DATA TO POLICY PROJECT

Using real data to solve real problems
Giving students a constructive voice to respond to police shootings
• Get your data USED

• You know questions that need to be answered

• Student analysis & policy work can contribute to local government

• Bridge between students and employers
TOPICS

2017-2018:
• Denver Policing
  • Patterns in Crime
  • Policing Practices
  • Information Collection

2018-2019:
• Policing
• Affordable Housing
D2P PROJECT STRUCTURE

- Question Formulation
- Data Collection & Organization
- Community Outreach
  - Faculty luncheons:
  - Panel Discussions:
- Internships
- D2P Courses
- Data and Skills Support

1st Semester Symposium
2nd Semester Symposium
PANELS AND SYMPOSIA

Photo: Matt Mariner
EXAMPLE PROJECTS
SPRING 2018

• Tree canopy and other factors used to predict crime frequency with linear regression
  [Grand prize – Montepagano and Younkes]

• Localization of auto-theft hotspots

• Cellular Automata model for creating a heat map of likely crime using building footprints
Optimized Allocation of Police Officers in Denver County

Authors: Alexa Desautels, Christina Ebben, Anna Gibala, Joshua Luginbill

Abstract
Police presence is known to be a key factor in reducing violent crime in an area. However, the question of where officers should be located and in what quantity, in order to best reduce violent crime is rarely studied. In this work, we propose an integer linear Programming formulation for the optimization of police officer allocation across police districts in Denver County. The allocation takes into account the population, budget, number of officers, and violent crime data for Denver County from 2014. Moreover, we demonstrate that our model can be efficiently solved and its solutions are not affected by changes to the budget and number of officers employed.

Objective
- Objective Function with Constraints

\[
\text{maximize } \sum_{i=1}^{N} s_i x_i \\
\text{subject to } \sum_{i=1}^{N} c_i x_i = \text{budget} \\
f_1 \leq x_i \leq h_i \\
x_i \in \mathbb{N}
\]

Given the violent crime data for 2014, we propose to optimize the allocation of police officers across police districts. We constructed a certain number of officers to distribute, taking into account violent crime data to allocate more officers to districts where more violent crimes occurred. The allocation is constrained by an “ideal number” of officers that each district would like to receive and a budget for each district. Additionally, each district must receive a minimum number of officers needed to maintain basic public safety.

Methods

\[
\text{maximize } \sum_{i=1}^{N} s_i x_i \\
\text{subject to } \sum_{i=1}^{N} c_i x_i = \text{budget} \\
f_1 \leq x_i \leq h_i \\
x_i \in \mathbb{N}
\]

Background
This work was motivated by the University of Colorado Denver’s Data to Policy project. Our methodology was inspired by the proof of concept proposed by Cambazard et al. in which police officers were optimally distributed across the states of the United States of America.

Policy Recommendations
Below are the results of our modeling using data from 2014.

References
- City and Denver Police Department/Colorado Analysis Unit County of Denver, 2016.
- Michael B. Hancock, City and County of Denver Mayor’s Proposed 2016 Budget, City and County of Denver, 2015.
INTERDISCIPLINARY VISION

Framework:
Building class pairs across departments

Applied Regression Analysis

Skill development & Project formulation

Economic Geography

Symposium Presentation

Cooperative work
DATA TO POLICY WEBSITE

https://library.auraria.edu/d2pproject
## DATA ACCESSIBILITY

Google spreadsheet with links

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HOW TO GET INVOLVED

• Data data data
• Contribute to question formulation
• Attend the symposiums
• Be a judge
• Come to the panel discussions or be a panelist
• Help develop internships
CONTACT - D2P COMMITTEE

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