

MS-GIST Projects Spring 2022

Friday, May 06

** 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
05/06/22 08:30 - 08:55 AM	Analysis of Mosul, Iraq Area Land Usage Change Due to Conflict	David Nagel
05/06/22 10:30 - 10:55 AM	A Site Suitability Analysis to Reduce Lead Poisoning Through Small-Scale Retail	Erika Hernandez
05/06/22 11:00 - 11:25 AM	Optimized Community Center Placement in Minneapolis	Thomas Bacon
05/06/22 02:00 - 02:25 PM	Using ArcGIS Dashboards to Monitor Scheduled Python Geoprocessing Scripts	Celso Montes

Analysis of Mosul, Iraq Area Land Usage Change Due to Conflict

David Nagel

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05/06/22, 08:30 - 08:55 AM

Abstract:

Military conflict continues to be incredibly destructive even as modern militaries try to avoid collateral damage more than ever. A side effect of conflict is internally displaced persons or IDPs (people forced to leave their home but still within their borders) and refugees which disrupts the civil recovery of an area after the conflict has passed. Understanding how the level and type of conflict affecting areas, and if or when those areas recover is paramount to returning a region to normalcy. In 2014, Mosul, Iraq was invaded and occupied by ISIS displacing an estimated 500,000 people. Mosul was eventually liberated in 2017 by Iraqi Government Forces after some the heaviest fighting of the conflict. This study examines land use change for the region to identify which areas were most effected, and which have recovered. Utilizing Landsat 8 imagery from 2013 to 2021 and conflict data from The Armed Conflict Location & Event Data Project, the images were classified and compared over time and analyzed with the conflict data to identify changes. The results of this project will be able to help both defense and interior government personnel understand which areas are more effected and correctly proportion critical resources.

Keywords: Land Use Change, Mosul Iraq, Military Conflict, Remote Sensing, Temporal Analysis

A Site Suitability Analysis to Reduce Lead Poisoning Through Small-Scale Retail

Erika Hernandez
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05/06/22, 10:30 - 10:55 AM

Abstract:

Syracuse, New York has been fighting an uphill battle against lead. It's in their homes, soil, and water and disproportionately affects lower-income communities. Children are especially sensitive before the age of 6, experiencing decreased cognitive function, reduced motor control, developmental disabilities, and death, among others. 12 percent of children in Syracuse tested positive for elevated blood lead levels, four times the national average. Diet can help combat lead contamination by increasing iron levels. Iron and lead bind to the same transport protein in the small intestine where metals are absorbed into the bloodstream. With only 77 grocery stores to cover 25.5 square miles and over 140,000 people, Syracuse's residents may rely on convenience stores, dollar stores, and fast-food restaurants to pick up the slack. Combating food insecurity may be possible by targeting food deserts and increasing access to healthy foods. To find the areas where small-scale retail would benefit the most, a Boolean Suitability Analysis was used to find food deserts using poverty levels, minority status, population density, existing grocery stores, and vacant lot parcel data. A Weighted Linear Combination Suitability Analysis found locations that ranked higher for the intersection of food deserts, childhood elevated blood lead levels, current lead violations, and tracts with high numbers of children under 5-years-old. Of the 165 locations from the resulting analysis, 65 locations ranked between medium and high suitability. This analysis will help local officials, community leaders, and non-profit organizations determine where to combat food deserts and elevated blood lead levels in children.

Keywords: Blood Lead, Food Desert, Overlay Weighted Model, GIS, Boolean Logic, Multi-Criteria Analysis, Site Suitability

Optimized Community Center Placement in Minneapolis

Thomas Bacon

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05/06/22, 11:00 - 11:25 AM

Abstract:

Violent crime has risen sharply in Minneapolis in the last two years and with that, youth and teenagers as young as 13 years old participating in violent crime has also seen a sharp increase. With on-going teacher strikes, remote learning, and other factors allowing youth more opportunity to be out of school, Minneapolis can greatly benefit from the implementation of a new community center. Attempting to solve this problem comes with a twofold approach of an overlay analysis, analyzing socio-economic factors, currently occupied and vacant public institutions, and relative crime per neighborhood – then using these same variables with a weighted overlay analysis. The simple overlay approach indicates that a community center would be optimally placed in Northeast Minneapolis however, it should be noted that the relative crime there is far lower than any location the weighted overlay would result in. The results from the weighted analysis are far more practical than the results of the simple overlay would suggest, having more possible locations in North and South Minneapolis. It would be beneficial to talk to community stakeholders and gather their opinion for influence on the weighted overlay for future iterations of this research.

Keywords: Minneapolis, Community, Center, Suitability, Analysis

Using ArcGIS Dashboards to Monitor Scheduled Python Geoprocessing Scripts

Celso Montes
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05/06/22, 02:00 - 02:25 PM

Abstract:

There is a need in Pima County's Information Technology Department, Geographic Information Systems Division for visualizing the status of GIS scheduled Python jobs that run on various servers throughout the day and night. Most scheduled job owners get notified if there is a problem with the script. However, end users of the data may not necessarily be notified that the data they are viewing did not update. This leads to the end users being perplexed on why their edits made the day before are not visible. The solution was to create a Python module called PC_Monitor that the script owner imports into the beginning of an existing or new script that is executed at the end of the script in either its own try, except statement or at the end of a finally statement. Parameters need to be passed into one of the module's functions to successfully update the database table. The database table is then used for visualizing the status of the script using ArcGIS Dashboards widgets. The module captures various information programmatically using user inputs. Most importantly, the module captures and records the status of the script (Success, Finished with Warnings, or Failed) and the first 255 characters of the status message for Finished with Warnings and Failed. The module has been successful in various test situations on multiple servers. The PC_Monitor module alongside the ArcGIS Dashboard will help our organization's GIS users to visually monitor the status of Python scripts, keep track of Python scripts, and the effect those scripts have on data sets.

Keywords: ArcGIS Dashboard, Arcpy Module, Pima County ITD-GIS, Python Geoprocessing, Monitoring Scheduled Python Jobs