Predicting Terrorism / Bayesian Inference

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Summary

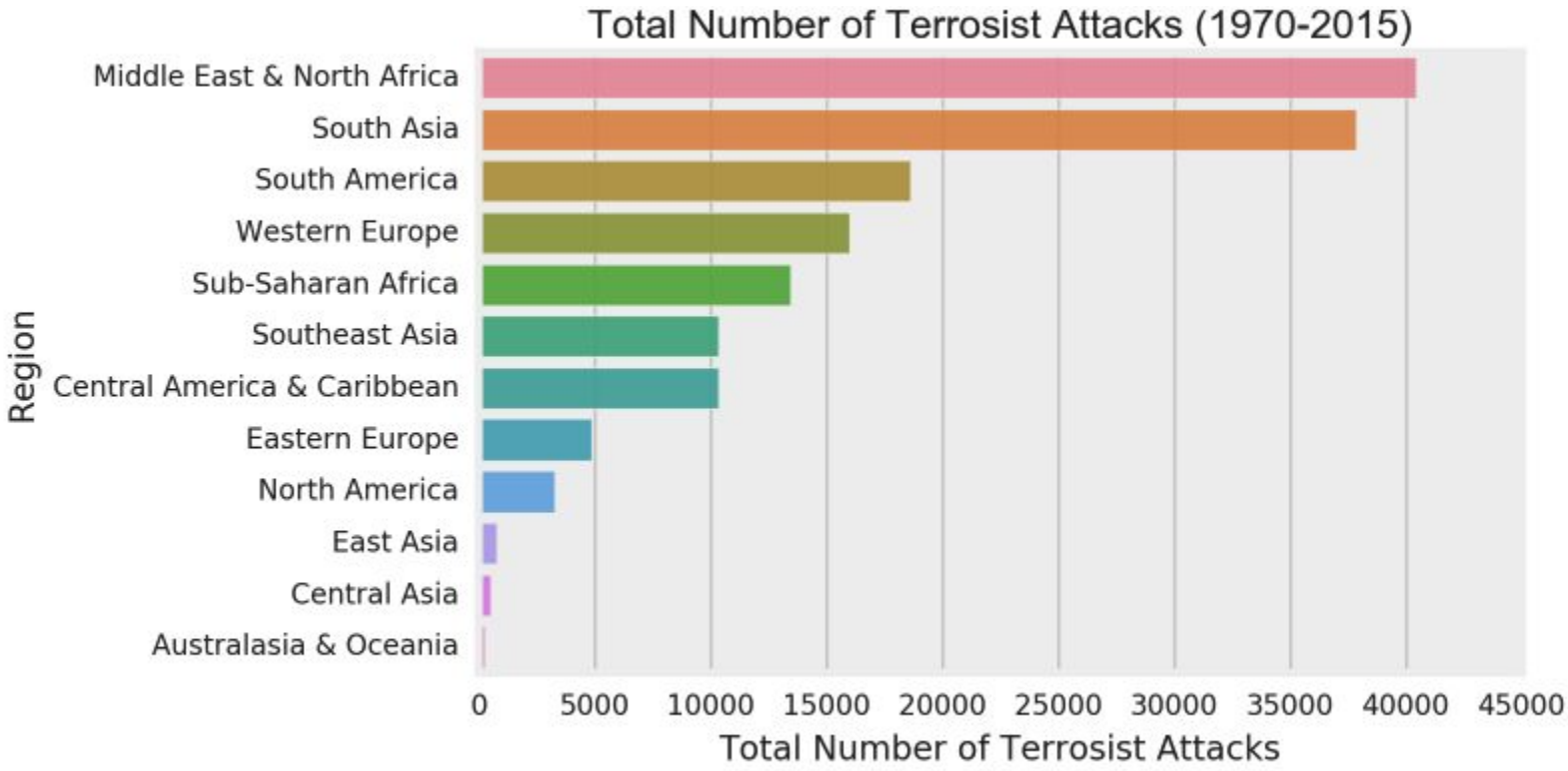
Goals:

- Getting insight about the dataset
- Using Bayesian approach in comparing the number of terror attacks between two countries (Lebanon and West Bank and Gaza Strip)
- Predicting the number of terrorist bombings in Lebanon in 1993

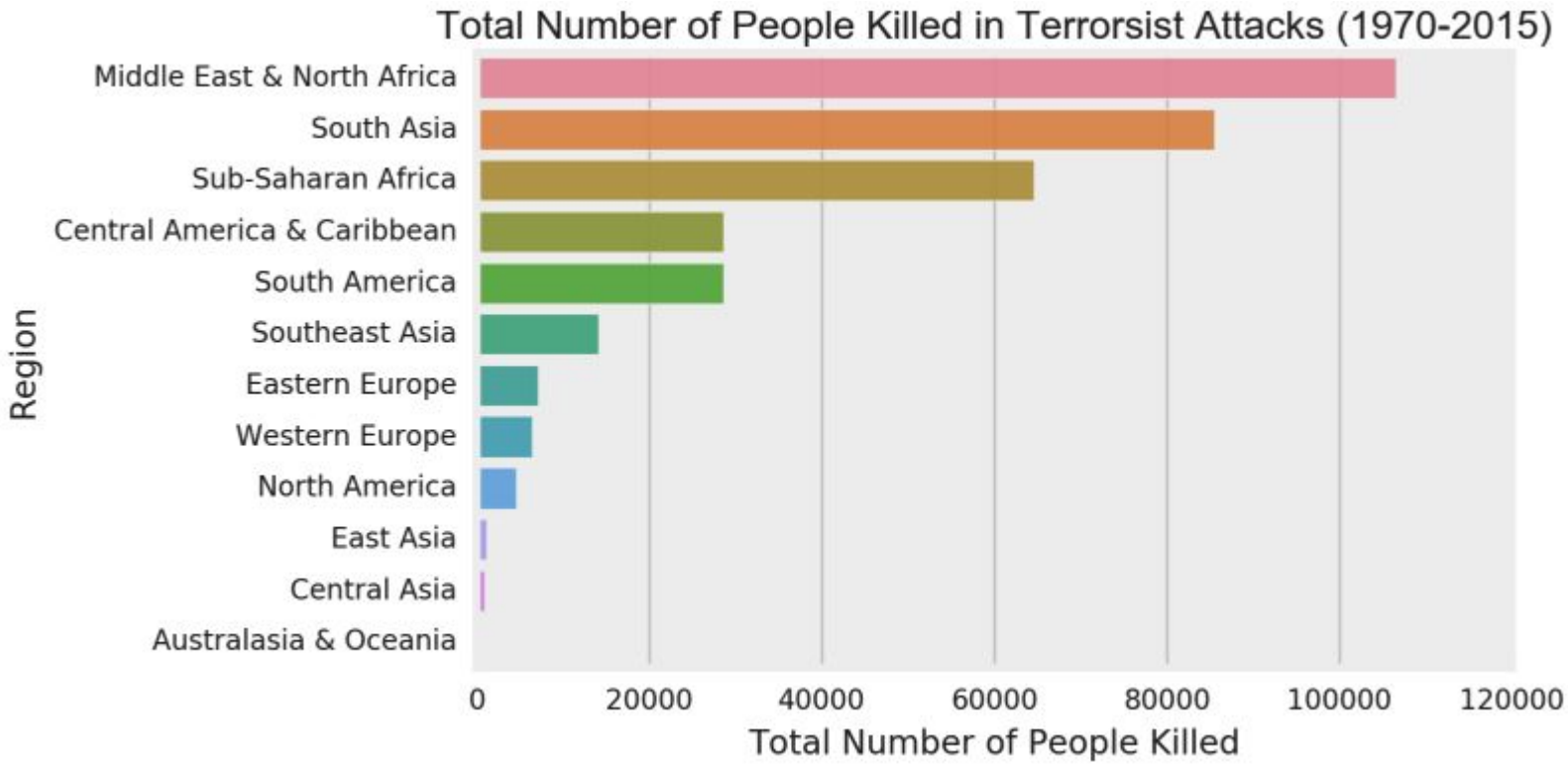
The Data

- Global Terrorism Database (GTD)
- Terrorist attacks around the world from 1970-2015 except 1993
- Including 156772 incidents and 137 variables
- Variables have info on:
  - Region and Location
  - Tactics and Targets
  - Outcomes
  - Number of people killed, injured ,...

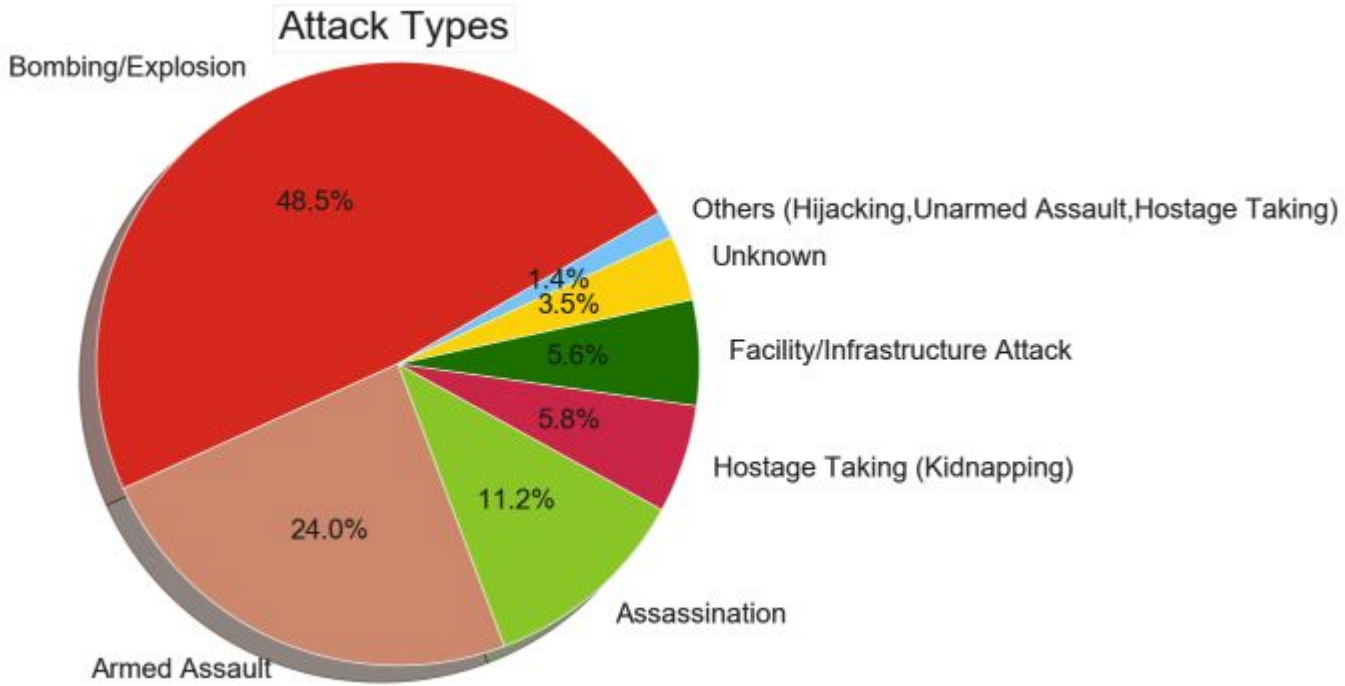
Overall View



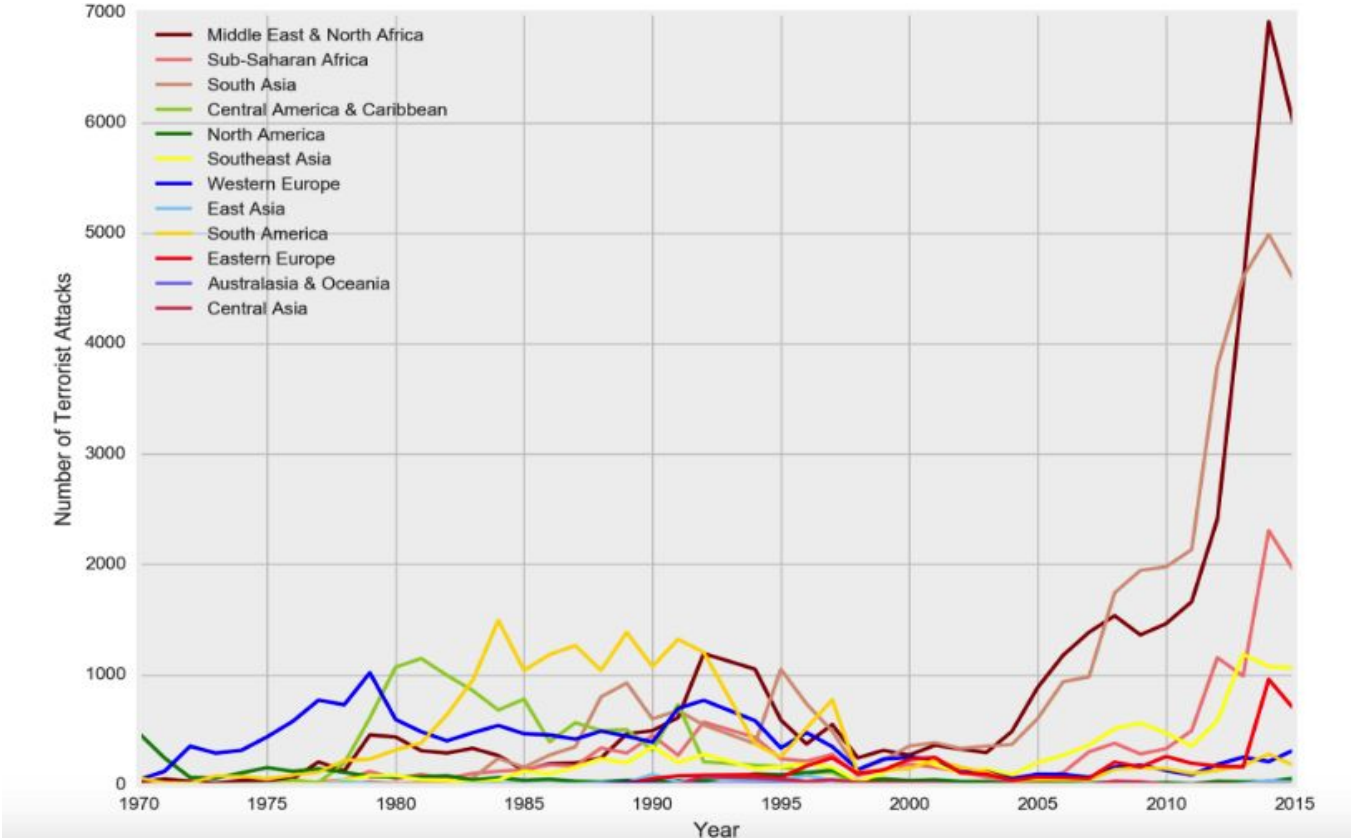
Fatalities


Total Number of People Killed in Terrorsist Attacks (1970-2015)
Middle East & North Africa
South Asia
Sub-Saharan Africa
Central America & Caribbean
South America
Southeast Asia
Eastern Europe
Western Europe
North America
East Asia
Central Asia
Australasia & Oceania
Region
0
20000
40000
60000
80000
100000
120000
Total Number of People Killed

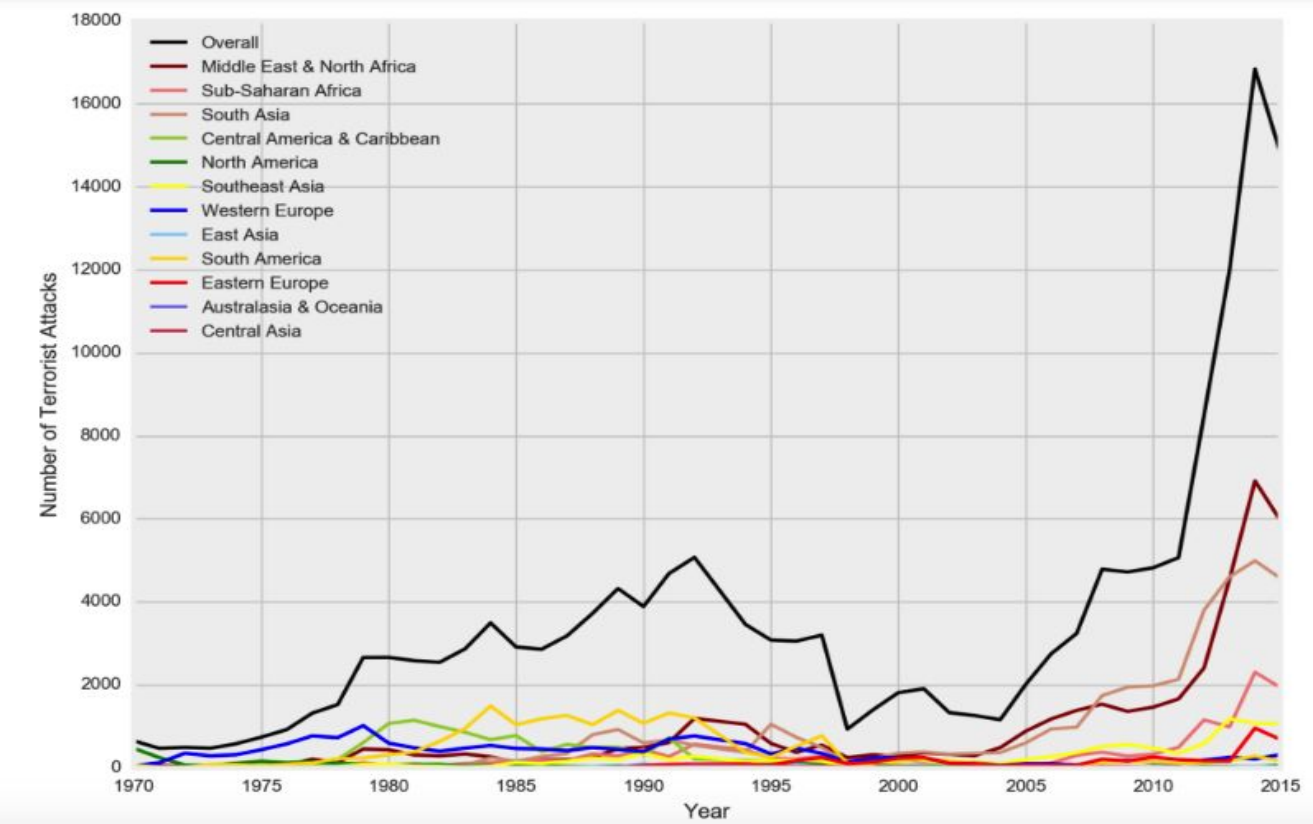
Major Terror Attack Types



Terrorist Attacks Trends!



Terrorist Attacks Trends!

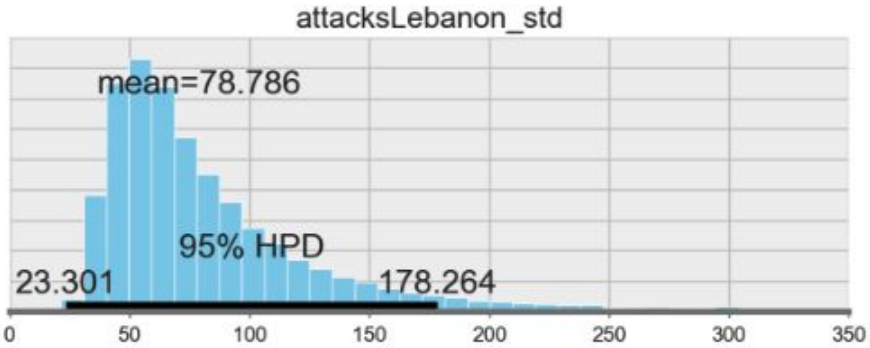


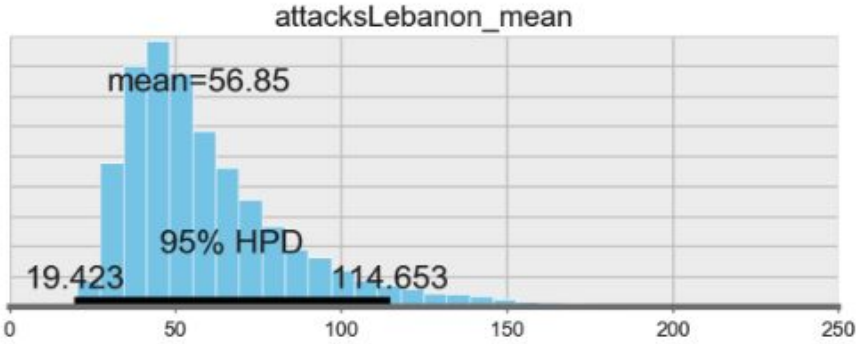
Comparing Terrorist Attacks in Lebanon and West Bank- Bayesian inference

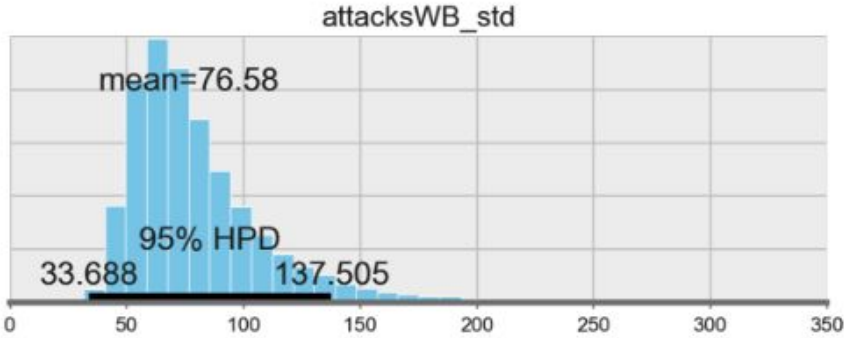
Assumptions:

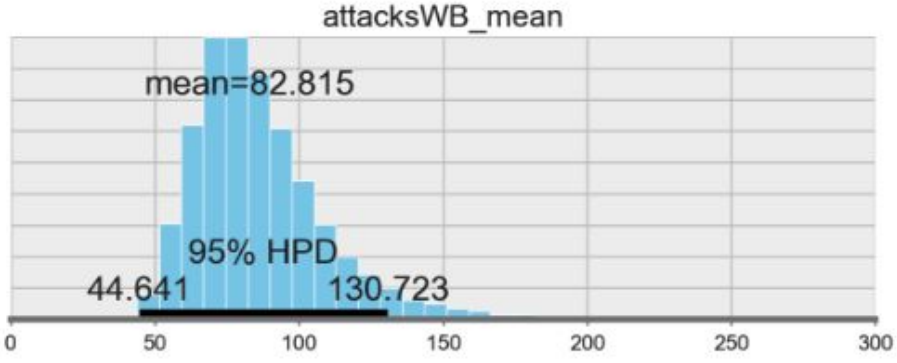
- Using the mean and standard deviation of data before year 2000 as the mean and standard deviation of the prior upper limit
- Using the data after year 2000 as the observed data
- Assuming uniform distribution for the mean and standard deviation of prior
- Gamma distribution for the prior

Inferences :

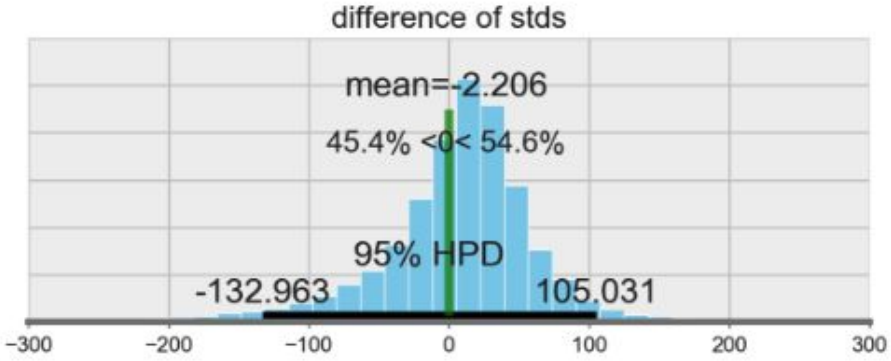

attacksLebanon_std
mean=78.786
95% HPD
23.301
178.264
0
50
100
150
200
250
300
350

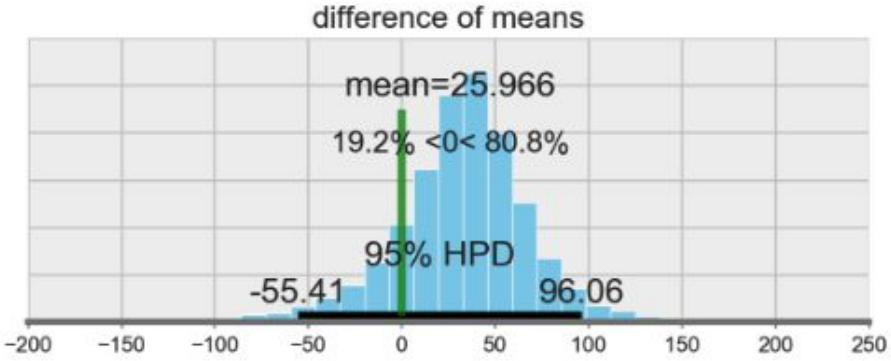

attacksLebanon_mean
mean=56.85
95% HPD
19.423
114.653
0
50
100
150
200
250

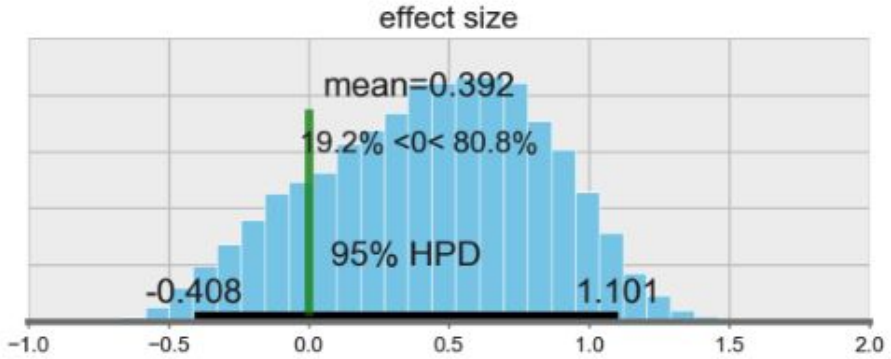

attacksWB_std
mean=76.58
95% HPD
33.688
137.505
0
50
100
150
200
250
300
350


attacksWB_mean
mean=82.815
95% HPD
44.641
130.723
0
50
100
150
200
250
300

Inferences:


difference of stds
mean=-2.206
45.4% <0< 54.6%
95% HPD
-132.963
105.031
−300
−200
−100
0
100
200
300


difference of means
mean=25.966
19.2% <0< 80.8%
95% HPD
-55.41
96.06
−200
−150
−100
−50
0
50
100
150
200
250


effect size
mean=0.392
19.2% <0< 80.8%
95% HPD
-0.408
1.101
−1.0
−0.5
0.0
0.5
1.0
1.5
2.0

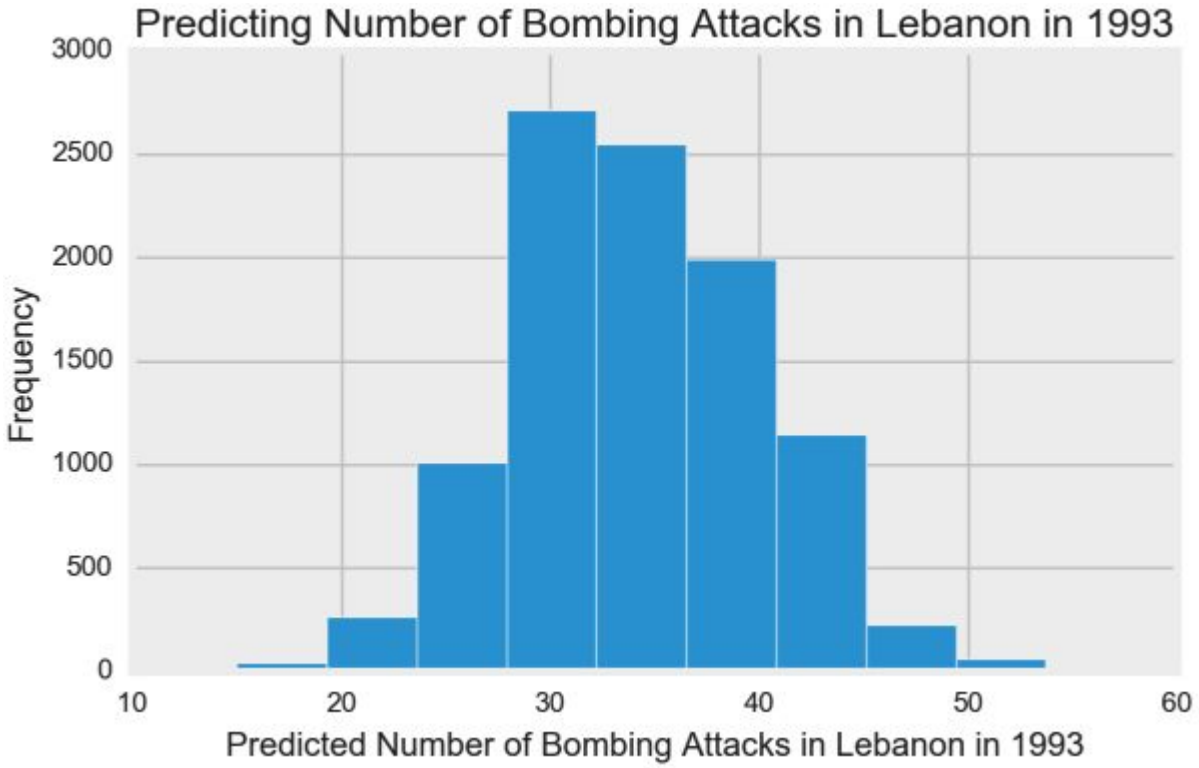
Predicting Number of Bombings in Lebanon in 1993

Bayesian Regression

Assumptions:

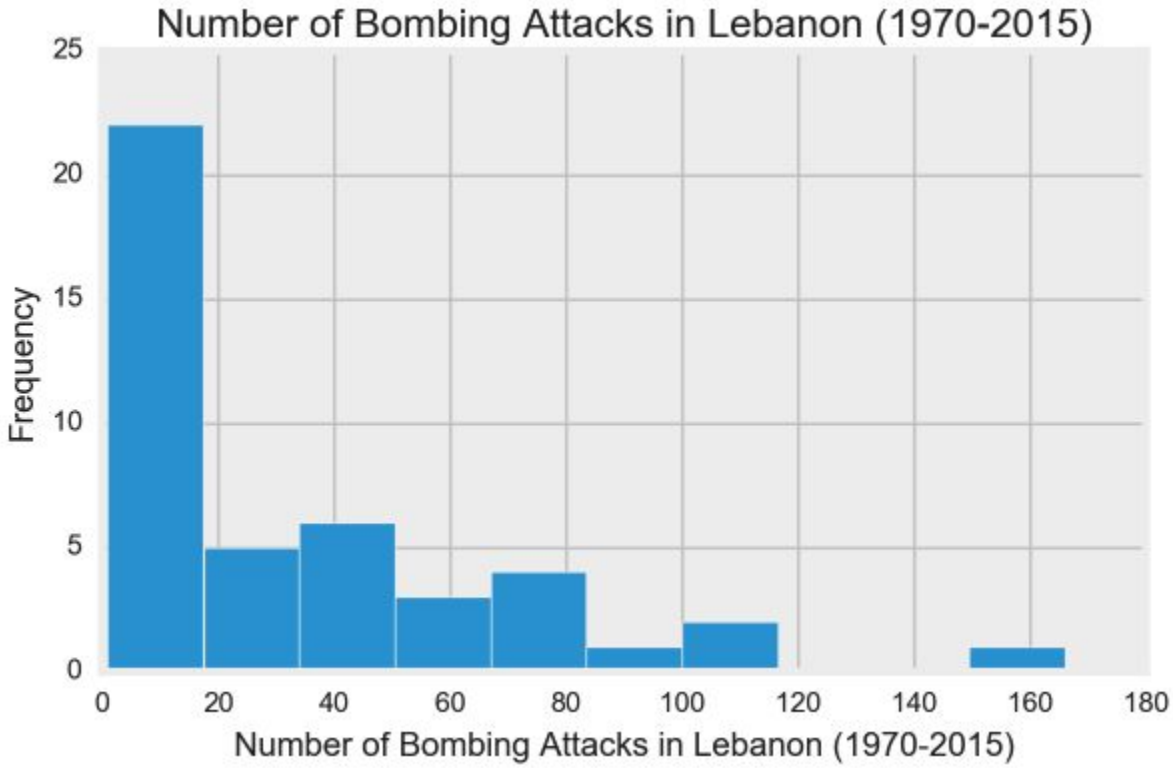
- Number of Bombing attacks : B0 +B1 * year
- Assuming uniform distribution for B0 (intercept)
- Assuming normal distribution for B1 (beta_year)
- Using the bombing attacks in Lebanon (1970-2015) as the observed data
- Assuming poisson distribution for the prior

Predictions :



Conclusion:

The result of the prediction is basically the mean of the values of bombings in Lebanon between 1970-2015.


Number of Bombing Attacks in Lebanon (1970-2015)
Frequency
25
20
15
10
5
0
0
20
40
60
80
100
120
140
160
180
Number of Bombing Attacks in Lebanon (1970-2015)