GIS 8990: Research Problems in GIS
Registration Instructions

You can earn credit for an approved GIS independent research project with a MGIS faculty member by undertaking the following steps:

1) Identify a GIS-based research project by discussing your interests/idea with a MGIS faculty member who is willing to advise you.

2) Discuss the details of your project with your MGIS faculty sponsor using the *Student/Faculty Contract* as a guide, e.g., determine how many credits will be earned and what work will be submitted for credit.

3) Complete the form, sign and date it, and acquire your faculty sponsor's signature.

4) Submit the form to Susanna McMaster in order to get a permission number to register for GIS 8990 credits.

Please feel free to contact Susanna McMaster or the current DGS for more information about GIS 8990.

GIS 8990: Research Problems in GIS Student/Faculty Contract

Student Information

Student name: Zain Ul Abdin Siyal

ID#: 5823083

Degree program: MGIS

College: CLA

MGIS Faculty Sponsor Information

MGIS Faculty name and title: Dr. Ying Song

Department: Geography, Environment & Society

E-mail: yingsong@umn.edu

GIS Research Project Information

Semester (check one): Fall

Year: 2023

Credits (1-6): 3

Project title: Spatial-temporal Analyzing of Air Quality in Twin Cities Metropolitan Area

Project description (i.e., your learning objectives and proposed activities.):

This project involves a comprehensive spatial-temporal analysis of air quality within the Twin Cities metropolitan areas across time, including seasons of the year, days of the week, hours of the day. The collected data will first be meticulously cleaned and managed in a geospatial database. Second, we will employ spatial interpolation techniques to generate layers of air quality data for the entire study area, each correspond to a specific time periods. Using this dataset, we will review literatures and apply spatial-temporal analytical methods to uncover patterns and trends in air quality within the metro area.
(Alternative) Exploring Relationship between Human Mobility and Air Quality Data
In case of high-resolution temporal air quality data is not available, the project will use the weekly air quality summairy data to investigate the complex relationship between human mobility patterns and air quality. This analysis will involve data on human mobility, weather conditions, population distribution, employment density, land use, and traffic patterns. The goal is to identify correlations relationships between these factors and air quality outcomes as well as spatial patterns of air quality.

The method for both the projects follows the same systematic process. It begins with collecting air quality data, ensuring its cleanliness and organization. Relevant research papers will be reviewed to determine the most suitable analysis method. The advisor provides guidance through weekly meetings, and thorough documentation is maintained for future reference.

Results to be evaluated (e.g., written paper, application development, web development):

The project will be evaluated based on three main deliverables (1) a meticulously structured dataset incorporating air quality data and pertinent environmental and human mobility variable; (2) a comprehensive report explaining project methodology, data analysis, findings, and insights gained from the study, and (3) bi-weekly 45-minute meetings with the advisor to report and keep track of the project progress and to refine the research design to achiveve high-quality research outcomes.

Due date for evaluation materials: 12/17/2023

Signatures

Student

Date 09/15/2023

Director of Graduate Studies

Date 09//2023

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MGIS Faculty sponsor signature

Date 09/15/2023