Welcome to the GIS Lab in IESA UNG

The GIS Lab is Dr. Huidae Cho's research group in IESA. Our research focuses around the broad applications of Geographic Information Systems (GIS) and computational methods to geospatial analysis, modeling, and engineering. We use this wiki site to share project information and document our research for internal collaboration. Most of pages related to ongoing projects will be hidden from the public, but we will disseminate research findings and outcomes once the project is completed. Find the conferences where you can meet us.

Please also check these 2021 academic opportunities.

Current projects

- Google Summer of Code 2021 Parallelization of existing modules for GRASS GIS
  - Funded by Google
- Water balance analysis for Seoul
- Fast flow accumulation
- Efficient delineation of a large number of subwatersheds

Projects on hold

- UNG stormwater modeling by Christopher Pugel
  - Idea proposed by Huidae Cho, but put on hold because of a lack of budget
- Topographic index enhanced with soil moisture
  - A special topic in GIS for spring 2020
  - Idea proposed by Huidae Cho and partially implemented by Tyler Henderson

Past projects

- ProjPicker: Spatial query of coordinate reference systems
  - Funded by IESA
- Efficient longest flow path algorithm
- GFC canopy assessment
  - Funded by the Georgia Forestry Commission
  - Phase 1 by Owen Smith and Jennifer McCollum
  - Phase 1.5 by Owen Smith
  - Phase 2 by Owen Smith
- Open source canopy classification by Owen Smith
  - A special topic in GIS for spring 2020
  - Idea proposed and implemented by Owen Smith

Software

- GetOSM: OpenStreetMap tile downloader
- ProjPicker: Spatial query of coordinate reference systems
- r.accumulate: An efficient flow accumulation addon for GRASS GIS
- Coronavirus Disease 2019 (COVID-19 or 2019-nCoV) Cases
- CanoClass: An open-source Python module for canopy classification using scikit-learn
- CanoPy: A Python module for canopy classification using Feature Analyst
- The Automated Floodway Optimizer for HEC-RAS (AFORAS)
- Isolated-Speciation-based Particle Swarm Optimization (ISPSO)
- The Web-based Hydrologic Modeling System (WHydroMod) v0.1 for Texas
- Let-It-Rain: A Poisson Cluster Stochastic Rainfall Generator
- GRASS GIS for MS Windows
    - Latest daily build for advanced users
    - Latest daily build for beginners

Manuscripts in preparation

- Owen Smith, Huidae Cho. An Open-Source Canopy Classification System Using Machine-Learning Techniques Within a Python Framework. Environmental Modelling & Software. SCIE, 2019 Impact Factor 4.807.
- Huidae Cho, Owen Smith. Quantifying Decade Canopy Change for the State of Georgia Utilizing NAIP Imagery from 2009–2019. Forestry. SCIE, 2019 Impact Factor 2.293 (too low, maybe a remote sensing journal?).

Manuscripts under review

- Aboalhasan Fathabadi, Huidae Cho, Seyed Morteza Seyedian, Bahram Choubin. Comparison of Bayesian Model Averaging and GLUE Weighting Methods for Uncertainty Estimation in Hydrologic Modeling. Journal of Hydrology. SCIE, 2019 Impact Factor 4.500.

Recent publications

- Huidae Cho, September 2020. A Recursive Algorithm for Calculating the Longest Flow Path and Its Iterative Implementation. Environmental Modelling & Software 131, 104774. 10.1016/j.envsoft.2020.104774. SCIE, 2019 Impact Factor 4.807, Author's Version.
- Huidae Cho, Jeongha Park, Dongkyun Kim, March 2019. Evaluation of Four GLUE Likelihood Measures and Behavior of Large Parameter Samples in ISPSO-GLUE for TOPMODEL. Water 11 (3), 447. doi:10.3390/w11030447. SCIE, 2019 Impact Factor 2.544.
- Huidae Cho, Tien M. Yee, Joonghyeok Heo, October 2018. Automated Floodway Determination Using Particle Swarm Optimization. Water 10 (10), 1420. doi:10.3390/w10101420. SCIE, 2019 Impact Factor 2.544.
- Dongkyun Kim, Huidae Cho, Christian Onof, Minha Choi, May 2017. Let-It-Rain: A Web Application for Stochastic Point Rainfall Generation at Ungaged Basins and Its Applicability in Runoff and Flood Modeling. Stochastic Environmental Research and Risk Assessment 31 (4), 1023-1043. doi:10.1007/s00477-016-1234-6. SCI, 2019 Impact Factor 2.351.

- Huidae Cho, Emma Bones, August 2016. Quantification of Uncertainties in the 100-year Flow at an Ungaged Site Near a Gaged Station and Its Application in Georgia. Journal of Hydrology 539, 640-647. doi:10.1016/j.jhydrol.2016.05.070. SCI, 2019 Impact Factor 4.500, Author's Version.

Recent presentations

- Huidae Cho, Aboalhasan Fathabadi, Seyed Morteza Seyedian, Bahram Choubin, March 22–23, 2021. Uncertainty Estimation in Hydrologic Modeling Using Bayesian Model Averaging Within the GLUE Framework. 2021 Georgia Water Resources Conference (GWRC). Online.
- Huidae Cho, February 7, 2021. r.accumulate: Efficient Computation of Hydrologic Parameters in GRASS—Improving the Performance of Geospatial Computation for Web-based Hydrologic Modeling. Free and Open Source Software Developers' European Meeting (FOSDEM) 2021. Online.
- Owen Smith, Huidae Cho, Jennifer McCollum, July 13–16, 2020. Tree Canopy Dataset Creation for the State of Georgia with NAIP Imagery and Python. 2020 Esri User Conference. Esri. Online.
- Owen Smith, Huidae Cho, March 13, 2020. A Reproducible Supervised Classification System for Tree Canopy and Deforestation Detection Within an Open Source Python Framework Utilizing NAIP Imagery (slides). University of North Georgia 25th Annual Research Conference (ARC). Online.
- Jennifer McCollum, Huidae Cho, March 13, 2020. Georgia Statewide Tree Canopy Analysis. University of North Georgia 25th Annual Research Conference (ARC) Online.
- Tyler Henderson, Huidae Cho, March 13, 2020. Expansion of Topographic Wetness Index to Include Remotely Sensed Soil Data. University of North Georgia 25th Annual Research Conference (ARC). Online.
- Huidae Cho, April 16, 2019. Revisiting the Longest Flow Path Algorithm. 2019 Georgia Water Resources Conference (GWRC). University of Georgia. Athens, GA.

Other resources

- Conferences
- Journals
- Scientific writing

projects seminars software students

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