# NOAA Storm Data Analysis to quantize the impact both Economically and Health wise

Storms and other severe weather events can cause both public health and economic problems for communities and municipalities. Many severe events can result in fatalities, injuries, and property damage, and preventing such outcomes to the extent possible is a key concern.

This project involves exploring the U.S. National Oceanic and Atmospheric Administration's (NOAA) storm database. This database tracks characteristics of major storms and weather events in the United States, including when and where they occur, as well as estimates of any fatalities, injuries, economic damage.

Data is taken and preprocessed in Data Processing section to produce tidy data which is further used to plot various graphs, in Result section, which shows what different types of severe weather events cause maximum damage in terms of injuries, fatalities as well as economic damage.

## Data Processing

```
#Loading required libraries
library(reshape)
library(ggplot2)

#Loading data
DATA <- read.table("repdata-data-StormData.csv", header = TRUE, sep = ",")

#Subsetting data
requiredData <- DATA[, c("EVTYPE", "FATALITIES", "INJURIES", "PROPDMG", "PROPDMGEXP", "CROPDMGEXP", "CR

#Calculating total property damage caused by natural clamities
requiredData$PROPDMGCOST = 0
requiredData[requiredData$PROPDMGEXP == "K", ]$PROPDMGCOST <- requiredData[requiredData$PROPDMGEXP == "
requiredData[requiredData$PROPDMGEXP == "H", ]$PROPDMGCOST <- requiredData[requiredData$PROPDMGEXP == "
requiredData[requiredData$PROPDMGEXP == "M", ]$PROPDMGCOST <- requiredData[requiredData$PROPDMGEXP == "
requiredData[requiredData$PROPDMGEXP == "B", ]$PROPDMGCOST <- requiredData[requiredData$PROPDMGEXP == "

#Calculating total crop damage caused by natural clamitites
requiredData$CROPDMGCOST = 0
requiredData[requiredData$CROPDMGEXP == "K", ]$CROPDMGCOST <- requiredData[requiredData$CROPDMGEXP == "
requiredData[requiredData$CROPDMGEXP == "H", ]$CROPDMGCOST <- requiredData[requiredData$CROPDMGEXP == "
requiredData[requiredData$CROPDMGEXP == "M", ]$CROPDMGCOST <- requiredData[requiredData$CROPDMGEXP == "
requiredData[requiredData$CROPDMGEXP == "B", ]$CROPDMGCOST <- requiredData[requiredData$CROPDMGEXP == "


#Data to know the extent of damage to health cause by natural clamities
FatalitiesData <- aggregate(FATALITIES ~ EVTYPE, requiredData, sum)
InjuriesData <- aggregate(INJURIES ~ EVTYPE, requiredData, sum)

#Merging data on the basis of natural clamity
totalEffectData <- merge(InjuriesData, FatalitiesData , by="EVTYPE", all.x=TRUE)
colnames(totalEffectData) <- c("EventTypes", "Injuries", "Fatalities")
```

```r
#Ordering data based on both fatalites and injuries and taking top 10 of them
totalEffectData <- totalEffectData[order(totalEffectData$Injuries, totalEffectData$Fatalities, decreasi

#Reshaping data to produce variable
short.m <- melt(totalEffectData)
```

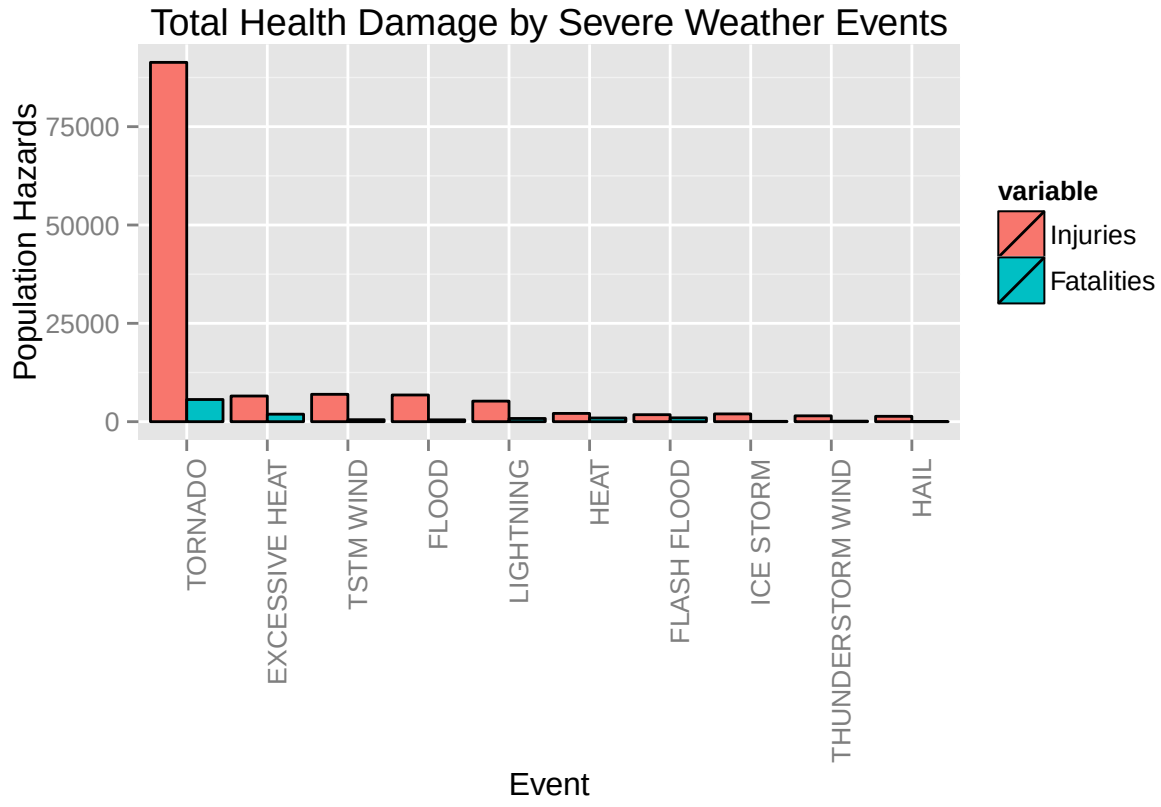
```
## Using EventTypes as id variables
```

```r
#Data to know the extent of damage economically caused by natural clamities
CropData <- aggregate(CROPDMGCOST ~ EVTYPE, requiredData, sum)
PropData <- aggregate(PROPDMGCOST ~ EVTYPE, requiredData, sum)

#Ordering both the data
CropData <- CropData[order(CropData$CROPDMGCOST, decreasing = TRUE), ][1:10, ]
PropData <- PropData[order(PropData$PROPDMGCOST, decreasing = TRUE), ][1:10, ]

#Merging data on the basis of natural clamity
totalEconomicData <- merge(CropData, PropData , by="EVTYPE", all.x=TRUE)
colnames(totalEconomicData) <- c("EventTypes", "Crop", "Prop")

#Ordering data based on both Crop and Property and taking top 10 of them
totalEconomicData <- totalEconomicData[order(totalEconomicData$Crop, totalEconomicData$Prop, decreasing

#Reshaping data to produce variable
shortEconomic <- melt(totalEconomicData)
```

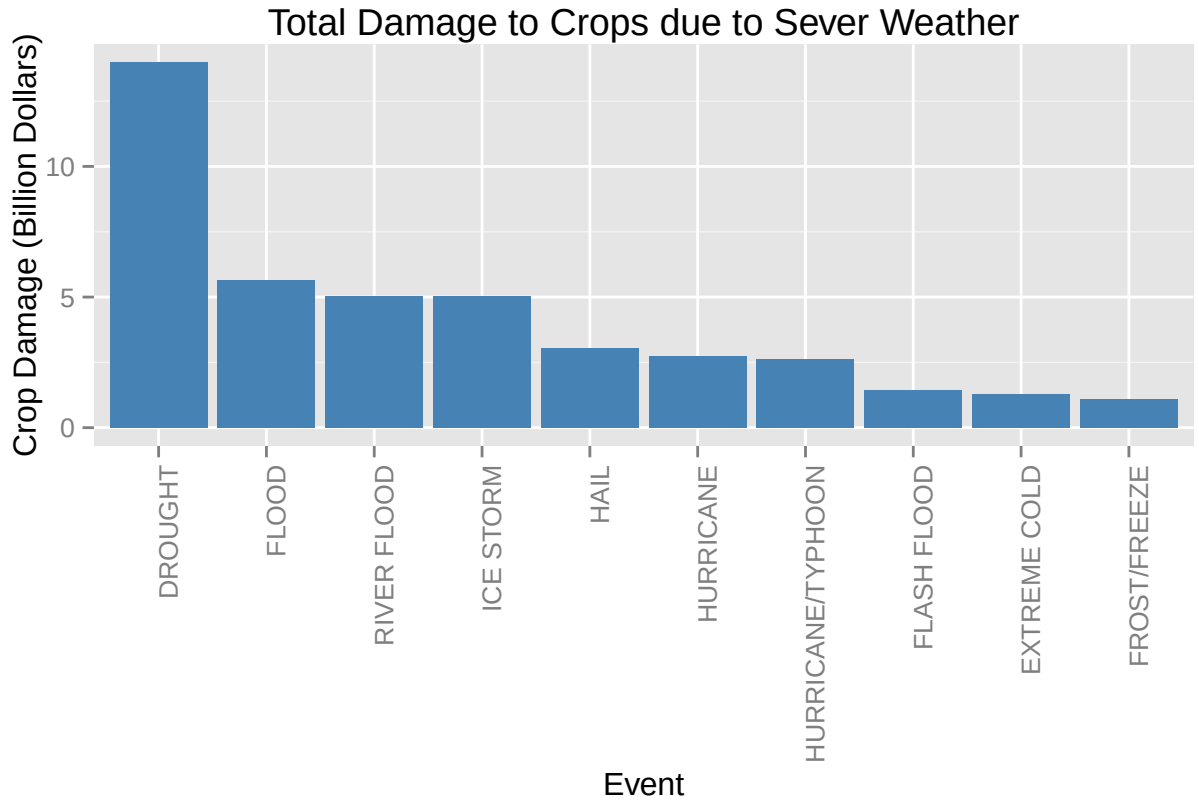
```
## Using EventTypes as id variables
```

## Result

```r
#Plotting data in decreasing order of damage to health
g <- ggplot(short.m, aes(x = reorder(EventTypes, -value), y = value, fill = variable))
g <- g + geom_bar(stat = "identity",position = "dodge", colour="black") + labs(x = "Event") +
labs(y = "Population Hazards") +  ggtitle("Total Health Damage by Severe Weather Events") +
theme(axis.text.x = element_text(angle = 90, hjust = 1))
print(g)
```

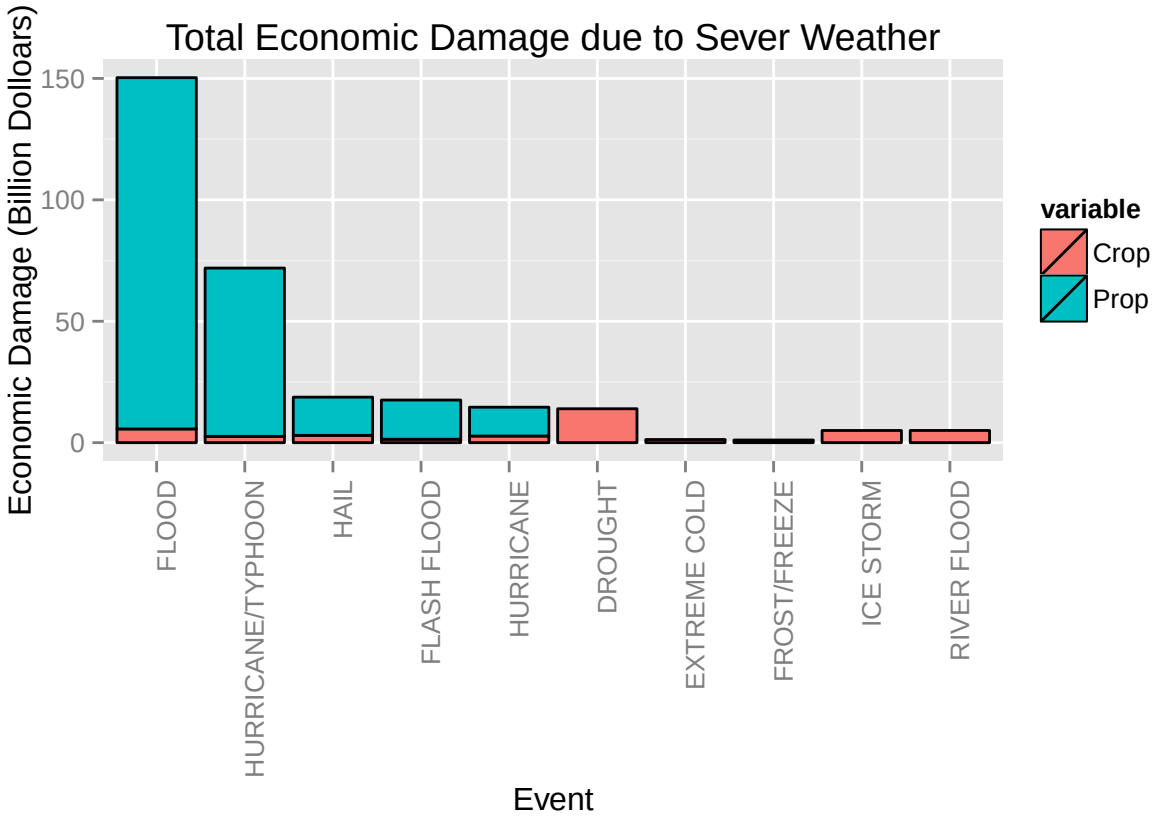



```
#Plotting the data for damage due to crops
gCrop <- ggplot(CropData, aes(x = reorder(EVTYPE, -CROPDMGCOST), y = CROPDMGCOST / 10^9))
gCrop <- gCrop + geom_bar(stat = "identity", fill = "steelblue") + labs(x = "Event") +
labs(y = "Crop Damage (Billion Dollars)") + ggtitle("Total Damage to Crops due to Sever Weather") +
print(gCrop)
```




```
#Plotting the data for damage due to crops
gEco <- ggplot(shortEconomic, aes(x = reorder(EventTypes, -value), y = value / 10^9, fill = variable))
gEco <- gEco + geom_bar(stat = "identity", colour="black") + labs(x = "Event") +
labs(y = "Economic Damage (Billion Dolloars)") + ggtitle("Total Economic Damage due to Sever Weather") +
print(gEco)
```

```
## Warning: Removed 5 rows containing missing values (position_stack).
```


Total Economic Damage due to Sever Weather
Economic Damage (Billion Dolloars)
150
100
50
0
FLOOD
HURRICANE/TYPHOON
HAIL
FLASH FLOOD
HURRICANE
DROUGHT
EXTREME COLD
FROST/FREEZE
ICE STORM
RIVER FLOOD
Event
variable
Crop
Prop