Hongruixuan CHEN

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EDUCATION & GPA

State Key Laboratory of Information Engineering in Survey, Mapping and Remote Sensing (LIESMARS), Wuhan University | Wuhan, China *Sept.,2019-Jun.,2022(EXP)*

- ***M.S*** in *Photogrammetry and Remote Sensing* Overall GPA: 4.05/5.0

School of Resources and Environmental Engineering, Anhui University | Hefei, China *Sept.,2015-Jun.,2019*

- ***B.S*** in *Geomatics Engineering* Overall GPA: 4.41/5.0 (ranking: 1/230)

HONORS & AWARDS

- National Scholarship for Postgraduates (**Top 1 in 169**) *Oct., 2020*
- LIESMARS Scholarship for Excellent First-Year Postgraduates (**Top 9 in 169**) *Sept.,2019*
- Excellent Graduate of Anhui Province, China (**Top 1%**) *May, 2019*
- GuoSen Scholarship (**Top 3%**) *Oct., 2018*
- First Prizes of Academic Scholarship of Anhui University *Oct., 2018*
- National Scholarship for Undergraduates (**Top 2 in 230**) *Oct., 2017*
- Anhui University Scholarship for Excellent Students (**Top 3%**) *Oct., 2016*
- Second Prize of ESRI Cup GIS Software Development Contest in China (**Top 6 in 105**) *Nov., 2018*
- Second Prize of GIS Contest in Anhui Province (**Top 5%**) *Sept.,2018*
- Outstanding Prize of National Survey and Mapping Contest in Programming (**Top 3 in 113, also the first time for universities in Anhui Province to win the prize**) *July, 2018*
- Meritorious Winner of the US Mathematical Contest in Modeling *Apr., 2018*
- Second Prize of China National Mathematical Contest in Modeling (**Top 3%**) *Nov., 2017*

RESERCH INTERESTS

Remote Sensing Image Interpretation; Image Processing; Change Detection; Deep Learning; Machine Learning; Transfer Learning; Domain Adaptation; Unsupervised Learning; Weakly-supervised Learning; Point Cloud Data Processing, Indoor Positioning

PUBLICATIONS

H. Chen, C. Wu, B. Du, L. Zhang, and L. Wang, "Change Detection in Multisource VHR Images via Deep Siamese Convolutional Multiple-Layers Recurrent Neural Network," *IEEE Transactions on Geoscience and Remote Sensing*, vol. 58, no. 4, pp. 2848–2864, 2020.

H. Chen, C. Wu, B. Du, and L. Zhang, "Deep Siamese Multi-scale Convolutional Network for Change Detection in Multi-Temporal VHR Images," *2019 10th International Workshop on the Analysis of Multitemporal Remote Sensing Images (MultiTemp)*, Shanghai, China, 2019, pp. 1-4. (Oral)

C. Wu, **H. Chen,** B. Du, and L. Zhang, "Unsupervised Change Detection in Multi-temporal VHR Images Based on Deep Kernel PCA Convolutional Mapping Network," *IEEE Transactions on Cybernetics*, 2019, https://arxiv.org/abs/1912.08628. (Supervisor as first author, Chen as the second, Submitting the first-round revision, and is under the second review)

H. Chen, C. Wu, B. Du, and L. Zhang, "DSDANet: Deep Siamese Domain Adaptation Convolutional Neural Network for Cross-domain Change Detection," *IEEE Transactions on Geoscience and Remote Sensing*, 2020, https://arxiv.org/abs/2006.09225. (Under review)

H. Chen, C. Wu, B. Du, and L. Zhang, "Change Detection in Multi-temporal VHR Images Based on Deep Siamese Multi-scale Convolutional Networks," *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, 2020, https://arxiv.org/abs/1906.11479. (Under review)

H. Chen, C. Wu, B. Du, and L. Zhang, "Towards Deep and Efficient: A Deep Siamese Self-Attention Fully Efficient Convolutional Network for VHR Image Change Detection," 2020. (Manuscript, aims at *ISPRS Journal of Photogrammetry and Remote Sensing*)

C. Wu, J. Yuan, L. Ru, **H. Chen,** B. Du, and L. Zhang, "A Measurement of Transportation Ban inside Wuhan on the COVID-19 Epidemic by Vehicle Detection in Remote Sensing Imagery," 2020, https://arxiv.org/abs/2006.16098.

PROJECTS & RESEARCH EXPERIENCES

Theoretic Research on Scene Change Detection Method of Time-series High-resolution Remote Sensing Image Based on Deep Slow Feature Analysis (A Project Funded by National Natural Science Foundation of China)

Key member | Sigma Laboratory of Wuhan University *Jan., 2020 - Present*

Advisor: Chen WU, Associate Professor at State Key Laboratory of Information Engineering in Survey, Mapping and Remote Sensing, Wuhan University

- Proposed the concept of cross-domain change detection, introduced domain adaptation into change detection, and presented a deep siamese domain adaptation convolutional neural network for cross-domain change detection.
- Assisted to design and implement a vehicle detection algorithm in very-high-resolution (VHR) images based on local anomaly detection, deep learning, and spectral information post-processing.
- Labeled a multi-temporal vehicle detection data set to evaluate the performance of different vehicle detection algorithms.

Research on Scene Change Detection Method of High-resolution Remote Sensing Image Based on Slow Feature Analysis (A Project Funded by National Natural Science Foundation of China)

Key member | Sigma Laboratory of Wuhan University *Mar., 2019 - Dec., 2019*

Advisor: Chen WU, Associate Professor at State Key Laboratory of Information Engineering in Survey, Mapping and Remote Sensing, Wuhan University

- Presented a novel deep kernel PCA convolutional mapping network for unsupervised binary and multi-class change detection in VHR images.
- Proposed a deep siamese convolutional multiple-layers recurrent neural network for multi-source change detection, which not only can process homogeneous images, but also effectively detect changes between heterogeneous images.
- Designed two deep siamese multi-scale convolutional neural networks to tackle the multi-scale changed objects in VHR images and presented two frameworks for unsupervised and supervised change detection, respectively.
- Labeled a scene change detection data set of high-resolution remote sensing images to evaluate the performance of scene change detection algorithms.

Research on the Planning Model of Highway Construction Scheme Based on Voronoi Diagram and Minimum Spanning Tree

Independent Research | Lanzhi Laboratory of Anhui University *May, 2018 - July, 2018*

Advisor: Yanlan WU, Professor at School of Resource and Environmental Engineering, Anhui University

- Designed and established the whole framework of the model of highway construction schema.
- Proposed and implemented the specific highway construction scheme algorithm based on the Voronoi diagram and minimum spanning tree with Python and ArcPy.

Urban Road Defect Detection System Based on Deep Learning

Key Member | Lanzhi Laboratory of Anhui University *Feb., 2018 - May, 2018*

Advisor: Yanlan WU, Professor at School of Resource and Environmental Engineering, Anhui University

- Designed and established the framework of the urban road defect detection system.
- Obtained client side of the system with Android, built back-end server with Java, and established the database of the system with PostgreSQL and PostGIS.
- Independently developed an automatic sample generation tool for traffic signs with Python for the following urban road research.
- Collected urban road video data and GPS trajectory data and managed them in the established database.

Indoor/Outdoor Seamless Positioning and Navigation System Integrated with Multi-sensor of Mobile Phone (National Undergraduate Innovation and Entrepreneurship Project)

Initiator & Team Leader | Lanzhi Laboratory of Anhui University *Nov., 2016 - Nov., 2018*

Advisor: Peng JIANG, Associate Professor at School of Resource and Environmental Engineering, Anhui University

- Designed and established the framework of indoor/outdoor seamless positioning and navigation system.
- Obtained indoor/outdoor seamless positioning system of smart terminals and data acquisition tools with Android, built back-end server with Java, and established the database of the system with PostgreSQL and PostGIS.
- Proposed and implemented a multi-sensor indoor/outdoor seamless positioning and navigation algorithm based on GPS, WIFI, NFC, and inertial positioning.
- This project was judged as excellent at the end and the established system has won one national second prize, one second prize of Anhui Province, and one software copyright.

OTHER EXPERIENCES

Long-term Practice of Mathematical Modeling

Group Leader & Member | Mathematical Modeling Competition Team of Anhui University *Mar., 2017 - Apr.,2018*

Advisor: Ligang ZHOU, Professor at School of Mathematics Sciences, Anhui University

- Systematically studied mathematical modeling and data mining, and finished five papers on mathematical modeling.
- Applied optimization models to crowdsourcing problems, and solved these models using different heuristic algorithms.
- Used statistical modeling and machine learning to find key factors related to energy consumption conditions, establish effective indicators for describing energy structure, and predict future energy situation.
- Designed an innovative algorithm based on ant colony algorithm and cluster analysis for shredded paper stitching.
- Adopted a fuzzy analytic hierarchy process and a statistical regression model to evaluate the mental health of students.

SKILLS, ACTIVITIES & INTERESTS

- **Reviewer:** IEEE Transactions on Image Processing, IEEE Transactions on Geoscience and Remote Sensing, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing
- **Programming:** Python, Java, Android, VB.Net, C#, C/C++, R, SQL (PistgreSQL+PostGIS), Latex
- **Deep Learning Framework:** Pytorch, Tensorflow, Keras
- **Software:** MATLAB, ENVI, ArcGIS, eCognition, GoogleEarth, SPSS, Lingo, Geoda, AutoCAD, Photoshop, CityEngine, SketchUp, proficient in PowerPoint
- **Interests:** Playing table tennis, Roller skating, Outdoor cycling, Reading, Watching movies, Programming