Muchun Li

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Education

Master of Electronic Information (Computer Technique) *Sep.2020 – Jun.2022*
State Key Laboratory of Information Engineering in Surveying, Mapping, and Remote Sensing *GPA 4.49/5*
Wuhan University, China

Bachelor of Software Engineering *Sep.2016 – Jun.2020*
Software Academy *GPA 4.27/5 | Ranking:2/100*
Taiyuan University of Technology, China

Relevant Coursework

- Advanced Algorithm Design and Analysis
- Advanced Database Technology
- Mathematical Models and Optimization
- Digital Signal Processing
- Principles and Methods of Automated Integration of Geographic Information

Skills

- Programming: Python, Java, C++, C#, SQL, HTML
- Model: Cellular Automata, System Dynamic, Multi-objective Optimization, Artificial Intelligence
- Software: ArcGIS, Vensim, Origin, SPSS, GEE
- English level: IELTS (6.5)

Research Experience

[1] Land use change simulation based on CNN-MOGA and Self-correcting CA model
Postgraduate Research program *Mar.2022 – Jun.2022*

- Proposed the CNN-MOGA model that integrates a Convolutional Neural Network (CNN) and Multi-objective Genetic Algorithm (MOGA) based on Cellular Automata (CA).
- Investigated the consequences of neighborhood effects and spatial heterogeneity on land-use dynamic in Wuhan, China, from 2005 to 2015.

[2] Remote sensing monitoring and model prediction of agricultural and forestry land changes in a giant reservoir complex
Laboratory Open Fund of Nanjing Beidou Innovation and Application Research Institute *Apr.2021 –Sep.2022*

- Conducted literature searches, processed datasets, and authored the research proposal.
- Applied the CNN-MOGA model for simulating multiple land use scenarios in the Three Gorges Reservoir area.

[3] Spatiotemporal coupling of vegetation changes and water resources in the Yangtze River Basin and its spatial optimization
National Natural Science Foundation of China *Feb.2021 – Present*

- Assisted in exploring techniques of land use optimization and designing the technical route.
- Proposed the AC-CNN-CA model to optimize the allocation of land resources of the revegetated areas in the Yangtze River Basin in future research.

Academic Project

Coupled Neural Network and Cellular Automata for Land use change simulation *Sep.2020 – Jun.2021*

- Designed software based on ANN-CA model using Python and C# for further studies.
- Implemented ANN-CA and examined it in Wuhan, China, for simulating land use change.

Publication and Patent

Working papers

[1] Muchun Li, Boyan Li, Wei Wang. Automatic Calibration of Cellular Automaton based on Gaussian function to improve the simulation of land use dynamics *Under Review*

- Developed an automatic calibration convolutional neural network CA (AC-CNN-CA) model.
- Adopted a compact convolutional neural network (CNN) to mine the land-use expansion probability
- Used the Gaussian function to capture the micro-process and macro-evolutionary pattern of urban sprawl through calibration module.

[2] Muchun Li, Boyan Li, Chao Wang, Wei Wang. A review of future land-use scenarios simulation in the latest 30 years

- Reviewed the existing methods of modeling and validating future land use scenarios.
- Discussion mainly focused on two aspects: (i) the trend of land change scenario studies, (ii) major land use changes modeling methods for scenario analysis, their advantages, and limitations.
- Results indicated that each method with its drawbacks that may be improved by involving stakeholders during the construction process for scenario simulation.

Patents

[3] Land utilization suitability probability generation method considering space partition.

CN.Patent CN114819112A

[4] Land use change simulation method based on NSGA-II self-correcting cellular automaton.

CN.Patent CN114818517A

Felloship and Activities

- Outstanding Participant Certificate in 2021 LIESMARS OPEN DAY *Sep.2021*
- Scholarship of Academic Excellence (TOP 25%) *Spring 2020*
- Scholarship of Academic Excellence (TOP 25%) *Spring 2019*
- ”Internet+”Student Innovation and Entrepreneurship Competition *Sep.2018*

Referee

Dr. Boyan Li

- **Associate Researcher**, Faculty of Geosciences and Tourism, Shaanxi Normal University, China
- **Email:** byli@snnu.edu.cn