Mengyu Liao

Email: myuliao@umd.edu | Phone: (716) 730-9950

Research Interests

My interests include spatiotemporal theories and applications, big data, spatial data science, as well as geospatial modeling with machine learning. I am eager to use those above to explore how humans perceive, interact with, and change space/environments. Particularly, I have a strong interest in bridging geospatial modeling with criminology, health, and human mobility prediction.

Education

University at Buffalo, SUNY *09/2019-08/2021*
M.S. Geographic Information Science

Southwest University, China *09/2014-06/2018*
B.S. Geographic Information Science

Research Experiences

Does Crime Affect House Price Prediction

A Project of STA 545 Data Mining I, the prior research of my master thesis *09/2020-12/2020*

➢ Objective:

Using different machine learning methods, exploring whether crime rates could increase or decrease the accuracy of house price prediction results in the Wales, UK, from November 2017 to October 2020.

➢ Responsibilities:

1. Data tidying (geocoding and spatial joining)
2. Implementing random forest and neural network regression to do the prediction, using 5-fold cross validation to tune the main hyperparameters of the two models, and comparing models based on the test errors.

The Spread of Misinformation Tweets during the COVID-19 Pandemic

Assisting Dr. Monica Stephens to do data collecting and processing *05/2020-07/2020*

➢ Objective:

Plotting and analyzing the spatial distribution of the tweets containing misinformation related to COVID-19 from April to June 2020.

➢ Responsibilities:

1. Collecting, crawling, and streaming the tweets containing misinformation
2. Geocoding the addresses of the tweets by calling different Map APIs

Assessing Water Contamination

A Project of GEO597 Applied GeoStatistics *02/2020-05/2020*

- ➢ Objective:

  Using Ordinary Kriging, assessing regional stream contamination in northern Vancouver Island, Canada

- ➢ Responsibilities:

  1. Choosing proper semivarigrams and search neighborhoods to implement Ordinary Kriging

  2. Interpolating the surfaces of the main heavy metals, water pH, and Sediment Quality Index

  3. Comparing the kriging results above and assessing the water quality in our study area

Prediction of Crime Types Using Machine Learning

A Project of GEO503 GIS and Machine Learning   *09/2019-11/2019*

- ➢ Objective:

  Predicting the top 3 most crime types happened most frequently in Manhattan from 2015-2017 and exploring how land use types and time affect the occurrence of different crime types.

- ➢ Responsibilities:

  1. Tidying crime and land use data, and visualizing crime occurrences by using R programming

  2. Using Python, building random forest and lightGBM models to do the classification, using grid search to tune the hyperparameters of the models above, and comparing them based on the log loss.

  3. Finally choosing random forest algorithm and building the classification model.

A Webpage Portfolio of Web-Geovisualization

A Project of GEO 597 Cartography and Web-Geovisualization   *09/2017-01/2018*

- ➢ Building a webpage and learning about fundamentals of HTML, CSS and JavaScript

- ➢ Plotting and processing spatial data in Mapbox and QGIS

- ➢ Creating the interactive maps using different methods (Leaflet API and D3.js with Node.js)

Spatiotemporal Distribution and Evolution of Hakka's Place Names

Bachelor Thesis   *07/2017-05/2018*

- ➢ Objective:

  Choosing Fujian, Jiangxi, and Guangdong provinces as the study area, collecting the place names of Hakka; visualizing and analyzing the spatiotemporal distribution of Hakka's place names; and deducing a possible historical migration path of Hakka people

- ➢ Responsibilities:

  1. Collecting all place names in the study area and classifying them as Hakka or non-Hakka

  2. Analyzing the correlation between the distribution of Hakka place names and possible natural and social factors

  3. Predicting the likelihood that a place name is a Hakka's place name by building logistic regression model.

  4. Plotting the geometric centers of Hakka place names' spatial distributions during different periods and deducing one possible historical migration path of Hakka people

The GIS-based Identification of The Countries Prone to "Color Revolution"

Supported by Undergraduate Innovation and Entrepreneurship Training Programs which is funded by Institute of Geographic Sciences and Natural Resources Research (10k RMB)   *09/2017-01/2018*

➢ Objective:

   Quantifying and analyzing which countries where color revolutions more likely to occur

➢ Responsibilities:

   1. Collecting economic data of different countries

   2. Applying to an optimal weights combination method considering both subjective and objective weight information

   3. Calculating different weights of different factors which affect the appearance of color revolution.

The 5th National College Student GIS Application Skills Competition, China

Our team is on behalf of Southwest University to participate in   *11/2016*

➢ The third prize

➢ Responsibilities:

   1. Taking the spatial analysis part, specifically, using tracking analyst tool in ArcMap 10.2 to track the typhoon's path as time goes by

   2. Writing the report

Internship Experiences

National Ocean Technology Center, China   **09/2017-12/2017**

Data Analyst

➢ Collecting the place names which has been changed in recent ten years (2008-2018) in Nantong, Jiangsu Province, China

➢ Converting those addresses into geographic coordinates using different geocoding APIs

Campus Activities

➢ **Research Assistant**
   The Department of Geography, Southwest University   *09/2016-05/2017*

➢ **Teaching Assistant**
   The Department of Geography, Southwest University   *09/2015-05/2016*

➢ **Assessor**
   Teaching Information Center of Southwest University   *10/2014-05/2015*

Relative Skills

Good command of **R, Python, C# and ArcMap Pro**
Learn about **HTML, CSS, JavaScript, and Data-Driven Documents (D3.js**)
Know the basic operations of **AutoCAD, SketchUp and VRML**

Honors and Awards

Outstanding individual in literary and artistic activity, Southwest University, 12/2017
Second-class merit-based scholarship, Southwest University, 12/2017
Third-class merit-based scholarship, Southwest University, 12/2016
Third-class merit-based scholarship, Southwest University, 12/2015