MS-GIST Projects Fall 2022
Monday, December 05

**** There will be 5 minute breaks between each back-to-back presentation to facilitate transitions in Zoom.***
***** Zoom links are available on request. Please contact Andrew Grogan - atgrogan@arizona.edu***

Date/Time	Presentation Title	Student Name
12/05/22 11:30 - 11:55 AM	Exploratory Regression Analysis of Crime Trends in Richmond, Virginia	Jamie Faircloth
12/05/22 12:00 - 12:25 PM	Understanding how "Prevention through Deterrence" has weaponized the Sonoran Desert as understood through terrain analysis	Jon Rex
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Exploratory Regression Analysis of Crime Trends in Richmond, Virginia

Jamie Faircloth
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12/05/22, 11:30 - 11:55 AM

Abstract:

Crime negatively affects the safety and lives of citizens daily and has been one of societies' worst byproducts. If one can identify the underlying influences that cause certain crime trends, then resolutions could be found to address these issues and to possibly curb future crime. This study observed the potential spatial relationships and distributions between crime locations, crime type, socioeconomics, and demographic for Richmond, Virginia. Richmond was divided into 148 neighborhoods and crime incidents occurring between January 1, 2020, and December 31, 2021, were analyzed. Crimes were separated into two dependent variables: crimes against persons (assault, murder, sex offenses, robberies) and property crimes (larcenies and burglaries). These two variables were then analyzed using Exploratory and Ordinary Least Squares linear regression to determine if any of the socioeconomic and demographics statistics had a relationship with crime trends in Richmond, VA. The three explanatory variables that were found to explain crime occurrence best were population density, percent of the population renting housing instead of owning, and the percentage of the population with a high school level education or less. The Global Moran's I test was used to determine if any of the two crime categories had any significant clustering. Only 34% of crimes against persons and 18% of property crimes were supported by the three explanatory variables and both crime categories are considered to have random distributions. These results indicate that the socioeconomic and demographic variables used do not accurately explain crime trends in Richmond, VA.

Keywords: Socioeconomics, Demographics, Crime, Richmond VA, Regression

Understanding how “Prevention through Deterrence” has weaponized the Sonoran Desert as understood through terrain analysis

Jon Rex
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12/05/22, 12:00 - 12:25 PM

Abstract:

The hostility index is a project born out of necessity. Currently hundreds of migrants go missing or die crossing the Arizona/Mexican border every year. The aim of my analysis is to reduce harm and alleviate needless suffering for individuals and families who are affected by this loss. Current border policy was informed by the 1994 doctrine of “Prevention through Deterrence”, which was built on the fallacious claim that channeling human bodies through the most dangerous parts of the Sonoran Desert would decrease illegal migration. It is now largely understood that this policy at its foundation is an effort to weaponize the environment, turning large swathes of the otherwise beautiful landscape into an open grave. My work is built on the data collected by Humane Borders and is designed to help locate missing persons through quantitatively analyzing land features of Southern Arizona and Northern Mexico. The terrain metric is a tool that works on the principles of a probability index to predict the location of bodies by codifying environmental variables. My hope is that this project can be used by individuals and groups interested in fieldwork operations to help the living before they are lost.

Keywords: Binary Model, Post-Colonial Studies, Terrain Hostility Index, Death Map, Data Visualization S

GIS and Free Roaming Dog Management: Using Suitability Analysis to Determine Potential Locations for Oral Rabies Vaccination on the Navajo Nation

Ashley Owens
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12/05/22, 01:30 - 01:55 PM

Abstract:

Over 250,000 free roaming domestic dogs are estimated to live on Navajo Nation land, raising animal welfare and public health concerns. Due to the high dog to human ratio in Navajo communities, dog bites are a common injury. Free roaming dogs can contract and spread rabies after interactions with infected wildlife, and less than 20% of dogs living on the Navajo Nation are vaccinated against the disease. Research on oral rabies vaccines emphasize how important efficient delivery methods are in adequately vaccinating enough dogs to reach herd immunity. Suitability modeling can further improve vaccination rates by mapping preferred habitat to locate unowned dogs. This research-based project aims to model suitable locations for oral rabies vaccine delivery using the geographic information systems software ArcGIS Pro. Suitable habitat in the study area is based on proximity to human development, preferred land cover, and water sources - as documented in existing free roaming dog research. Habitat is combined with Boolean overlays for slope and road buffers, to determine valid delivery sites. The results indicate 648 of 1663 square miles, or 38.96% of the total study area, is suited for both free roaming dog habitation and oral rabies vaccine delivery. Within this habitat, two main areas have the highest suitability scores; totaling 140 miles, or 8.41% of the study area. Conducting a local suitability analysis before implementing oral vaccine deliveries could improve efficiency by eliminating areas unsuitable for free roaming dogs. Determining suitable habitat may lead to the discovery of more dogs, especially when dogs may be unrestricted or completely feral.

Keywords: Navajo Nation, Free Roaming Dogs, Oral Rabies Vaccine, Suitability Modeler, Optimal Location