Crime Pattern Prediction

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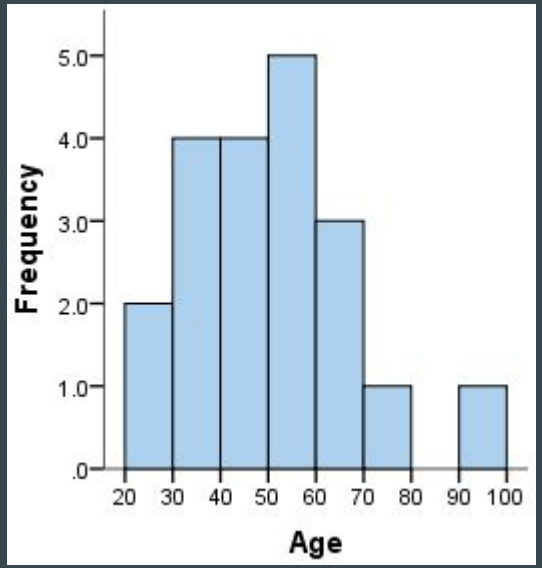
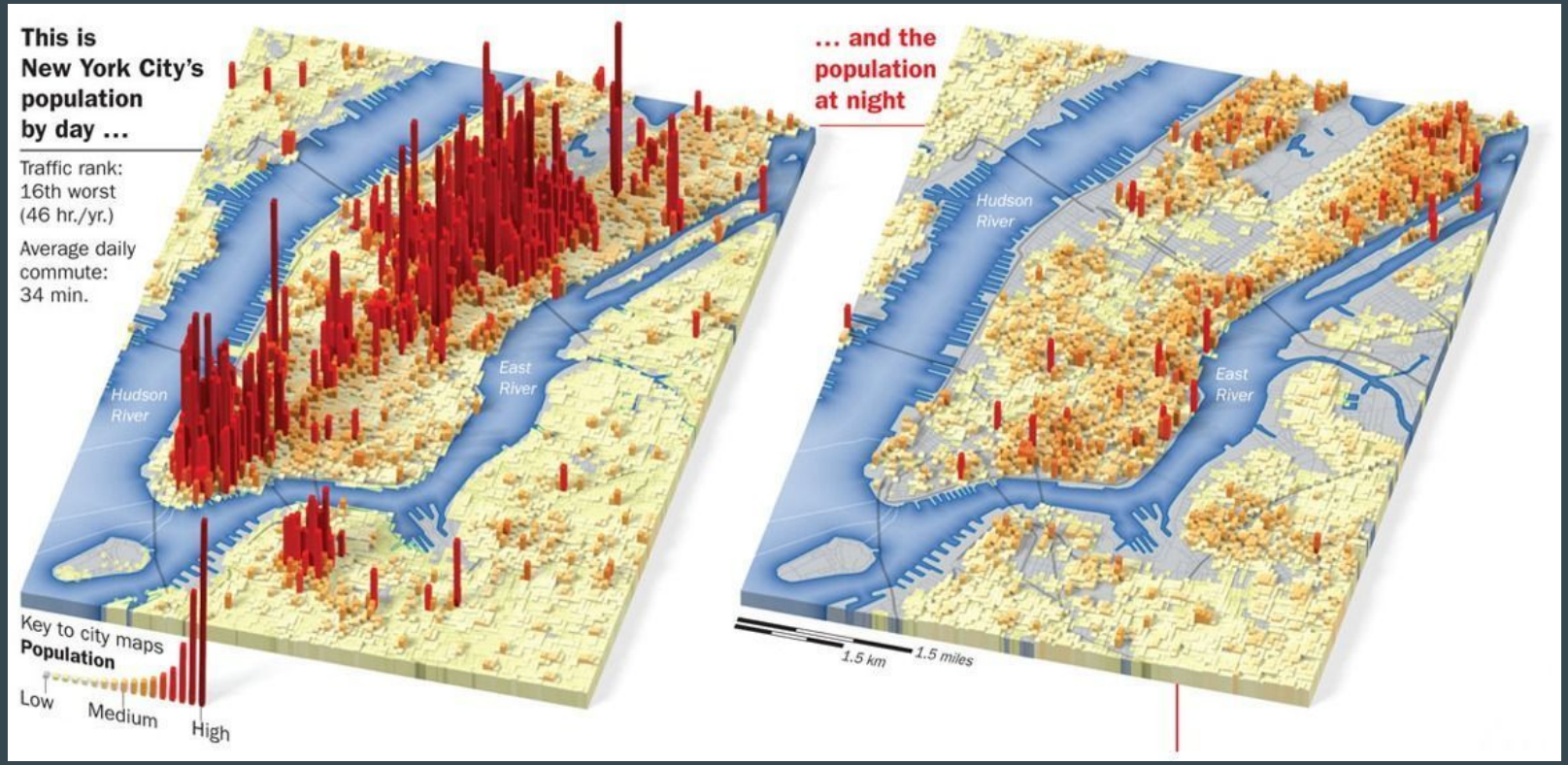
Crime Analyst

Histogram



Map


This is New York City's population by day ...
Traffic rank: 16th worst (46 hr./yr.)
Average daily commute: 34 min.
Hudson River
East River
Key to city maps
Population
Low
Medium
High
... and the population at night
Hudson River
East River
1.5 km
1.5 miles

Exploring Intensity Function

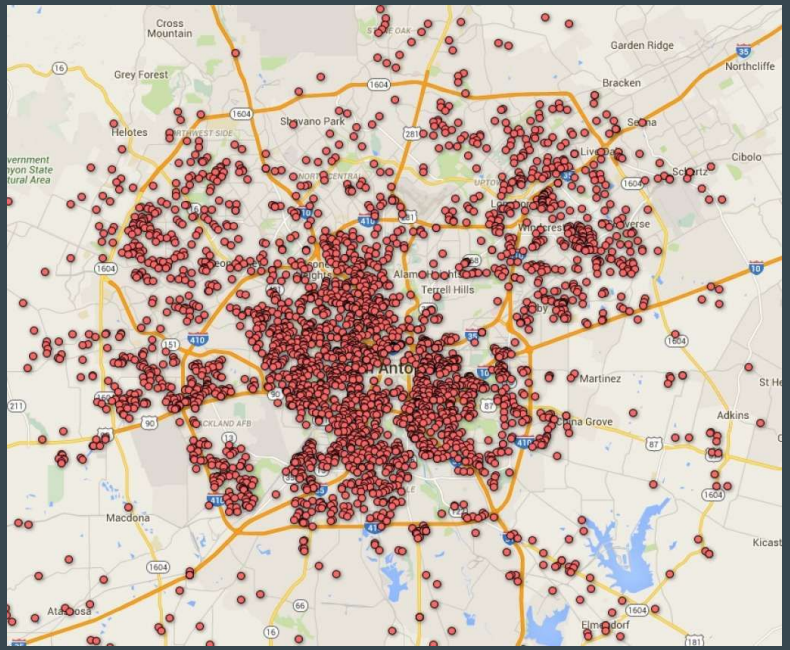
X : Numbers of Cars that pass in an hour.

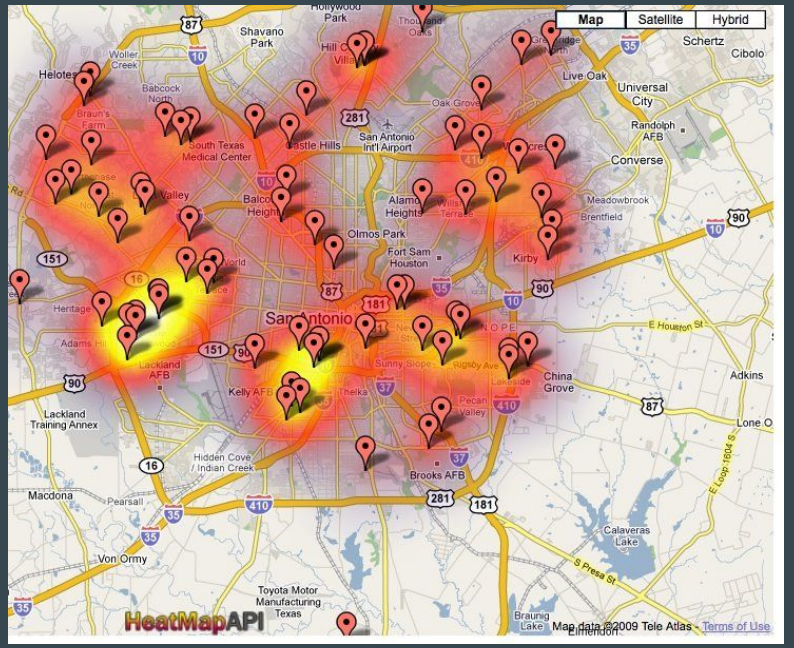
E(X) = 5 Cars per hour

X: Number of Crimes that happen in an hour.

$E(X) = \lambda(t) = ???$

Count and Call It a Day





Cooler Intensity Function

Let’s be smarter:

λ(latitud,longitud,time) = u(x,y,t)

λ(latitud,longitud,time) = ???

twitter

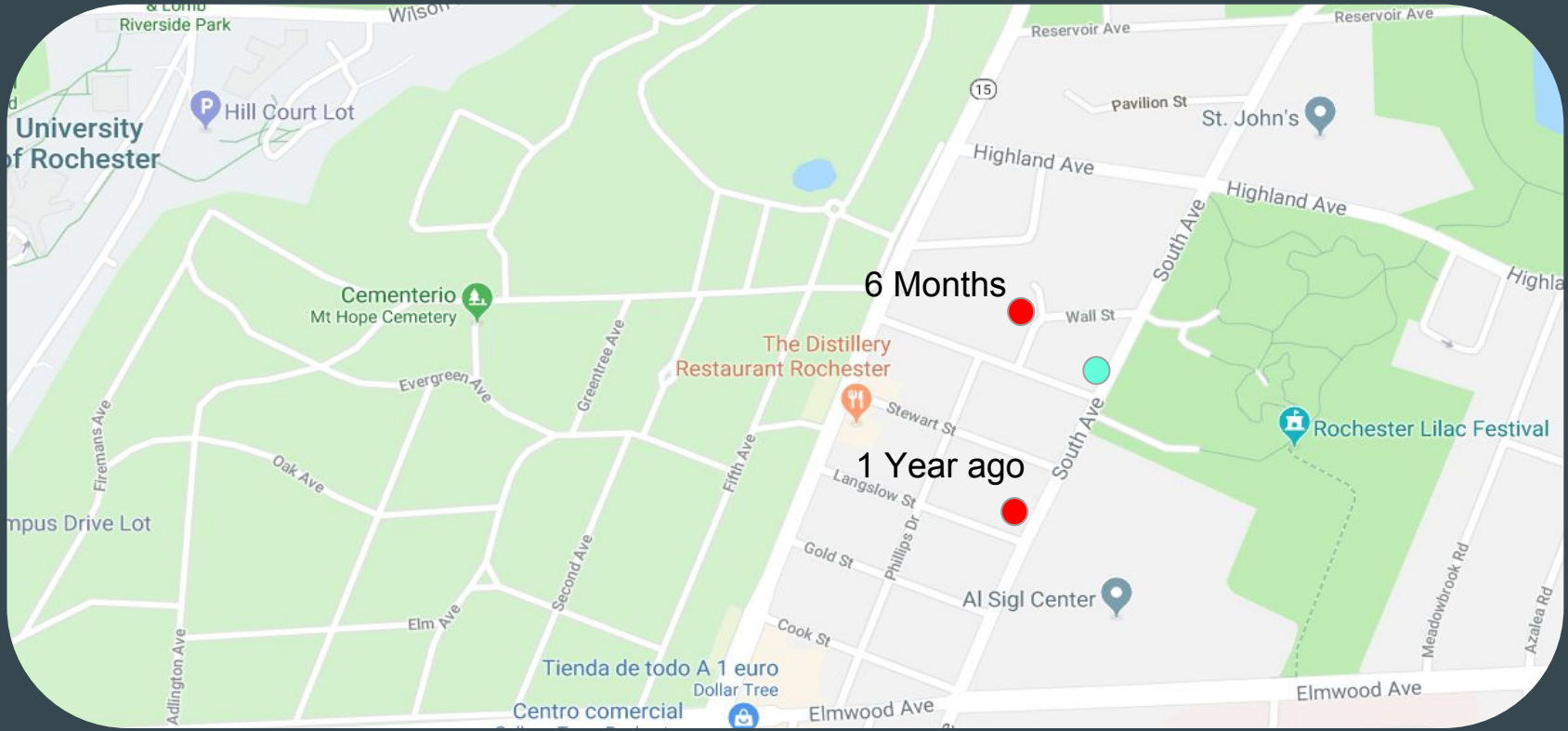
Repeat victimization in Property Crimes: Distance and time proximity.

Cooler Intensity Function

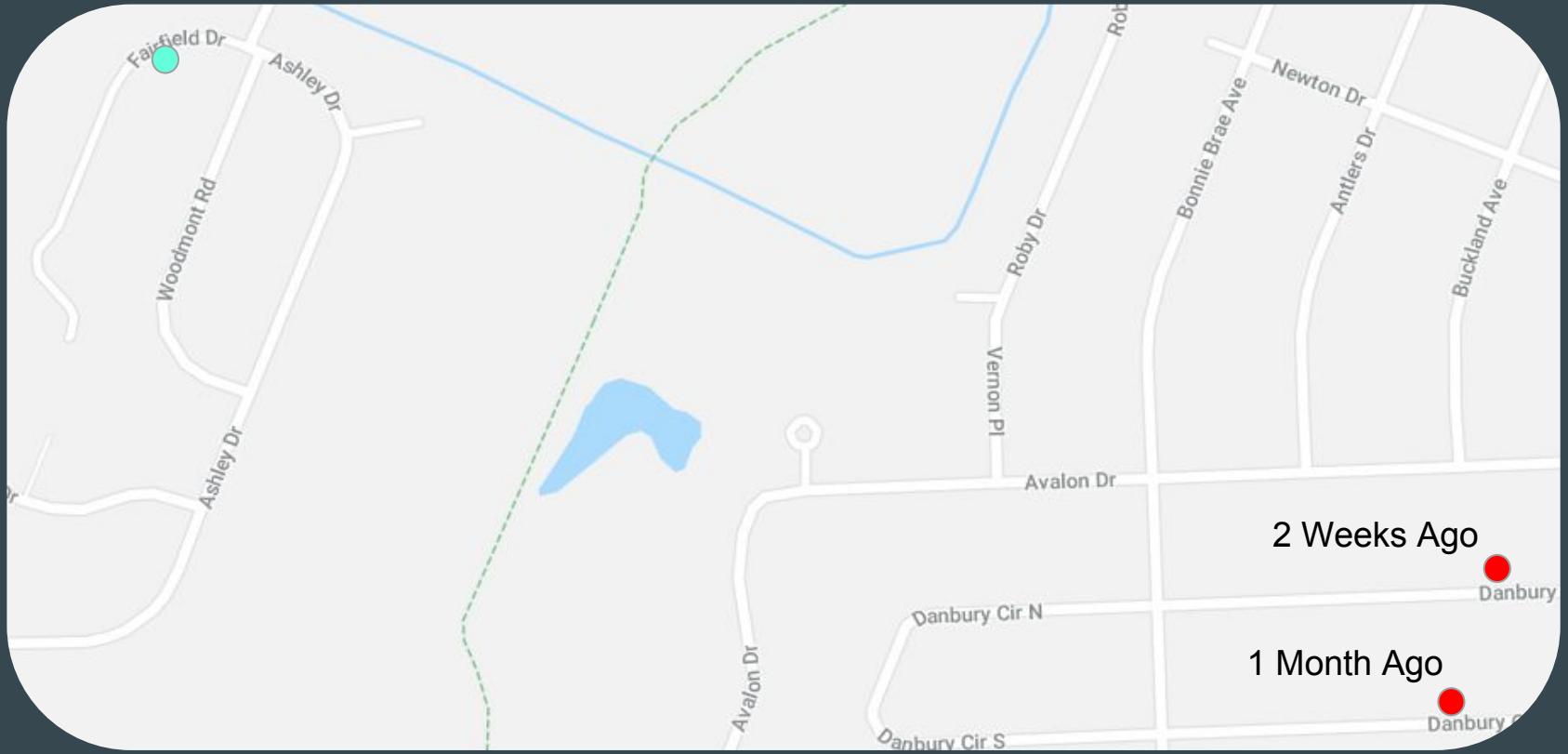
Self exciting point processes AKA count and a little bit more

$$\lambda(t,x,y) = \underbrace{\mu(x,y)}_{\text{Count}} + \underbrace{\sum_{t^*=1}^{T} g(t-t^*, x-x^*, y-y^*)}_{\text{A little bit more}}$$

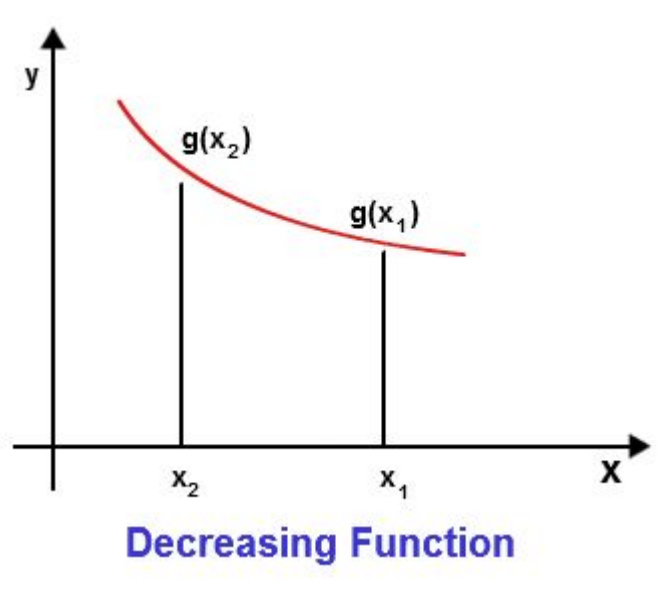
Cooler Intensity Function



Cooler Intensity Function



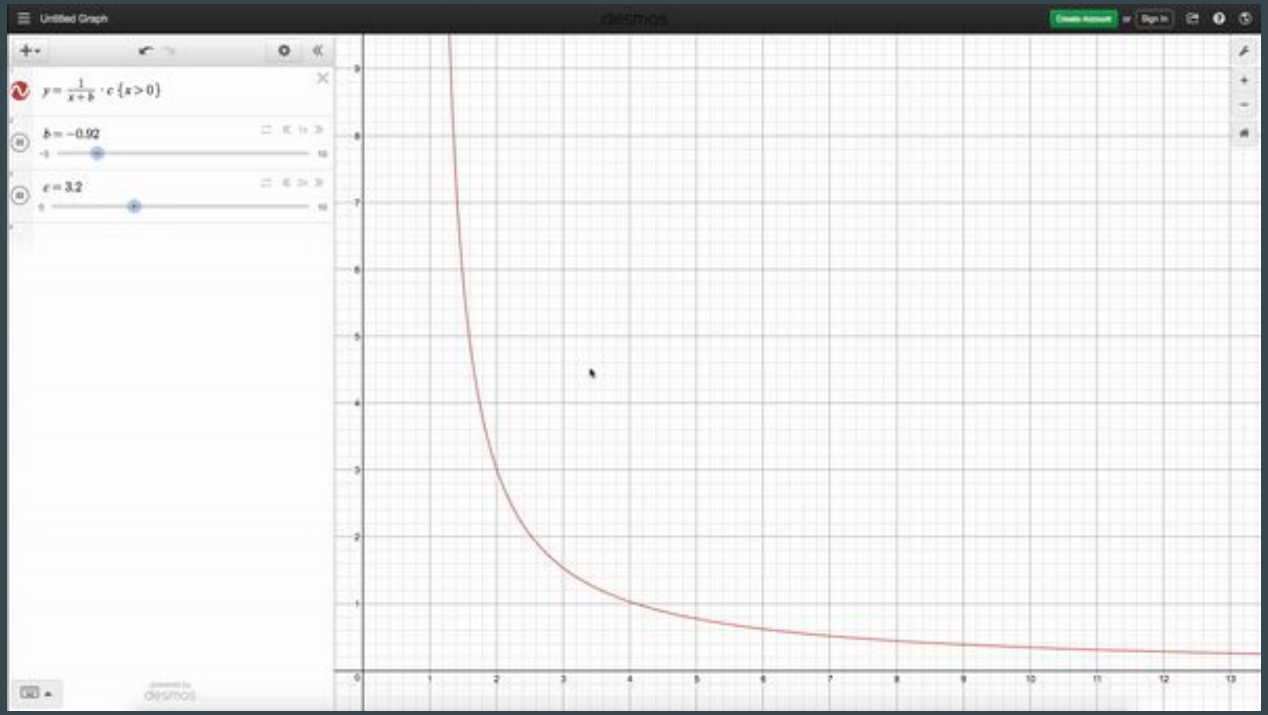
Cooler Intensity Function



$$g(x) = \frac{c}{x + b}$$

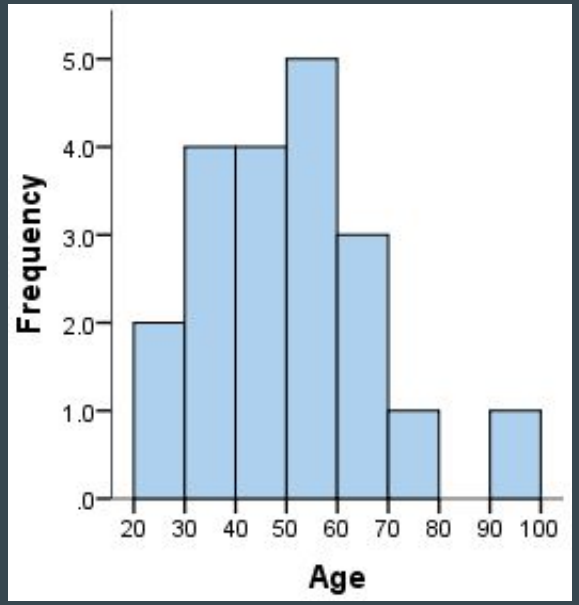
Cooler Intensity Function

Looking for g function

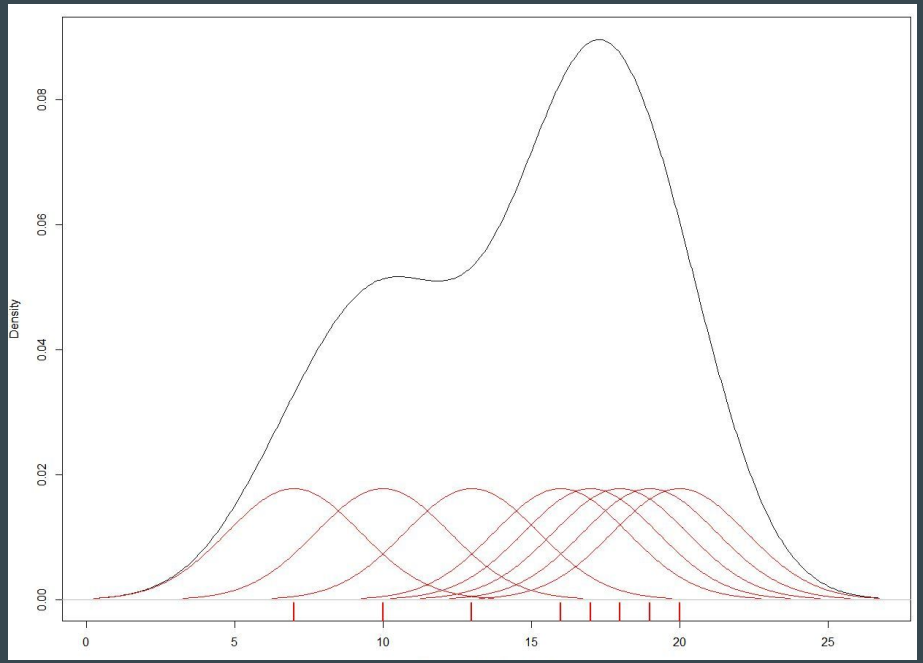


Kernel Density Estimation

Blocks



Stacked Normal Mountains



Kernel Density Estimation