# Crime and Demographics in the Mile High City

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# Questions Sought to Answer

1. Does violent crime cluster in particular areas of Denver?

2. If so, do areas with higher concentrations of violent crime suffer from poorer health outcomes?

3. Do these areas have higher rates of poverty and lower levels of education?

4. Do these areas have larger minority populations as suggested by our literature survey?

# Tools

# Data Preparation

- **Collection:** identifying relevant datasets with emphasis on ability to join on common attribute, Neighborhood
- **Preprocessing:** attribute reduction, clarification, and standardization; NaN values identified and eliminated

# Data Preparation

● **General Exploration:** what crimes are most common? what do Denver's demographics look like? what are violent crimes?

● **Neighborhood-Level Exploration:** which crimes occur where? are there significant demographic differences between neighborhoods?
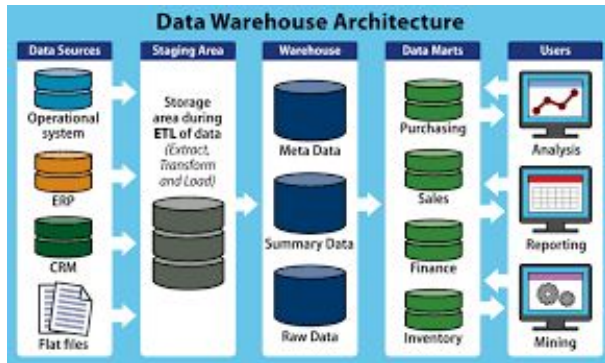
# Data Preparation

● **Integration:** consolidation and summarization of attributes; creation of 'violent crimes' dataset
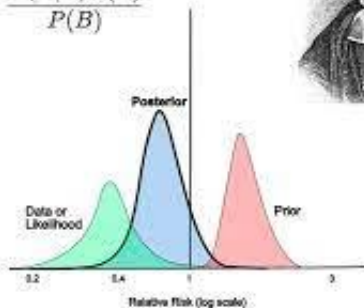
**Data Warehouse**

- Consolidate data of interest under unified schema
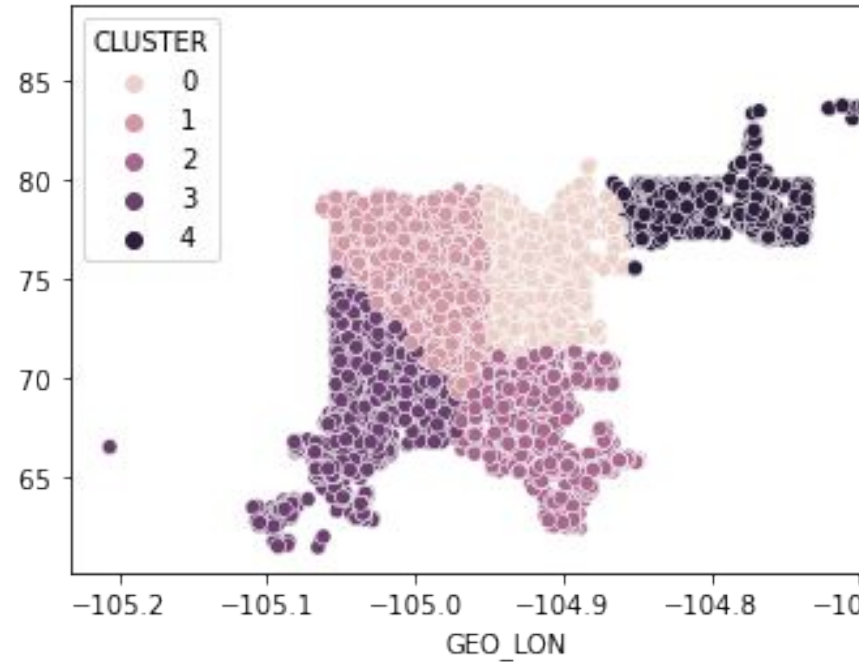- Multi-dimensional: counts, percentages, rankings



**Bayesian**

- Preparation
- Binary Model
- Categorical Classifier

# K-Means

We treated violent crime data objects as two-dimensional Euclidean points based on their latitude and longitude. K-Means clustering yielded violent crime centroids in Denver.

# K-Means

We mapped these centroids along with the top five crime hot spots identified by the Denver Police Department and found significant overlap.



Violent Crime Clusters

# Knowledge Gained

Compared to the state of Colorado, neighborhoods containing violent crime centroids have diminished health outcomes:

## ~21k
**Violent Crimes**

## -2.8yr
**Life Expectancy**

## +7.1%
**Obesity Rate**

# Knowledge Gained

...they also have higher rates of poverty on average and lower levels of education. They are also more racially diverse.

**+7%**

**Poverty Rate**

**-15.2%**

**Higher Education**

**+44.4%**

**Racially Diverse**

# Caveats:

Neighborhoods defy easy classification. Correlation does not equal causation.

# Further Applications and Additional Research

**01** Targeting Resources to Communities

**02** Policing and violent crime prevention

**03** Additional Research

# Thank you!

## -Naureen, Sean, & Cody