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Education

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| 2022.07 ~ present | Joint Ph.D. in Parallel & Distributed Computing, the University of Sydney, NSW 2006, Australia (Sponsored by China Association for Science and Technology & China Scholarship Council, the supervisor is Albert Zomaya) |
| 2018.09 ~ present | Ph.D in Forestry Information Engineering, Northeast Forestry University, Harbin, China (The supervisors are Guangsheng Chen & Weipeng Jing) |
| 2014.09 ~ 2018.07 | B.S. in Information management and information system, Northeast Forestry University, Harbin, China |

Research Interests

- Distributed systems
- Data-intensive Computing
- Spatio-temporal data storage and analysis

Peer-reviewed Publications

1. Chen,G., **Zou, W.**, Jing,W., Wei,W., Scherer,R. (2022). Improving the Efficiency of the EMS-Based Smart City: A Novel Distributed Framework for Spatial Data. *IEEE Transactions on Industrial Informatics*, doi:[10.1109/TII.2022.3194056](https://doi.org/10.1109/TII.2022.3194056).

Brief Introduction: *This paper present SeFrame, a spatially enabled framework for improving the efficiency of smart city EMS based on a distributed architecture. It supports a set of spatial queries, including the range query, KNN query, and spatial join query. It benefits greatly from using the buffer-enabled partition method*

to eliminate duplicate results. In each partition, the local index based on CQG (a combination of the quad-tree and grid index) significantly improves the spatial query efficiency in memory. CQG manages complex spatial objects, including a point, polygon, and polyline.

2. **Zou, W.**, Jing,W., Chen,G., Lu,Y., Song,H. (2019). A Survey of Big Data Analytics for Smart Forestry. *IEEE Access*,
doi:[10.1109/ACCESS.2019.2907999](https://doi.org/10.1109/ACCESS.2019.2907999).

Brief Introduction: *This paper comprehensively summarizes the spatial big data technology applied in smart forestry in recent years. We reviewed the development of big data in the field of forestry and proposed a system architecture model for smart forestry. The related work of data storage, query, analysis, and forestry application in smart forestry systems was summarized, and the development trend of big data technology in smart forestry prospected. This paper has 36 citations in Google Scholar.*

3. **Zou, W.**, Jing,W., Chen,G., Lu,Y. (2019). Strark-H: A Strategy for Spatial Data Storage to Improve Query Efficiency Based on Spark. *International Conference on Algorithms and Architectures for Parallel Processing 2019*,
doi:[10.1007/978-3-030-38991-8_19](https://doi.org/10.1007/978-3-030-38991-8_19).

Brief Introduction: *This paper presents a strategy for querying spatial data from HDFS using Spark. We extend the interface of HDFS to support the spatial data format. Data is organized and persisted using the non-uniformly partitioning method and the local index based on spatial objects' attributes and categories. Moreover, we implement query and serialization interfaces for the proposed storage method.*

4. Huang, Y., Qiao, Z., **Zou, W.**, et, al. (2021). Evaluation index system of ecological welfare supply of National Forest Park based on Interpretation Structure Model. *Acta Ecological Sinica*,
doi:[10.1680/jensu.18.00056](https://doi.org/10.1680/jensu.18.00056).

Brief Introduction: *The National Forest Park is one of the carriers of ecological welfare supply and an important way to balance social development and ecological protection, meet the people' s growing needs for a better life. Combining the system theory and taking Heilongjiang Province as an example, this paper constructs the ecological welfare supply system of the national forest park and sets up the hierarchical structure of the internal elements of the ecological welfare supply system by using the Interpretation Structure Model (ISM).*

5. Chen,G., **Zou, W.**, Xu, Z., Jing,W. (2022). An Ecosystem Service Assessment Dataset in Mao' er Mountain National Forest Park (2018-2019) *China Scientific*

Data,

doi:[10.11922/11-6035.noda.2022.0013.zh](https://doi.org/10.11922/11-6035.noda.2022.0013.zh).

Brief Introduction: *We evaluate the Ecosystem Service of Mao' er Mountain National Forest Park based on cloud computing and distributed technologies. We evaluate the Ecosystem Service of Mao' er Mountain National Forest Park based on cloud computing and distributed technology. This paper provides the assessment result of six index categories, including water conservation, soil conservation, carbon fixation and oxygen release, nutrient accumulation, atmospheric purification, and biodiversity conservation, in 2018-2019.*

We developed a visualization platform deployed on Aliyun to display the assessment results. (URL: <http://123.57.35.71:20000/load.html>, testID: weitao | password: zou)

Paper Under Review

1. FedME2: Memory Evaluation & Erase for Federated Unlearning in DTMNs *IEEE Journal on Selected Areas in Communications*.(under review)
2. Spatiotemporal Fusion for Spectral Remote Sensing: A Statistical Analysis and Review *Journal of King Saud University - Computer and Information Sciences*.(under review)

Intellectual Property

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|------|---|
| 2016 | Software for Mobile Object Generation Method Based on Urban Road Network (Software Copyright: 2017SR234627) |
| 2021 | System for Ecological Service Assessment V3.0 (Software Copyright: 2021SR2203443) |
| 2021 | A Spark-based Spatial Vector Data Memory Storage Query Method and System (Invention Patent: CN 112925789 A) |

Reviewer

- IEEE Transactions on Consumer Electronics
- Neural Computing and Applications
- IEEE Access

Project Experience

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| 2018 ~ 2021 | Fundamental Research Funds for the Central Universities – An Efficient Spatial Big Data Processing Platform Based on In-memory computing engine (Host) |
| 2019 ~ 2020 | China State Forestry Administration Forestry Industry Public Welfare Project – Cloud Computing-based Forest Ecological Function Assessment Decision (Participate) |
| 2021 ~ present | National Natural Science Foundation of China – Research on the Optimization of Inversion Model and Driving Mechanism of Spatio-temporal Changes for Foresatry NPP Based on Distributed Framework (Apply & Participate) |

Awards & Honors

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| 2015 | National Encouragement Scholarship |
| 2017 | Second prize in the "Blue Bridge Cup" National Software Competition |
| 2017 | Second prize in "Challenge Cup" National College Student Curricular Academic Science and Technology Works Competition |
| 2021 | National Scholarship for Doctoral Students |

Professional Societies & Activities

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| 2018 ~ present | Student member of China Computer Federation (CCF) |
| 2019 ~ present | Student member of the Chinese Society of Forestry (CSF) |
| 2020 ~ present | Student member of the Association for Computing Machinery (ACM) |
| 2020 ~ present | Student member of the China Society of Image and Graphics (CSIG) |