Yuchi Ma, Ph.D. Candidate

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Education

University of Wisconsin-Madison, Madison, USA 2019 – Present

- Ph.D. in Biological Systems Engineering (**GPA: 3.88/4.00**)
- Specialization: **Remote Sensing**
- Thesis: County-Level Corn Yield Prediction with Deep Learning (dissertator status)
- Minor in Electrical and Computer Engineering (Specialization: **Machine Learning**)
- Research: Crop Yield Prediction, Remote Sensing, Deep Learning, Domain Adaptation

Purdue University, West Lafayette, USA 2017 – 2019

- M.Sc. in Civil Engineering (**GPA: 3.94/4.00**)
- Thesis: Moving Objects Detection and Tracking with Doppler LiDAR
- Research: Laser Scanning, Object Tracking, Computer Vision

Wuhan University, Wuhan, China 2013 – 2017

- B.E. in Geomatics Engineering (GPA: 3.72/4.00)
- Thesis: Generative Model for Highway Traffic Understanding
- Minor in Finance
- Research: Satellite Image Processing

York University, Toronto, Canada 2016 – 2017

- Undergraduate Exchange Student at The Centre for Vision Research and Vision
- Research: Traffic Simulation, Computer Vision

Research Experiences

Unsupervised Domain Adaptation for county-level crop yield prediction 01/2020 – Present

- Addressing the challenge of domain shift between different agricultural regions.
- A deep learning-based domain adaptation framework based on **remote sensing** variables has been developed to improve the yield prediction accuracy for region where there is no historical yield information.

County-level corn yield prediction using deep Bayesian Neural Networks 08/2019 – 08/2020

- Addressed the challenge of missing uncertainty information in machine learning-based corn yield prediction models.
- Conducted corn yield prediction and uncertainty analysis based on **remotely sensed variables** using a Bayesian neural network approach.

Field-level alfalfa yield and nutritive value prediction based on UAV Imagery 08/2019 – 12/2019

- Addressed the challenge in precision agriculture of in-season alfalfa yield and nutritive value prediction at the field level.
- Applied ensemble learning and multi-task learning for field-level alfalfa yield and nutritive value prediction based on UAV imagery.

Moving object detection and tracking with Doppler LiDAR 01/2018 – 04/2019

- Developed object detection and tracking methods based on algorithms including DBSCAN, region growing, Kalman filter, particle filter and multiple hypothesis tracking.

Comparison of Lidar sensors 09/2017 – 06/2018

- Explored the data derived by an adaptive LiDAR scanner *HRS3D-AS* and compared it with the data from traditional LiDAR

Skills and Certificates

- Programming language: Python, C++, C#, MATLAB, R, JavaScript, SQL
- Library: OpenCV, Point Cloud Library (PCL)
- Deep learning framework: Keras, Tensorflow, Pytorch
- Software: ArcGIS, Git, ERDAS, CloudCompare, Unity 3D
- Cloud computing: Azure
- Database: Postgres/PostGIS
- Certificate: Federal Aviation Administration (FAA) Certification
- Language: English, Chinese

Teaching Experiences

Independent Lecturer: Geog574-Spatial Database Design and Development (**4 credits**) UW-Madison
- Taught this course independently with 23 students enrolled in Dept. Geography Fall 2021
- Prepared course materials and gave two lectures per week
- Mentored students through course projects about geo-spatial databases, i.e., Postgres/PostGIS

Practicum-Ag Engineering Teaching: BSE 301-Land Information Management (**3 credits**) UW-Madison
- Prepared video teaching materials about geo-spatial data processing Fall 2021
- Prepared lecture slides and exam questions

Journal Publications

1. **Ma, Y.**, Zhang, Z., Kang, Y. and Özdoğan, M., 2021. Corn yield prediction and uncertainty analysis based on remotely sensed variables using a Bayesian neural network approach. *Remote Sensing of Environment*, 259, p.112408 (**IF: 10.164, the Top 1 Journal in the Remote Sensing field**).
2. **Ma, Y.**, Zhang, Z., Yang, H.L. and Yang, Z., 2021. An adaptive adversarial domain adaptation approach for corn yield prediction. *Computers and Electronics in Agriculture*, 187, p.106314 (IF: 5.565).
3. **Ma, Y.**, Anderson, J., Crouch, S. and Shan, J., 2019. Moving Object Detection and Tracking with Doppler LiDAR. *Remote Sensing*, 11(10), p.1154 (IF: 4.848).
4. Feng, L., Zhang, Z., **Ma, Y.**, Sun, Y., Du, Q., Williams, P., Drewry, J. and Luck, B., 2021. Multitask Learning of Alfalfa Nutritive Value From UAV-Based Hyperspectral Images. *IEEE Geoscience and Remote Sensing Letters* (IF: 3.966).
5. Wang, Y., Zhang, Z., Feng, L., **Ma, Y.** and Du, Q., 2021. A new attention-based CNN approach for crop mapping using time series Sentinel-2 images. *Computers and Electronics in Agriculture*, 184, p.106090 (IF: 5.565).
6. Feng, L., Zhang, Z., **Ma, Y.**, Du, Q., Williams, P., Drewry, J. and Luck, B., 2020. Alfalfa Yield Prediction Using UAV-Based Hyperspectral Imagery and Ensemble Learning. *Remote Sensing*, *12*(12), p.2028 (IF: 4.848).
7. Sun, C., Feng, L., Zhang, Z., **Ma, Y.**, Crosby, T., Naber, M. and Wang, Y., 2020. Prediction of end-of-season tuber yield and tuber set in potatoes using in-season uav-based hyperspectral imagery and machine learning. *Sensors*, 20(18), p.5293 (IF: 3.576).
8. Li, Q., **Ma, Y.**, Anderson, J., Curry, J. and Shan, J., 2019. Towards Uniform Point Density: Evaluation of an Adaptive Terrestrial Laser Scanner. *Remote Sensing*, 11(7), p.880 (IF: 4.848).
9. Sun, C., Zhou, J., **Ma, Y.**, Xu, Y., and Zhang, Z., 2022. A Review of Remote Sensing for Precision Potato Management. *Computers and Electronics in Agriculture* (submitted).
10. **Ma, Y.**, Zhang, Z., Maximum Predictor Discrepancy for Multi-source Unsupervised Domain Adaptation on Corn Yield Prediction. (In preparation, expected submission date: 03/2022).
11. **Ma, Y.**, Zhang, Z., A Bayesian Domain Adversarial Neural Network for Corn Yield Prediction. (In preparation, expected submission date: 01/2022).

Conference Publications&Presentations

1. **Ma, Y.**, Kang, Y., Ozdogan, M., and Zhang. Z., 2019. County-level corn yield prediction using deep transfer learning, *AGU Fall Meeting Abstracts* 2019. ***Oral Presentation***

2. **Ma, Y.**, Zhang, Z, 2022. Multi-source Unsupervised Domain Adaptation on Corn Yield Prediction. AAAI-22 AI for Agriculture and Food Systems (AIAFS) Workshop. (Accepted)
3. Zhang, Z., **Ma, Y.**, Yang, H.L. and Yang, Z., 2021. An adaptive adversarial domain adaptation approach for corn yield prediction. *AGU Fall Meeting Abstracts* 2021. ***Oral Presentation***
4. Zhang, Z., Feng, L., **Ma, Y.**, Du, Q., Williams, P., Drewry, J. and Luck, B., 2021. Alfalfa Nutritive Value Prediction Using UAV-Based Hyperspectral Imagery and Multi-task Learning. *AGU Fall Meeting Abstracts* 2021. ***Oral Presentation***

Journal Reviewer

1. *Frontiers in Plant Science* (IF: 4.407)
2. *Plant Methods* (IF: 4.993)
3. *PLOS One* (IF: 3.240)
4. *Concurrency and Computation* (IF: 1.536)

Awards & Honors

- Lecturer Scholarship from Department of Geography — UW-Madison, Fall 2021
- Dr. Leonard E. Mortenson Graduate Scholarship — UW-Madison, Fall 2020
- Dr. Leonard E. Mortenson Graduate Scholarship — UW-Madison, Fall 2019
- Roland S. Corning II Memorial Fund — Purdue University, Fall 2017