Minard plot revisioned

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Revision of Minard's plot

Description from R package HistData

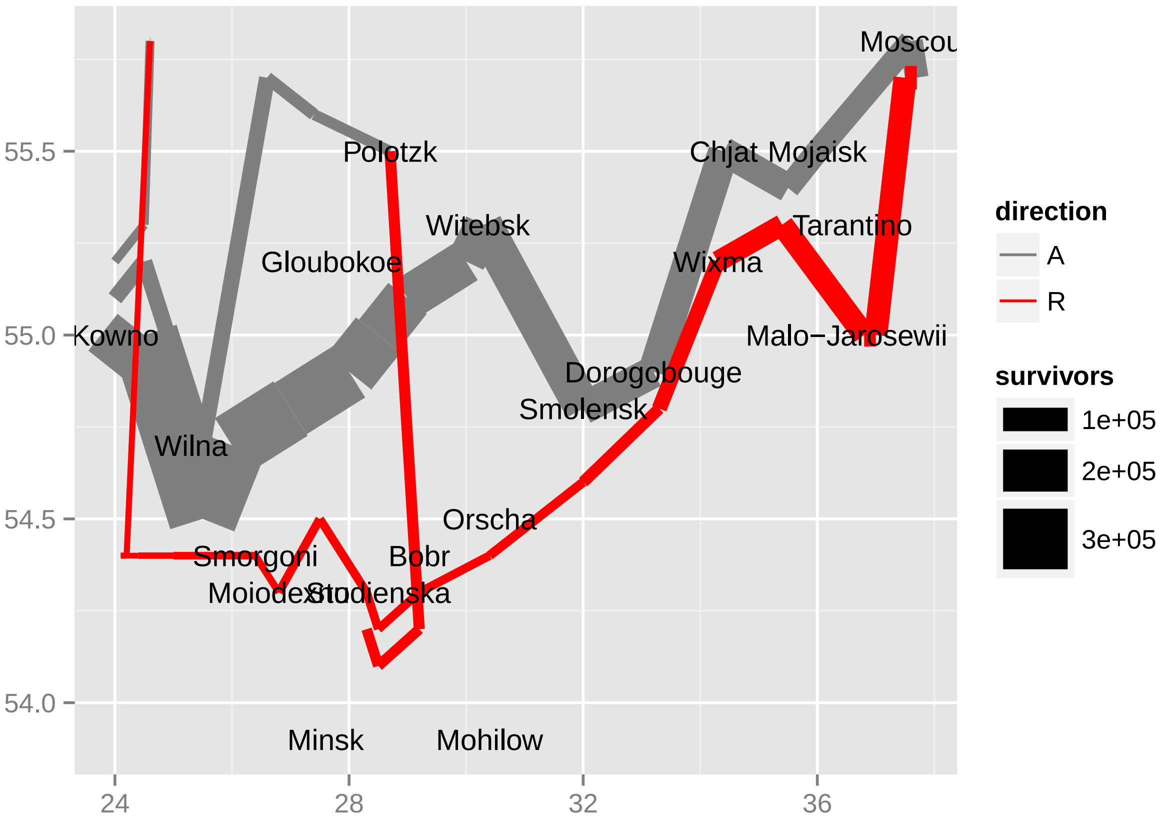
"Charles Joseph Minard's graphic depiction of the fate of Napoleon's Grand Army in the Russian campaign of 1815 has been called the"greatest statistical graphic ever drawn" (Tufte, 1983). Friendly (2002) describes some background for this graphic, and presented it as Minard's Chalenge: to reproduce it using modern statistical or graphic software, in a way that showed the elegance of some computer language to both describe and produce this graphic."

[minard plot]{https://upload.wikimedia.org/wikipedia/commons/2/29/Minard.png}

```
## Loading required package: HistData
## Loading required package: maps

## Warning: package 'maps' was built under R version 3.1.3

##
##  # ATTENTION: maps v3.0 has an updated 'world' map.        #
##  # Many country borders and names have changed since 1990. #
##  # Type '?world' or 'news(package="maps")'. See README_v3. #
##
##
## Loading required package: mapproj

## Warning: package 'mapproj' was built under R version 3.1.3

## Loading required package: ggplot2

## Warning: package 'ggplot2' was built under R version 3.1.3

## Loading required package: RgoogleMaps
## Loading required package: sp

## Warning: package 'sp' was built under R version 3.1.3

## Loading required package: RColorBrewer
## Loading required package: grid
## Loading required package: lava
## lava version 1.4.0
##
## Attaching package: 'lava'
##
## The following object is masked from 'package:ggplot2':
##
##     %+%
```

ggplot2 implementation from the HistData example codes.

```
plot_troops <- ggplot(Minard.troops, aes(long, lat)) +
  geom_path(aes(size = survivors, colour = direction, group = group))

plot_both <- plot_troops +
  geom_text(aes(label = city), size = 4, data = Minard.cities)

plot_polished <- plot_both +
  scale_size_continuous(range = c(1, 12),
    breaks = c(1, 2, 3) * 10^5, labels = format(c(1, 2, 3) * 10^5)) +
  scale_colour_manual(values = c("grey50","red")) +
  xlab(NULL) +
  ylab(NULL)

plot_polished
```



Revision the Minard's plot using RgoogleMap

First separate the individual tracks.

```
Minard.troops.list=list(1:6)
tracks=NULL
tracks$direction=rep(c("A", "R"), each=3)
tracks$rt=rep(1:3, 2)
```

```
for(i in 1:6){
  Minard.troops.list[[i]]=Minard.troops[(Minard.troops[,4]==tracks$direction[i])&(Minard.troops[,5]==tra
  Minard.troops.list[[i]]$up=Minard.troops.list[[i]]$lat+
    Minard.troops.list[[i]]$survivors/1500000
  Minard.troops.list[[i]]$lo=Minard.troops.list[[i]]$lat-
    Minard.troops.list[[i]]$survivors/1500000
  Minard.troops.list[[i]]$size=Minard.troops.list[[i]]$survivors/1500000
}
```

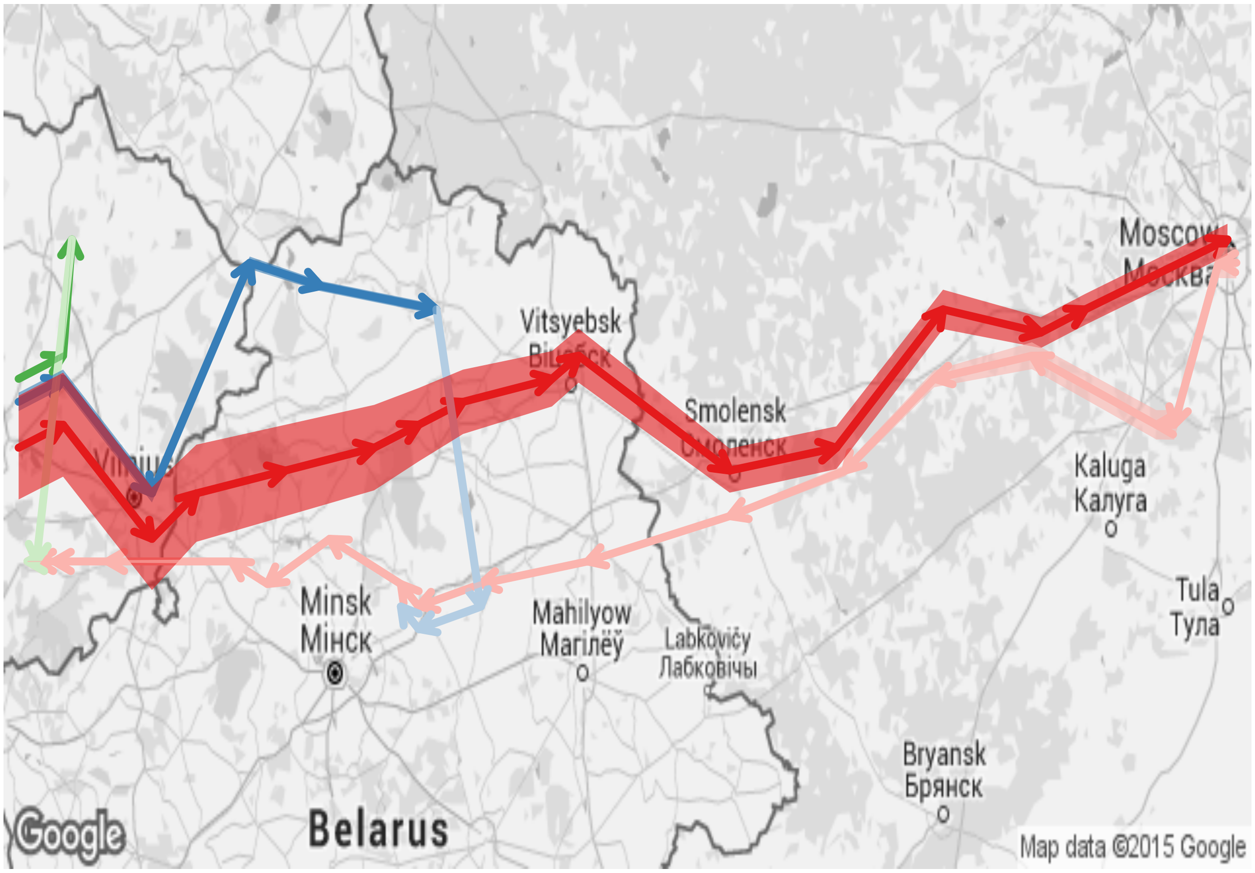
Second, setup the map.

```
lat=Minard.troops$lat
lon=Minard.troops$lon
center = c((max(lat)+min(lat))/2, (max(lon)+min(lon))/2);
zoom <- min(MaxZoom(range(lat), range(lon)))

MyMap <- GetMap(center=center, zoom=zoom,
                size=c(640, 300),
                GRAYSCALE=TRUE,
                destfile = "MyTile1.png")
```

Using `PlotArrowsOnStaticMap` and `PloyPolysOnStaticMap` to show the survivors along the tracks.

```
col.use=c(brewer.pal(3, "Set1"), brewer.pal(3, "Pastel1"))

for(i in 1:6){
  rt.len=nrow(Minard.troops.list[[i]])
  add.ind=TRUE
  if(i == 1) {add.ind=FALSE}
  PlotArrowsOnStaticMap(MyMap,
                        lat0=Minard.troops.list[[i]]$lat[-rt.len],
                        lon0=Minard.troops.list[[i]]$long[-rt.len],
                        lat1=Minard.troops.list[[i]]$lat[-1],
                        lon1=Minard.troops.list[[i]]$long[-1],
                        add=add.ind,
                        length=unit(0.1, "npc"),
                        lwd=4,
                        col = col.use[i])



}

Srs=list(1:6)
for(i in 1:6){
  rt.len=nrow(Minard.troops.list[[i]])
  xx=c(Minard.troops.list[[i]][,1], Minard.troops.list[[i]][rt.len:1,1])
  yy=c(Minard.troops.list[[i]][,4], Minard.troops.list[[i]][rt.len:1,5])
  Sr1 = Polygon(cbind(xx, yy))
  Srs[[i]] = Polygons(list(Sr1), paste("s", i, sep=""))
}

SpP = SpatialPolygons(Srs, 1:6)
```

```
PlotPolysOnStaticMap(MyMap, SpP,
                     lwd=2,
                     border=NA,
                     col = Col(col.use, alpha=0.6),
                     add = T)
```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