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: 4.0/5.0

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

- ***B.S*** in *Geomatics Engineering* Overall GPA: 4.4/5.0 (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*
- Two First Prizes and One Second Prize of Academic Scholarship of Anhui University *Oct., 2018*
- National Scholarship for Undergraduates (**Top 0.8%**) *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 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 Analysis; Image Processing; Change Detection; Deep Learning; Machine Learning; Transfer Learning; Domain Adaptation; Unsupervised Learning; Weakly-supervised Learning; Point Cloud; 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, "Deep Siamese Domain Adaptation Convolutional Neural Network for Cross-domain Change Detection in Multispectral Images," 2020, https://arxiv.org/abs/2004.05745.

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.

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

- Labeled a multi-temporal vehicle detection data set.
- Assisted to design and implement a vehicle detection algorithm in high-resolution images based on local anomaly detection, deep learning, and spectral information post-processing.

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

- Labeled a scene change detection data set of high-resolution remote sensing images to evaluate the performance of scene change detection algorithms.
- Collaborated with other research investigators in drawing up regular progress reports.

Data-driven Feature Representation and Transfer Learning in Hyperspectral Remote Sensing Images and Its Application in Urban Geographic Information Extraction (A Key Project Funded by National Natural Science Foundation of China)

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

- The first to propose the concept of cross-domain change detection, introduced domain adaptation methods into change detection, and presented a deep siamese domain adaptation convolutional neural network for cross-domain change detection.
- Collaborated with other research investigators in drawing up regular progress reports.

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

Key Member | 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.
- Implemented the specific highway construction scheme algorithm based on the Voronoi diagram and minimum spanning tree with Python.

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.
- Independently 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.
- Collected and managed urban road video data and GPS trajectory data.

Indoor/Outdoor Seamless Positioning and Navigation System Integrated with Multi-sensor of Mobile Phone

Initiator & Team Leader | National Undergraduate Innovation and Entrepreneurship Project *Nov., 2016-Nov., 2018*

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

- Established the framework of indoor/outdoor seamless positioning and navigation system.
- Independently 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 an indoor/outdoor seamless positioning and navigation algorithm based on GPS, WIFI, and inertial positioning.
- The system has won one national second prize, one second prize of Anhui Province and one software copyright.

SKILLS, ACTIVITIES & INTERESTS

- **Programming:** Python, Java, Android, VB.Net, C#, R, Latex, SQL (PistgreSQL+PostGIS), C/C++
- **Deep Learning Framework:** Pytorch, Tensorflow, Keras
- **Software:** MATLAB, ENVI, ArcGIS, eCognition, GoogleEarth, SPSS, Lingo, Geoda, AutoCAD, Photoshop, CityEngine, SketchUp
- **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

陈洪瑞轩

出生年月: 1997 年 7 月 22 日 | 性别: 男
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通讯地址: 武汉大学测绘遥感信息工程国家重点实验室, 洪山区珞喻路 129 号

教育经历

硕士 武汉大学 测绘遥感信息工程国家重点实验室 2019 年 09 月-2022 年 07 月
- 摄影测量与遥感 GPA: 4.0/5.0

本科 安徽大学 资源与环境工程学院 2015 年 09 月-2019 年 07 月
- 测绘工程 GPA: 4.41/5.0 (排名: 1/230)

获奖情况

- 研究生国家奖学金(**Top 1 in 169**) 2020 年 10 月
- 测绘遥感信息工程国家重点实验室优秀硕士新生奖学金(**Top 9 in 169**) 2019 年 09 月
- 安徽省优秀毕业生(**Top 1%**) 2019 年 05 月
- 国森奖学金(**Top 3%**) 2018 年 10 月
- 安徽大学学术科技奖一等奖两项、二等奖一项 2018 年 10 月
- 国家奖学金(**Top 0.8%**) 2017 年 10 月
- 安徽大学优秀学生奖学金(**Top 3%**) 2016 年 10 月
- ESRI 全国大学生 GIS 软件开发竞赛二等奖(**Top 6 in 105**) 2018 年 11 月
- 安徽省大学生 GIS 竞赛二等奖(**Top 5%**) 2018 年 09 月
- 全国大学生测绘技能大赛编程组特等奖(**Top 3 in 113**) (**安徽省高校首次获得**) 2018 年 07 月
- 美国大学生数学建模竞赛一等奖 2018 年 04 月
- 全国大学生数学建模竞赛二等奖(**Top 3%**) 2017 年 11 月

研究兴趣

遥感图像分析; 自然图像处理; 变化检测; 语义分割; 深度学习; 机器学习; 迁移学习; 领域自适应; 无监督学习; 弱监督学习; 点云数据处理; 室内定位

论文成果

- **期刊 & 会议**

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. (**ESI 高被引论文, SCI 一区 Top**, IF: 5.85, 遥感图像处理顶级期刊)

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. (**EI 会议**, Oral)

- **在投**

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. (导师一作, 学生二作, **SCI 一区 Top**, IF: 11.08, 一审意见已返 二审中)

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. (**SCI 一区 Top**, IF: 5.85, 在投)

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. (**SCI 二区**, IF: 3.83, 在投)

- **预印本 & 手稿**

H. Chen, C. Wu, B. Du, and L. Zhang, "Deep Siamese Domain Adaptation Convolutional Neural Network for Cross-domain Change Detection in Multispectral Images," 2020, https://arxiv.org/abs/2004.05745.

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.

项目与研究经历

面向时序高分遥感影像场景变化检测的深度慢特征分析理论研究(国家自然科学基金面上项目)

研究骨干 | 武汉大学智能感知与机器学习组(Sigma) 2020 年 01 月至今

导师: 武辰, 武汉大学测绘遥感信息工程国家重点实验室副教授

- 标记武汉市多时相高分辨率遥感影像车辆检测数据集。
- 参与设计并实现了一种基于局部异常探测、深度学习和光谱信息后处理的遥感影像车辆检测算法。

基于慢特征分析的高分辨率遥感影像场景变化检测方法研究(国家自然科学基金)

研究骨干 | 武汉大学智能感知与机器学习组(Sigma) 2019 年 03 月-2019 年 12 月

导师: 武辰, 武汉大学测绘遥感信息工程国家重点实验室副教授

- 标记武汉市多时相高分辨率遥感影像场景变化检测数据集, 用于评估场景变化检测算法的性能。
- 与其他研究人员合作起草定期进度报告和结项报告。

数据驱动的高光谱遥感影像特征表达、迁移学习及其在城市地理信息提取中的应用(国家自然科学基金重点项目)

武汉大学智能感知与机器学习组(Sigma) 2019 年 03 月-2019 年 12 月

- 首次提出"跨域变化检测"的概念, 并将领域自适应方法引入到遥感图像变化检测中, 提出了一种深度孪生域适应卷积神经网络, 用于遥感图像的跨域变化检测。
- 与其他研究人员合作起草定期进度报告和结项报告。

基于网络 Voronoi 图和最小生成树的公路修路方案规划模型研究

研究骨干 | 安徽大学兰芷课题组 2018 年 05 月-2018 年 07 月

导师: 吴艳兰, 安徽大学资源与环境工程学院教授 学术带头人

- 负责搭建修路方案规划模型的整体框架。
- 实现了一种基于网络 Voronoi 图和最小生成树的公路修路方案规划算法。

基于深度学习的城市道路病害检测系统

技术负责人 | 安徽大学兰芷课题组 2018 年 02 月-2018 年 05 月

导师: 吴艳兰, 安徽大学资源与环境工程学院教授 学术带头人

- 负责设计城市道路病害检测系统的整体框架。
- 负责利用 Android 语言实现检测系统客户端, 利用 Java 语言搭建后台服务器, 利用 PostgreSQL+PostGIS 搭建系统数据库。
- 负责采集并管理城市道路视频数据和 GPS 轨迹数据。

集成手机多传感器的室内外无缝定位导航系统

项目负责人 | 国家级大学生创新创业项目 2016 年 11 月- 2018 年 11 月

导师: 江鹏, 安徽大学资源与环境工程学院副教授

- 负责设计室内外无缝定位系统的整体框架。
- 负责利用 Android 语言实现智能终端室内外无缝定位系统和数据采集工具, 利用 Java 语言搭建后台服务器, 利用 PostgreSQL+PostGIS 搭建系统数据库。
- 提出并实现了一种基于 GPS 定位, WIFI 定位和惯性定位, 辅以 NFC 位置校正的室内外无缝定位导航算法。
- 最终编写的系统获得全国二等奖一项, 安徽省二等奖一项, 软件著作权一项。

专业技能 & 其他

- **编程语言:** Python, Java, Android, VB.Net, C#, R, Latex, SQL (PistgreSQL+PostGIS), C/C++
- **深度学习框架:** Pytorch, Tensorflow, Keras
- **软件:** MATLAB, ENVI, ArcGIS, eCognition, GoogleEarth, SPSS, Lingo, Geoda, AutoCAD, Photoshop, CityEngine, SketchUp
- **审稿人:** IEEE Transactions on Image Processing, IEEE Transactions on Geoscience and Remote Sensing, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing