Mingda Wu

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EDUCATION

Capital Normal University | Beijing, China Sep 2020-Present
Bachelor of Science in Geographic Information Science
GPA: 4.34/5 (93.4/100), Major Top 1

Northern Illinois University | DeKalb, IL, USA Aug 2021-May 2023
Bachelor of Science in Geography
GPA: 3.98/4, Dean's List for 4 semesters, Full University Honors, Summa Cum Laude, GIS Certificate

PUBLICATIONS

- **Wu, M**., Sui, T., Huang, Q., & Wu, M. (2023). Multiclass Wildfire Burnt Area Detection using Deep Learning and Sentinel-2 Imagery. *Science of Total Environment*. (To be submitted in Nov 2023)
- Sui, T., **Wu, M**., Wu, M., & Huang, Q. (2023). Empowering Wildfire Burnt Area Detection with Deep Learning. International Society for Photogrammetry and Remote Sensing (ISPRS). (To be submitted in Nov 2023)
- **Wu, M**., Huang, Q., Sui, T., & Wu, M. (2023). *Pixel-wise Wildfire Burn Severity Classification with Bi-temporal Sentinel-2 Data and Deep Learning*. The 6th International Conference on Big Data Technologies (ICBDT 2023) Conference Proceeding. (**Excellent Presentation Award**, under publication)
- **Wu, M**. (2023). Pixel-Wise Machine Learning and Deep Learning Methods Implementation on Multi-Class Wildfire Mapping. *Honors Capstones, 1464*. https://huskiecommons.lib.niu.edu/studentengagement-honorscapstones/1464 (**Third Prize in environment category**)

PRESENTATIONS

- Huang, Q., **Wu, M**., & Sui, T. (2023). *Empowering Wildfire Damage Assessment with Bi-temporal Sentinel-2 Data and Deep Learning*. 2023 American Geophysical Union (AGU) Fall Meeting, San Francisco, CA, United States of America. (Invited)
- **Wu, M**. (2023). *Pixel-Wise Machine Learning and Deep Learning Methods Implementation on Multi-Class Wildfire Mapping*. Illinois GIS Association (ILGISA) - the Geographic Society of Chicago (GSC) Student Poster Symposium, Chicago, IL, United States of America. (**First Prize in undergraduate group**)
- Sui, T., **Wu, M**., Wu, M., & Huang, Q. (2023). *Empowering Urban Wildfire Burnt Area Detection with Deep Learning*. Global Smart Cities Summit Cum the 3rd International Conference on Urban Informatics (GSCS & ICUI 2023) Conference, Hong Kong, China.

RESEARCH EXPERIENCES

Wildfire Damage Assessment with Deep Learning and Sentinel-2 Jan 2023-Present
Spatial Computing and Data Mining Lab, University of Wisconsin-Madison Advised by Dr. Qunying Huang
Objective: Perform multiclass wildfire semantic segmentation to detect burnt area using deep learning

- Labeled fire images in QGIS based on NBR values, made Adobe Photoshop adjustments, and converted them for model input using Python.
- Designed a Bi-Temporal U-Net structure for pre- and post-fire data, integrating attention gates and residual blocks to focus on challenging classes. Used ArcGIS Pro's Deep Learning toolbox to generate training data for the models.
- Compared to the standard U-Net, we improved overall accuracy by 5%, the Kappa coefficient by 11%, and the mean IoU by 15%.
- Plotted an AUC-ROC curve to illustrate our model's training performance. It demonstrated excellent accuracy with a mean AUC > 0.93, while class 1 (AUC=0.87) needs further improvement.

Multiclass Wildfire Mapping using Machine Learning Jan 2023-May 2023
Department of Earth, Atmosphere and Environment, Northern Illinois University
Advised by Dr. Wei Luo & Dr. Alex Haberlie
Objective: Map wildfire burnt area using traditional machine learning algorithms

- Selected a study area and acquired Sentinel-2 images from ESA. Utilized Erdas to pick false-color bands emphasizing wildfire features.
- Employed QGIS for basic preprocessing tasks like cropping, mosaicking, and stacking. Calculated NDVI values and extracted wildfire features using Erdas.
- Utilized various machine learning algorithms, including Random Forest (RF), eXtreme Gradient Boosting (XGBoost), and Support Vector Machine (SVM).
- Assessed the results using standard metrics, such as overall accuracy (OA), precision, recall, F1-score, and mean IoU. SVM outperformed other models, achieving the highest accuracy.

INTERNSHIP

Geological and Geomorphological Field Trip May 2021
School Practice Qinhuangdao, Hebei Province, China
College of Resource Environment and Tourism, Capital Normal University

- Explored geological ages, rock formations, and mapped topography using GPS and a compass to understand mountainous and coastal terrain formation.

HONORS AND AWARDS

Excellent Presentation Award, 2023 6th International Conference on Big Data Technologies Sep 2023
Full University Honors, Northern Illinois University May 2023
GIS Certificate, Department of Earth, Atmosphere and Environment, Northern Illinois University May 2023
Richard E. Dahlberg Scholarship, Northern Illinois University May 2023
First Prize of the undergraduate group, ILGISA Poster Symposium May 2023
Third Prize of the environment category, NIU CURE Poster Symposium Apr 2023
Second Prize of general news photo, Illinois College Press Association Feb 2023
Major Third-Class Scholarship, Capital Normal University May 2022

WORK EXPERIENCES

Senior Photojournalist | DeKalb, IL, USA Aug 2021-May 2023
Northern Star, Northern Illinois University
Scanning Technician | DeKalb, IL, USA Aug 2022-Dec 2022
Founders Memorial Library, Northern Illinois University
Photographer | Beijing, China Sep 2020-Jun 2021
Youth Radio & College of Resource Environment and Tourism, Capital Normal University

EXTRACURRICULAR ACTIVITIES

Volunteer of "Week of Welcome 2022" | DeKalb, IL, USA Aug 2022
Responsible for organizing the welcome event and arranging the welcome picnic.
Volunteer of "Give DeKalb 2022" | DeKalb, IL, USA Mar 2022
Participated in the annual event of DeKalb County. Responsible for making advertising board.

SKILLS

- Programming Language and Libraries: Python, GDAL, Scikit-Learn, Tensorflow, Pytorch (learning)
- Major Software: ArcGIS Pro, QGIS, Erdas, Tableau, SPSS, Google Earth Engine (learning)
- Other: Photoshop, Lightroom, Premiere
- Languages: Chinese (native), English (TOEFL iBT 106)