

Boni Hu

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EDUCATION

Northwestern Polytechnical University	Mar 2021 - Jun 2025
Doctor of Computer Vision	China
University of Technology Sydney	Sep 2019 - Mar 2020
Visiting student of Computer Vision	Australia
Northwestern Polytechnical University	Sep 2018 - Mar 2021
Master of Computer Vision	China
Northwestern A&F University	Sep 2014 - Jul 2018
Bachelor of Engineering	China

PUBLICATIONS

1. **Hu, Boni.**, Chen, L., Chen, R., Bu, S., Han, P., & Li, H. (2024). "CurriculumLoc: Enhancing Cross-Domain Geolocalization through Multi-Stage Refinement". IEEE Transactions on Geoscience and Remote Sensing.

Paper link: <https://ieeexplore.ieee.org/abstract/document/10477445>

Code: <https://github.com/boni-hu/CurriculumLoc>

Synopsis: We first recognized semantic scene and then measured geometric structure, involving a delicate design of multistage refinement pipeline and a novel keypoint detection and description with global semantic awareness and local geometric verification, resulting in a practical visual geolocalization solution.

2. **Hu, Boni.**, Chen, L., Xu, B., Bu, S., Han, P., Li, K., Xia, Z., Li, N., Li, K., Cao, X., & Wan, G. 2024. Real-time dense point cloud generation and digital model construction of surface environment based on UAV platform. National Remote Sensing Bulletin, 28 (5) : 1206-1221 DOI : 10.11834/jrs.20232597.

Paper link: <https://www.ygxb.ac.cn/zh/article/doi/10.11834/jrs.20232597>

Synopsis: Our proposed geolocalization method is utilized for dense point cloud generation and digital model construction to survey washed-out and sediment areas, determining their location and extent accurately.

3. Weng, L., Yang, W., **Hu, Boni.**, Han, P., Xue, S., Zhang, Y., ... & Bu, S. (2024). "MDINet: Multi-Domain Incremental Network for Change Detection". IEEE Transactions on Geoscience and Remote Sensing.

Paper link: <https://ieeexplore.ieee.org/abstract/document/10379022>

Synopsis: We proposed a domain residual module, decomposes the feature space into domain-specific and domain-shared parameters. This effectively mitigates catastrophic forgetting and outperforming existing incremental learning and change detection techniques in remote sensing.

4. Zhang, Y., Bu, S., **Hu Boni.**, Han, P., Weng, L., Xue, S. (2023). "Gcg-net: Graph classification geolocation network". IEEE Transactions on Geoscience and Remote Sensing.

Paper link: <https://ieeexplore.ieee.org/document/10177735>

Synopsis: We designed a graph neural network for feature extraction, and trained the network based on image classification with a special data grouping strategy. Results demonstrate the effectiveness of our approach for UAV visual geolocation, especially for large scale applications.

5. Zhang, Shuai, et al. Hu, Boni "3D reconstruction of deformable colon structures based on preoperative model and deep neural network." 2021 IEEE International Conference on Robotics and Automation (ICRA). IEEE, 2021.

Paper link: <https://ieeexplore.ieee.org/abstract/document/9561772>

Synopsis: We utilized a preoperative colon model segmented from CT scans together with the colonoscopic images to achieve the 3D colon reconstruction, including dense depth estimation from monocular colonoscopic images using a deep neural network.

6. Zhang, Yanhao, et al. **Hu, Boni** "Deep learning assisted automatic intra-operative 3d aortic deformation reconstruction." Medical Image Computing and Computer Assisted Intervention–MICCAI 2020: 23rd International Conference.

Paper Link: https://link.springer.com/chapter/10.1007/978-3-030-59719-1_64

Synopsis: We provided a framework that reconstructed the live 3D aortic shape by fusing a 3D static pre-operative model and the 2D intra-operative fluoroscopic images.

7. **Hu, Boni**, et al. "DFNet: Deep Fusion Network for 3D Shape Classification and Retrieval." 2020 Chinese Automation Congress (CAC). IEEE, 2020.

Paper link: <https://ieeexplore.ieee.org/abstract/document/9327445>

Synopsis: We introduce a fusion network designed for 3D shape recognition and retrieval, which effectively incorporates both intrinsic characteristics from point clouds and extrinsic visual relationships from multi-view data.

8. Qu, M. & **Hu, Boni**. & Long, Y. & Song, H.. (2018). Target segmentation and picking point detection method of mature tomatoes based on multi-color space fusion. International Agricultural Engineering Journal. 27. 237-249.

Synopsis: We developed a multi-color space integration model with sparse coding for accurate segmentation of mature tomatoes, and used K-means clustering to separate the background without mature tomatoes.

RESEARCH EXPERIENCE

Visual Geolocalization and Place Recognition

Mar 2022 - Present

Pilot Intelligent Laboratory, PI-LAB

China

- **Advisor:** Shuhui Bu
- **Research Area:**
 - Explore a series of topics in vision representation and matching, aiming at developing versatile, discriminative, and robust representations, as well as a general geolocalization framework for remote sensing applications.
 - Deployment of corresponding deep learning models and software development.

Medical Image Process at UTS

Sep 2019 - Mar 2020

Robotics Institute, Faculty of Engineering and IT

Australia

- **Advisor:** Shoudong Huang and Liang Zhao
- **Research Area:** Processing of simulated and real images for 3D reconstruction in a surgical environment.

PERSONAL

- **Languages:** Mandarin (native), English (CTE6)
- **Technical Skills:** Python, html, Java Script, Neo4j, Unreal Engine, ColMap, QGIS
- **Extracurricular Activities:** Volunteer of Sunflower Youth Volunteer Team, Practiced yoga for over a year, Completed a marathon