Keying **Zhang**

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Education

Sep. 2019 - Nov. 2020 **King's College London (U.S.News Top30), London, UK**
Master of Science Major : Data Science
Advisor : Prof. Grigorios Loukides
Thesis : Graph Similarity Computation *(Distinction)* [PDF]
GPA : 3.8/4.0 *(Distinction)*

Sep. 2015 - Jul. 2019 **Guizhou University, Guiyang, China**
Bachelor of Engineering Major : Big Data Technology
Advisor : Prof. Tinghong Gao
Thesis : Material Big Data Distributed Processing System Design and Implementation *(Excellent Thesis Award)*[PDF]
GPA : 3.5/4.0 *(5/60)*

Field of Interests

Multi-modal (Vision-Language) Learning, Computer Vision, Machine Learning, Big Data Technologies, Cloud Platforms, Data Science

Skills

Programming Skills : Python, SQL, R, Matlab, LaTex, Markdown.
Operation System : Linux (Ubuntu, Centos), Windows.
Data Analysis : PyTorch, TensorFlow, Open3D, OpenCV, Tableau, ArcGIS, SPSS, etc.
Big Data Technology : Mysql, Spark Pyspark, Hadoop Mrjob, MongoDB, Sqoop, Hive, etc.
Cloud Platform : OpenStack, Zabbix, Kubernetes, Docker, Prometheus.
Project Management : PMP (Project Management Professional) Certification.
Language : IELTS 7.0 (Listen:8.0 Reading:6.5 Writing:6.5 Speaking:6.5).

Experiences

• **Digital Grid Research Institute of China Southern Power Grid, Guangzhou, China** Digital Transmission Division.
Ranked 83rd among the Fortune 500 Global Companies in 2023

Algorithm Engineer
07/2021-Present

3D Pointcloud Segmentation based Algorithms, Pytorch Tensorflow Python ArcGIS

- Proposed iBALR3D, a novel method for semantic segmentation tasks of point clouds. It addresses the challenges of imbalanced data and long-range distribution in real-world transmission line scenarios. iBALR3D incorporates a contrastive learning algorithm, adaptive spatial encoding module, and sampling strategy to prioritize junctional regions in long-range space and learn distinctive representations for different classifications. Also introduced a new dataset, 500KV3D, for evaluation purposes.
- As the technique leader, I led the team conducting a comprehensive Wildfire Risk Assessment for transmission lines with voltages of 500kV and above in China Southern Power Grid, incorporating meteorological data and satellite remote sensing data such as vegetation type, fuel load, DEM, NDVI, etc. This assessment covered a total distance exceeding 63,000 km. The work has had a significant impact and has been granted as one of the annual breakthroughs in China Southern Power Grid in the formal document.

Contrastive learning | Sampling Strategies | 3D Pointcloud Semantic Segmentation | Fire Trip Risk Measurement

Vision Language Model, Pytorch Matlab

- Addressed open-set semantic segmentation by efficiently adapting the model to the target domain with significantly limited training samples. It effectively preserves the model's open-set capacity and performance. The approach includes a Mask-Aware module to explore correlations between visual/mask space and feature space, a Structure Consistent module for stabilizing learning and maintaining generalization, and an efficient optimization solution.

Open-set Semantic Segmentation | Domain Adaption | Few-shot Learning | Fine-tuning | Multi-modal Learning | CLIP

Power Grid Disaster Prevention and Reduction Algorithms, Python

- Included researching and implementing calculation of current transmission line capacity and temperature of high voltage overhead lines, fire trip risk assessment, high temperature simulation, wind simulation, simulation of ice condition, creepage distance check as well as lightning resistance check.

High Voltage Line Design Theory | High Voltage Line Operation Regulations

Project Management, Project Management Methodology

- I have presided over the following projects since 2022 :
  - 12/2023-12/2025, Dynamic Calculation for Transmission Line Capacity Based on Multi-Source Data, Ongoing
  - 09/2022-09/2024, 3D Pointcloud Based Big Data Algorithms for Disaster Prevention and Mitigation in Transmission Lines, Ongoing
  - 06/2022-12/2023, Intelligent Algorithms for Disaster Prevention and Mitigation in the Transmission of New Power System, Completed
- I have involved in the following projects since 2022 :
  - 12/2023-12/2024, China Southern Power Grid Production and Operation Support System (Transmission Domain) Cloud-Side Infrastructure and Base Application Construction Project Phase II, Ongoing
  - 06/2022-12/2023, China Southern Power Grid Production and Operation Support System (Transmission Domain) Cloud-Side Infrastructure and Base Application Construction Project Phase I, Completed

Management and Negotiations | Agile management | Project Tendering and Bidding

- **Deloitte Consulting, Shenzhen, China** China Resources Land Project.

Engineering Intern
11/2020-02/2021

Data Warehouse, SQL Python Greenplum

- Participated in tasks such as SQL script development, logical testing, data warehouse monitoring and database maintenance during the national promotion event of China Resources Land Commercial.
- Traced abnormal business data, pinpointing the root cause of anomalies and fixed bugs.

Business logic | Log Check | Patience

ETL (Extract-Transform-Load), Java Azkaban Kafka

- Designed a real-time data access solution for the new project's passenger flow and traffic flow.
- Created daily scheduled monitoring scripts to oversee the access program operations and data status.
- Recorded monitoring results and coordinated resources from corresponding departments to resolve and continuously follow up in case of any malfunctions.

Logical Thinking | Log Check | Patience

Data Analysis & Visualization, Python Tableau JS

- Based on the current business logic, proposed an integrated BI solution, including comparing existing data analysis and visualization products such as Tableau, Oracle BI, D3.js, Echart.js, etc., optimizing the data metric dashboards design with Azxure as well as corresponding back-end algorithm selection.

Business Intelligence | Business Analysis | Prototype Design

- **Xiangming Technology, Guiyang, China** Group of Cloud Platform.

Cloud Intern
06/2017-09/2019

National College Student Innovation Project(Guizhou University), OpenStack Kubernetes Prometheus

- Involved in the operational and maintenance tasks for data center server clusters, encompassing the setup of server memory, network cables, power supplies, hard drives, RAID configuration, and PXE operating system installation.
- Resonsible for building, managing, and enhancing functionalities on the OpenStack cloud platform, which involved installing and managing associated open-source software like Zabbix, Ceph, and more.
- Researched and experimented scheduling strategies of distributed systems such as OpenStack, Kubernetes, Hadoop Zookeeper, Docker Swarm, Apache YARN, Apache Mesos, etc. [PDF][PDF]

Rough Set Theory | Queuing Theory | Q Learning | SLA(Service-Level Agreement)

Publications

- **Conferences & Journals**
  - **Keying Zhang**, Xinqiao Wu, Lan Liu, Ping Qin, Mingxiang Lu, "CODA-Mask : Contrastive and Adaptive Mask Aware Open-set Semantic Segmentation," *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, 2025, *Under Review*
  - **Keying Zhang**, "MADA : Mask Aware Domain Adaptation for Open-set Semantic Segmentation," *AAAI Conference on Artificial Intelligence (AAAI) Workshop*, 2024 [PDF]
  - **Keying Zhang**, Ruirui Cai, XinqiaoWu, Jiguang Zhao, Ping Qin, "iBALR3D : imBalanced-Aware Long-Range 3D Semantic Segmentation," *AAAI Conference on Artificial Intelligence (AAAI) Workshop*, 2024 [PDF]
  - **Keying Zhang**, XinqiaoWu, Jiguang Zhao, Lan Liu, Ping Qin, Hao Wang, Tanbochi Zhan, "A Real-time Wildfire Risk Assessment Model for Transmission Corridors Based on Feature Engineering, Ensemble Learning and Model Fusion (Chinese)," *Power System Technology*, 2023 [PDF]
- **Patents**
  - **Keying Zhang**, Xinqiao Wu, Ping Qin, Lan Liu, Yuan Chen, Chenrui Zhang, "Load Flow Verification System (Chinese)," *granted China Software Patent No. 2024SR0047398* [PDF]
  - **Keying Zhang**, Xinqiao Wu, Lan Liu, Ping Qin, Yuan Chen, Jiaxu Shen, "Operating Condition Simulation Verification System v1 (Chinese)," *granted China Software Patent No. 2024SR0048012* [PDF]

- Xinqiao Wu, **Keying Zhang**, Yuquan Xie, Ping Qin, Lan Liu, Yuan Chen, "Operating Condition Simulation Verification System v2 (Chinese)," *granted China Software Patent No. 2024SR0047988*[PDF]
- Xinqiao Wu, **Keying Zhang**, Ping Qin, Lan Liu, Yuan Chen, Yuquan Xie, "Creepage Distance Verification System(Chinese)," *granted China Software Patent No. 2024SR0047749*[PDF]
- Ping Qin, **Keying Zhang**, Xinqiao Wu, Lan Liu, Yuan Chen, Zikun Wu, "Lightning Protection Verification System (Chinese)," *granted China Software Patent No. 2024SR0047721*[PDF]
- **Keying Zhang**, Lan Liu, Jiguang Zhao, et al., "An Intelligent Analysis Method for Lightning Resistance Level (Chinese)", *China Invention Patent Under Review*
- **Keying Zhang**, Xinqiao Wu, Lan Liu, et al., "A Method, Device, Equipment, and Medium for Evaluating a Semantic Segmentation Model (Chinese)", *China Invention Patent Under Review*
- **Keying Zhang**, Ping Qin, Xinqiao Wu, et al., "A Model Training, Point Cloud Segmentation Method, Device, and Electronic Equipment (Chinese)" , *China Invention Patent Under Review*
- **Keying Zhang**, Xinqiao Wu, Lan Liu, et al., "An Apparatus, Method, Device, and Medium for Identifying Target Power Transmission Facilities (Chinese)" , *China Invention Patent Under Review*
- **Keying Zhang**, Xinqiao Wu, Lan Liu, et al., "Evaluation Method, Equipment, and Medium for the Risk Assessment of Wildfires Causing Power Transmission Line Tripping (Chinese)" , *China Invention Patent Under Review*
- **Keying Zhang**, Xinqiao Wu, Lan Liu, et al., "A Model Training, Point Cloud Segmentation Method, Device, and Electronic Device (Chinese)" , *China Invention Patent Under Review*
- **Keying Zhang**, Xinqiao Wu, Lan Liu, et al., "A Method for Training A Model, Segmenting Point Clouds, as well as A Device and Electronic Equipment (Chinese)" , *China Invention Patent Under Review*
- Lan Liu, **Keying Zhang**, Xinqiao Wu, et al., "Multi-scenario SimulFation and Analysis Method for Transmission Line Based on Real-time Multi-source Data Fusion (Chinese)" , *China Invention Patent Under Review*
- Xinqiao Wu, **Keying Zhang**, Lan Liu, et al., "A Method for Pollution Flashover Early Warning (Chinese)" , *China Invention Patent Under Review*
- Lan Liu, **Keying Zhang**, Xinqiao Wu, et al., "An Intelligent Assessment Method for Wildfire Risk (Chinese)" , *China Invention Patent Under Review*
- Lan Liu, **Keying Zhang**, Xinqiao Wu, et al., "A Method, Apparatus, Equipment, and Storage Medium for Feature Data Processing (Chinese)", *China Invention Patent Under Review*
- Lan Liu, **Keying Zhang**, Xinqiao Wu, et al., "A Method, Apparatus, Equipment, and Storage Medium for Feature Data Processing (Chinese)", *China Invention Patent Under Review*
- Lan Liu, **Keying Zhang**, Xinqiao Wu, et al., "A Method, Apparatus, Electronic Device, and Storage Medium for Training Pollution Flashover Prediction Models (Chinese)" , *China Invention Patent Under Review*

Honors & Awards

2024 Top Ten Outstanding Youth Award of Southern Power Grid Digital Grid Group Co., Ltd., China
2023 Gold Individual Innovation Award in China Southern Power Grid Digital Power Grid Group Co., Ltd., China
2022 Best Paper Award of China Southern Power Grid International Technology Forum, China
2019 Excellent Thesis Award of Guizhou University, China
2019 Second Scholarship of 'Cloud Guizhou', Guizhou Province, China
2018 Excellent Student in Guizhou University, China
2018 Second Scholarship in Guizhou University, China
2018 First Prize of National Undergraduate Student Mathematical Contest in Guizhou Province, China
2017 Excellent Student in Guizhou University, China
2017 Second Scholarship in Guizhou University, China
2017 Third Prize of the APMCM (Asia-Pacific Mathematical Contest in Modeling) for Undergraduate Students, China
2017 Second Prize of the 10th "Certification Cup" Mathematical Modeling Network Challenge, China
2016 Second Prize of National English Contest for Undergraduate Students, China

Certificates

2022 Project Management Professional (PMP), Project Management Institute (PMI)
2022 Tencent Cloud Solutions Architect Professional Engineer (TCP), Tencent Cloud
2022 Unmanned Aircraft Operator Certificate (UTC), China Air Transport Association (CATA)