

# 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: 4.02/5.0

**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 Graduates 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*

## RESEARCH 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, "Toward Deep and Efficient: An Deep Siamese Self-Attention Fully Efficient Convolutional Network for Change Detection in Multi-temporal VHR Images," 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 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