CHEN SHAO

Born 30.03.1995 in Xian Yang, China

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Klosterweg 28, 76131, Karlsruhe

EDUCATION

PhD candidate in Department of Economic and Development 7/2022 - present
Karlsruhe Institute of Technology (KIT), Germany

M.Sc. in Electronic and Information Engineering 10/2018 - 03/2022
Karlsruhe Institute of Technology (KIT), Germany

B.Eng. in Electronic and Information Engineering 09/2013 - 06/2017
Xi'an Jiaotong University (XJTU), China

PROJECTS

Master Thesis Research - Institute of Theoretical Informatics, KIT 11/2021 - 02/2022
Energy Difference Prediction in Chemistry using Graph Neural Network *Karlsruhe, Germany*

· Developed and optimized algorithm to predict energy difference of Gibbs free energy using graph neural network
· Achieved **0.999 in coefficient of determination** using invented preprocess method on custom dataset
· Invented outlier analysis method to detect out-of-distribution samples based on scatter plot

Research Assistant - Autonomous Learning Robots Lab, KIT 11/2021 - 02/2022
Graph Neural Network for Finite Element Analysis *Karlsruhe, Germany*

· Generated a Finite-Element-Simulation Dataset as alternative to time-consuming simulation in catia and implemented an adaptive meshing algorithm
· Developed a reinforcement learning environment for high-resolution simulators.

Research Intern - Autonomous Learning Robots Lab, KIT 11/2020 - 04/2021
Deep Multi-View Depth Estimation Based on Low-quality RGB-D Data *Karlsruhe, Germany*

· Invented modeling algorithm for depth noise to replace time-consuming deep learning algorithm and generated a 3D-Dataset in the blender
· Evaluated two types of estimation methods: monocular and multi-view depth estimation methods
· Optimized Adabins **performs up to 77.2% in metrics average relative error (REL)** compared with current technology Data Associated Recurrent Neural Networks (DA-RNN)

Research Intern - Precitec Gmbh Co. Kg. 04/2020 - 09/2020
Machine Learning in the processing of Laser material *Karlsruhe, Germany*

· Developed random forest algorithm for multi-sensor data
· Developed and quantitively evaluated three algorithms based on image neural network using internal metric for classification problem
· **Improved algorithm performs up to 17% better with internal metrics**

Research Assistant - Institute for Industrial Information Technology, KIT 04/2019 - 02/2020
Algorithms for the reconstruction of multispectral light field camera data *Karlsruhe, Germany*

· Generated the Benchmark of lightfield camera dataset by standardizing all published datasets in .npz
· Invented metrics for sparsity in reconstruction algorithm based on compressive sensing theory
· Implemented package for sparsity analysis containing DCTs, Wavelet-families

Bachelor Thesis Research - Institute for Microwave Technology, XJTU 01/2016 - 06/2017
Ground-roll noise Removal based on the Multiscale geometric transformation *Xi'an, China*

- Developed and adapted the Ridgelet algorithms for noise suppression of raw seismic data.
- Verified the effectiveness of the Ridgelet suppression method on synthetic and real data
- Invented a nonlinear amplification method to enhance weak amplitude signals

Semester Thesis Research - Institute for Microwave Technology, XJTU 09/2016 - 01/2017
Suppression of surface waves based on the MCA theory *Xi'an, China*

- Developed and adapted Morphological Component Analysis using radon and wavelet transformation for noise suppression in array data.
- Analyzed the sensitivity of hyper-parameters for suppression performance

Industry Intern - Nanjing Hoge Software Co., China 07/2016 - 09/2016
Antenna Simulation in Communication System

- Maintenance and management of hardware, electricity and auxiliary devices, wireless devices, optical transmission devices, microwave devices, WLAN devices.

PAPER IN PREPARATION

Patrick Reiser, **Chen Shao**, Chen Zhou, Andre Eberhard, Houssam Metni, Marlen Neubert, Timo Sommer, Clint van Hoesel, Luca Torresi, Pascal Friederich. *Review of Graph Neural Network for Materials*
Nature Communications Materials In progress

Chen Shao, Chen Zhou, Pascal Friederich. *Graph neural networks to learn joint representations of disjoint molecular graphs*
Workshop on Graph Learning Benchmarks (The Web Conference 2022) In progress

AWARDS AND LEADERSHIP

National Innovation Competition for Students 02/2017 - 07/2017
Xi'an JiaoTong University, China

Siyuan scholarship awarded at 03/2016
Awarded to excellent students by XJTU

TECHNICAL SKILLS

Interests: Graph Representation Learning, Graph Neural Networks (GNNs) in Quantum Chemistry and Simulation Science, Explainable AI
Theoretical Skills: Generative Model and Supervised Learning, Graph Neural Network in Quantum Chemistry, Mechanics and Web Technology
Computer Applications: Latex, Git and common packages for Unix-like platforms and Windows
Programming: Python, Tensorflow, Pytorch, PyG, Matlab, Latex, C, C++ (STL)
Language Skills: Chinese (Native language), German (Fluent), English (Fluent)