

MS-GIST
 Master Projects Fall 2020
 Thursday December 11th (Livestream via Zoom)

* There will be 5 minute breaks between each presentation to facilitate transitions in Zoom.

** Zoom links available on a per request basis. Contact: atgrogan@email.arizona.edu

Date/Time	Title	Person *
12/11/2020 10:30 – 11:00 am	<u>An Exploratory Analysis of Violent Crime and Population Demographics in the Country of Mexico</u>	Luis Medina
12/11/2020 11:30 – 12:00 am	<u>Measuring multi-species habitat connectivity: an infrastructure assessment in a GIS web application workflow</u>	Rachel More-Hla
12/11/2020 3:00 – 3:30 pm	<u>Explanatory Analysis of Spatial-temporal crime data in Washington D.C.</u>	Breona Smith
12/11/2020 4:30 – 5:00 pm	<u>Quantifying Social and Spatial Inequalities Using Activity Space in Three Hispanic Neighborhoods</u>	Chia-Yi Chin

An Exploratory Analysis of Violent Crime and Population Demographics in the Country of Mexico

Luis Medina

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Abstract:

Organized crime has plagued the Country of Mexico for decades and has subsequently affected communities beyond its own borders, reasons that should compel scholars to explore and identify contributory variables to understand these phenomena better. Much like spatial data mining influences policing in the United States, it can be assumed that the same techniques can influence the conversation around organized crime in Mexico. This study uses spatial statistics (exploratory regression) to determine if any relationships exist between crime counts and population demographics in Mexican Municipalities. The following explanatory variables were used in an exploratory regression analysis to determine if and how crime counts and these demographics align: the number of people in the age group of 15-64 years, the average education level of the population, the total male and female population, the unemployment counts of people ages 12-130 years old, and people between the ages 15-130 years old who did not pass any level of schooling or who only completed preschool. The exploratory regression analysis found that on a national level there is weak statistical correlation between violent crimes and population (Adjusted $R^2 = .02$). However, a closer look at a state's data exploratory regression revealed a significant increase in correlation (Adjusted $R^2 = .26$) in comparison to the entire nation. It is likely that the significant number of municipalities with a crime count of 0 contribute the weak correlation on a national scale, but individual state level regressions could identify statistical correlation. An in-depth look at state level demographics and violent crimes could reveal a higher statistical correlation.

Keywords:

Mexico, Population, Organized Crime, Exploratory Regression, Data Mining

Measuring Multi-Species Habitat Connectivity: an Infrastructure Assessment in a GIS Web Application Workflow

Rachel More-Hla

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Abstract:

Santa Fe National Forest in northern New Mexico has a network of roads providing access to nearly 1.6 million acres of public land. This network of roads spans watersheds of numerous streams within the forest. Culverts and bridges provide safe passage over waterways for passenger vehicles and habitat connectivity for fish and wildlife. Many of these stream crossings are aging and in need of restoration to continue supporting the various user groups and wildlife which they were built for. The main goal of this project was to develop a mobile application for surveying stream crossings that collects spatial and structural information along with riparian and stream conditions. The application incorporated established US Forest Service protocols for easier application in other regions of the forest. This was done by gathering spatial data on the project area, creating a web map for use in ArcGIS Collector, and building a datasheet in ArcGIS Survey123. The results of these surveys will inform State and Federal agencies' management decisions about the need for restoration within habitat for two federally endangered species and five New Mexico listed Species of Greatest Conservation Need. This pilot project provides a framework for future data collection along water and roadways in the National Forest system. To gain support for future work, a published StoryMap describes the area within the forest, the targeted wildlife species, and shares some of the results of the project.

Keywords:

ArcGIS Web Applications, Stream Connectivity, Species of Greatest Conservation Need, Critical Habitat, Public Land Management

Explanatory Analysis of Spatial-temporal Crime Data in Washington D.C.

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Abstract:

Combating criminal activity within America communities has been a top issue that many federal, state, and local law enforcement agencies are encountering. Being able to identify low or high patterns of criminal activity based of geographic location allows for these agencies to predict future hotspots within the affected area and how to allocate resources to those high crime areas. This research uses a three-year period of crime data from the District of Columbia to analyze crime within each census tract. The spatial and temporal shift in criminal patterns allows this research to highlight areas that high crime frequent, variables that may be potential indicators through the use of Exploratory Data Analysis, and the day/time of year that these crimes are likely to happen. Indicators such as, education attainment, average income, poverty, and racial majority of an area, allows for the further research of what contributes to the crime rate. Through the analysis of the District of Columbia crime data and explanatory variables, potential methods of prevention or reduction in crime are further understood. The results emphasized that crime incidents within the three-year period increased in the first two years from the beginning of the summer to the end of the year. The third year showed an increase at the beginning of the year, a decrease in the middle of the year, and an increase at the end of summer. Temporally, crime incidents happen most frequently between the times of 10:00 a.m. and 10:00 p.m.

Keywords:

Spatial-temporal Analysis, Indicators, GIS, Washington D.C., Crime

Quantifying Social and Spatial Inequalities Using Activity Space in Three Hispanic Neighborhoods

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Abstract:

Wealth inequality has always been a critical topic discussed in the United States. Gender, ethnicity, educational attainment, age, and birth year are the primary factors in wealth inequality. Unfortunately, after years of effort to eliminate gender inequality, minimize racial discrimination, and enhance education accessibility, wealth inequality has grown. This leads to the question that demographic variables solely cannot explain wealth inequality. Socio-demographic factors are mostly pre-determined and relatively fixed, while as a researcher, we are more interested in those challenges that can be improved by policy or engagement. Racial segregation, neighborhood exposure, individual mobility, political and community engagement, and self-identification also play significant roles in wealth distribution. This study analyzes three neighborhoods: Pilsen in Chicago, Garfield in Phoenix, and Little Havana in Miami. These three inner ring metropolitan neighborhoods have high levels of social demographic segregation, a history of immigration and, are transitional neighborhoods dealing with the challenges of urbanization and gentrification. In this study, I combined data from a large in person survey (n=1,190) with mental maps (n=120) to cross correlate and analyze how activity space and perception of neighborhood space correlate with socio-demographic variable of income, education, ethnicity, and years in the U.S. We found that an individual from the same neighborhood with the same ethnicity and a similar level of educational obtainment has a larger activity space (more mobility) and thus has access to more resources in the metropolitan area and concomitantly a higher income.

Keywords:

Wealth Inequality, Racial Segregation, Neighborhood Exposure, Activity Space, Human Capital, Social Capital, Cognitive Mapping