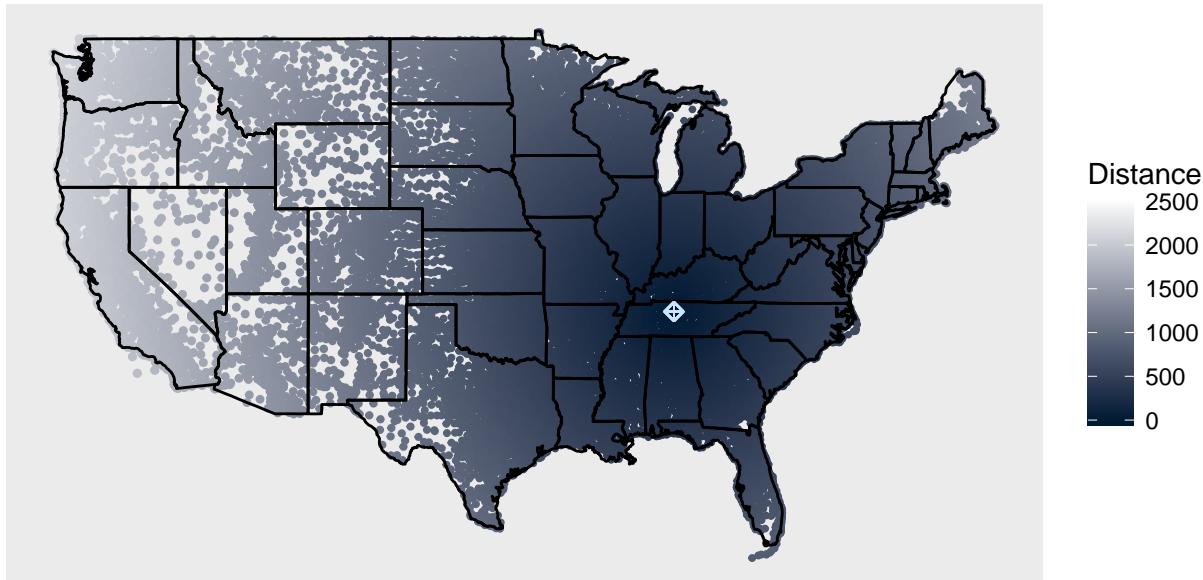
```
library(geosphere)

## Loading required package: sp
zipCodes <- read.csv("~/Documents/zipCodeMapping/zipCodesUS.csv", stringsAsFactors = FALSE,
header = TRUE)
colnames(zipCodes) <- c("zip", "lat", "long")
zipCodes <- zipCodes[zipCodes$lat < 50 & zipCodes$lat > 20 & zipCodes$long >
-130, ]
zipCodes$Distance <- (distm(zipCodes[, c("long", "lat")], zipCodes[zipCodes$zip ==
37214, c("long", "lat")]), fun = distVincentyEllipsoid)/1000/1.609
```

```

ggplot() + geom_point(data = zipCodes, aes(x = long, y = lat, colour = Distance,
size = Distance)) + scale_colour_gradient(limits = c(0, 2500), low = "#001933",
high = "white") + scale_size_continuous(range = c(0.25, 1), guide = FALSE) +
geom_polygon(data = states, aes(x = long, y = lat, group = group), fill = NA,
color = "black") + coord_fixed(1.3) + geom_point(data = zipCodes, aes(x = -86.67087,
y = 36.16219), colour = "#CCE5FF", size = 2, shape = 9) + theme(axis.text = element_blank(),
axis.line = element_blank(), axis.ticks = element_blank(), panel.border = element_blank(),
panel.grid = element_blank(), axis.title = element_blank())

```



```

coord_US <- matrix(0,3,ncol=4)
coord_US[1,] <- c(-86.67087, 36.16219, -122.3321,47.6062)
coord_US[2,] <- c(-86.67087, 36.16219, -74.0059, 40.7128)
coord_US[3,] <- c(-86.67087, 36.16219, -81.3792, 28.5383)
coord_US <- data.frame(coord_US)
colnames(coord_US) <- c("Long1","Lat1","Long2","Lat2")

cities <- matrix(0,4,ncol=3)
cities[1,] <- c(-86.67087, 36.16219, 'Nashville')
cities[2,] <- c(-122.3321,47.6062, 'Seattle')
cities[3,] <- c(-74.0059, 40.7128, 'New York City')
cities[4,] <- c(-81.3792, 28.5383, 'Orlando')
cities <- data.frame(cities)
colnames(cities) <- c("Long","Lat","City")
cities$Long <- as.character(cities$Long)
cities$Long <- as.numeric(cities$Long)
cities$Lat <- as.character(cities$Lat)
cities$Lat <- as.numeric(cities$Lat)

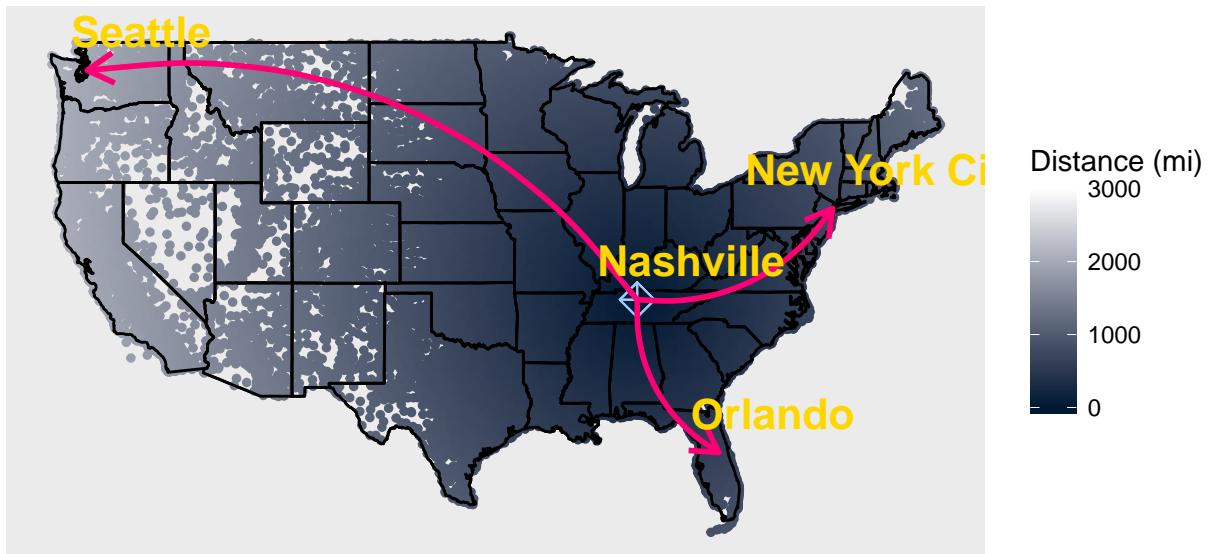
ggplot() +
  geom_polygon(data = states , aes(x=long, y = lat, group = group), fill = NA, color = "black") +
  geom_point(data = zipCodes, aes(x=long,y=lat,colour = Distance),size=1) +
  scale_colour_gradient(limits=c(0,3000),low='#001933',high='white',guide_legend(title="Distance (mi)")+
  #scale_size_continuous(range=c(1,5),guide=FALSE) +

```

```

coord_fixed(1.3) +
geom_polygon(data = states , aes(x=long, y = lat, group = group), fill = NA, color = "black") +
geom_point(data=cities,aes(x=Long[1],y= Lat[1]),colour='#99CCFF',size=4,shape=9) +
geom_curve(data=coord_US,aes(x=Long1, y=Lat1, xend=Long2, yend=Lat2),colour='#FF0074',
           arrow=arrow(angle=30,length=unit(0.4,"cm")), curvature = 0.3,size=1) +
geom_text(data=cities,aes(x=Long+3.5,y= Lat+1.95,label=City),size=5.5,colour=c('gold'), fontface=2) +
theme(
  axis.text = element_blank(),
  axis.line = element_blank(),
  axis.ticks = element_blank(),
  panel.border = element_blank(),
  panel.grid = element_blank(),
  axis.title = element_blank())

```



```

dat.tenn <- states[states$region == "tennessee", ]
tenn.zipcodes <- seq(37010, 38589, by = 1)

coord_TN <- matrix(0, 3, ncol = 4)
coord_TN[1, ] <- c(-86.67087, 36.16219, -90.049, 35.1495)
coord_TN[2, ] <- c(-86.67087, 36.16219, -85.3097, 35.0456)
coord_TN[3, ] <- c(-86.67087, 36.16219, -83.9207, 35.9606)
coord_TN <- data.frame(coord_TN)
colnames(coord_TN) <- c("Long1", "Lat1", "Long2", "Lat2")

cities_TN <- matrix(0, 4, ncol = 3)
cities_TN[1, ] <- c(-86.67087, 36.16219, "Nashville")
cities_TN[2, ] <- c(-90.049, 35.1495, "Memphis")
cities_TN[3, ] <- c(-85.3097, 35.0456, "Chattanooga")
cities_TN[4, ] <- c(-83.9207, 35.9606, "Knoxville")
cities_TN <- data.frame(cities_TN)
colnames(cities_TN) <- c("Long", "Lat", "City")
cities_TN$Long <- as.character(cities_TN$Long)
cities_TN$Long <- as.numeric(cities_TN$Long)
cities_TN$Lat <- as.character(cities_TN$Lat)
cities_TN$Lat <- as.numeric(cities_TN$Lat)

```

```

ggplot() + geom_polygon(data = dat.tenn, aes(x = long, y = lat, group = group),
  fill = NA, color = "black") + geom_point(data = zipCodes[zipCodes$zip %in%
  tenn.zipcodes, ], aes(x = long, y = lat, colour = Distance), size = 5) +
  scale_colour_gradient(low = "#001933", high = "white", guide_legend(title = "Distance (mi)") ) +
  # scale_size_continuous(range=c(1,5),guide=FALSE) +
  coord_fixed(1.3) + geom_polygon(data = dat.tenn, aes(x = long, y = lat, group = group),
  fill = NA, color = "black") + geom_curve(data = coord_TN, aes(x = Long1,
  y = Lat1, xend = Long2, yend = Lat2), colour = "#FFB266", arrow = arrow(angle = 30,
  length = unit(0.4, "cm")), curvature = 0.3, size = 1) + geom_point(data = cities_TN,
  aes(x = Long[1], y = Lat[1]), size = 5, colour = "#99CCFF", shape = 9) +
  geom_text(data = cities_TN, aes(x = Long + 0.45, y = Lat + 0.15, label = City),
  size = 5.5, colour = "gold", fontface = 2) + theme(axis.text = element_blank(),
  axis.line = element_blank(), axis.ticks = element_blank(), panel.border = element_blank(),
  panel.grid = element_blank(), axis.title = element_blank())

```

