MS-GIST Projects Summer 2023
Monday, August 07

**** 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
08/07/23 09:00 - 09:25 AM	GIS Analysis of fossils found in El Golfo, Sonora, México	Amber Webb
08/07/23 09:30 - 09:55 AM	Assessing The Urban Heat Island Effect In New York City	Eda Erol
08/07/23 12:00 - 12:25 PM	USING GIS TECHNOLOGIES AND HYPERSPECTRAL DATA TO IDENTIFY MINING EXPLORATION AT FRISCO MINE, ARIZONA	Landon Breeding

GIS Analysis of fossils found in El Golfo, Sonora, México

Amber Webb
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08/07/23, 09:00 - 09:25 AM

Abstract:

The canyons and badlands in El Golfo, Sonora, México have been found fossiliferous with land mammal fossils from the Irvingtonian age and Calabrian stage of the Pleistocene Epoch. There has not been any extensive GIS analyses performed on the fossil sites in El Golfo. The goal of this project is to build a geodatabase with associated feature classes of various El Golfo paleontological, geological, and physiographical data. Next construct cartographic products to look for patterns of paleofauna distribution and create an online webmap available for the scientific community for visualization and analysis. Finally, geoprocess a DEM to obtain elevation, slope, and aspect to predict fossil locations. For the suitability study GPS data was obtained from previous fossil prospecting and was paired with a digital elevation model to see what elevation, aspect and slope was prevalent. Histograms were then used to identify which values were favorable to use in the study. Finally, ModelBuilder was used to create a map of ideal sites. The results of the analysis identified areas which are more probable for finding fossils. This project is of value for future international researchers and the data will contribute to the natural resource management of fossils in El Golfo.

Keywords: El Golfo, Fossils, GIS, Suitability, Analysis

Assessing The Urban Heat Island Effect In New York City

Eda Erol
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08/07/23, 09:30 - 09:55 AM

Abstract:

This paper investigates the Urban Heat Island (UHI) effect in New York City (NYC) by analyzing temperature data from 2016 and 2023. The aim is to compare the seven-year changes and forecast UHI conditions for 2030, considering the implications of climate change and urbanization. Using a comprehensive methodology, an interactive web application is developed to map the UHI phenomenon in NYC. Python and Node.js are utilized for web development, integrating OpenStreetMap, US Census and ZIP Code data for the basemap. Z-score calculations are conducted using Land Surface Temperature (LST) data to quantify temperature differences between urban and rural areas. Analysis of Urban vs. Rural Temperature incorporates LST data, air temperature measurements, day/night temperature patterns, and seasonal temperature patterns. Hot spot analysis identifies areas with significant temperature anomalies based on air-related data. By analyzing the temperature data from 2016 and 2023, this study provides insights into UHI intensity changes and spatial patterns over the seven-year period. Findings inform predictions of UHI conditions in 2030, which hold environmental significance. Implications for energy consumption, human health, and urban livability are examined, facilitating informed decision-making for sustainable urban design and UHI mitigation strategies.

Keywords: Urban heat island, temperature analysis, urban vulnerability, climate change, urbanization.

USING GIS TECHNOLOGIES AND HYPERSPECTRAL DATA TO IDENTIFY MINING EXPLORATION AT FRISCO MINE, ARIZONA

Landon Breeding
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08/07/23, 12:00 - 12:25 PM

Abstract:

The potential benefits of incorporating digitized geologic maps and hyperspectral data for identifying new exploration mining targets at Frisco gold mine are explored in this project. The digitization of geologic maps converts valuable geologic information from traditional paper maps into a digital format, making it easier to analyze and integrate with other geological datasets. This integration helps identify spatial relationships, patterns, and trends in the geologic data, leading to the discovery of potential gold mineralization zones. Hyperspectral data is also crucial in enhancing exploration efforts. Hyperspectral imaging technology captures data across a broad range of wavelengths, enabling detailed characterization of mineralogy and alteration minerals associated with gold deposits. By analyzing hyperspectral data, geologists can identify spectral signatures indicative of gold mineralization, allowing for the precise delineation of potential exploration targets. Combining digitized geologic maps in Datamine Discover with hyperspectral data analysis provides a powerful toolset for gold mine exploration. The integrated approach efficiently identifies additional exploration targets by leveraging the spatial information from geologic maps and the spectral signatures captured by hyperspectral data. This workflow enhances understanding of the geology and mineralization processes, ultimately leading to improved targeting and resource estimation in gold mining operations.

Keywords: Au -Gold mt -Metric Tons g -Grams GIS -Grams Geographic Information Systems UTM -Universal Transverse Mercator Coordinate System NAD -North American Datum RGB -Red Green Blue