

Shiwei He

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Education

China University of Mining and Technology-Beijing

Beijing, China

B.ENG. IN SAFETY ENGINEERING

Sept. 2018 - June 2022

- **Math Courses:** Advanced Mathematics (Calculus I&II), Linear Algebra (MATLAB), Probability and Statistics Theory (Python), Discrete Math
- **Engineering Courses:** Mechanical and Electrical Safety Engineering, Engineering Mechanics, Combustion, Engineering Thermodynamics and Heat Transfer, Fluid Mechanics and Fluid Machinery of Safety Engineering

MINOR IN COMPUTER SCIENCE & TECHNOLOGY

Feb. 2021 - June 2022

- **CSE Courses:** C-Language Programming, Object-Oriented Programming (C++), Data Structures & Algorithms, Artificial Intelligence, Electrical & Electronic Engineering, Computer Organization & Architecture, Computer Operating System (C), Computer Networks, Database Theory (SQL)

Programming

C/C++

Built an operating system; Used OpenCV to make panorama; Coded for radio unit's software platform in Zillnk Co., Ltd

Python

Ran neural networks to recognize pedestrian; Connected databases to perform complex select, analyzed and visualized data

MySQL

Designed hazard source database for enterprises and utilized multiple nested functions to conduct an accurate and complex query of data (Select using Join, etc.)

Web Design

Familiar with JavaScript, HTML, CSS, and other front-end languages, had programming experience of separating the front and back-end design of the BI platform during the GeoVIS internship, built and launched my own WeChat applet

Projects

Unsafe Behavior Recognition in Coal Mining Environment

Beijing, China

6-MEMBER GROUP, INSTRUCTOR: DR. WEI ZHAO

Dec. 2020 - March 2021

- Used YOLOv5 to train the pictures of workers collected and labeled by other members
- Successfully detect whether workers in workspace wearing a hard hat with an overall accuracy rate **over 87%**.
- Implemented Human Keypoint Detection, Alpha Pose to detect the skeleton structures of workers, optimized the parameters to improve the recognition time by **5%** compared with the state-of-the-art
- Recognized 3 most common unsafe behaviors in workspace (such smoking, using phone, falling down), alert the safety office about the result

Panorama: Real-time Images Stitching Based on OpenCV

Beijing, China

LEADER OF A 5-MEMBER GROUP, INSTRUCTOR: DR. HONGQI SU

Feb. 2021 - May 2021

- Detected and extracted image key points using algorithms like SIFT and SURF, used Harris Corner Detector to screen corners.
- Used ORB-SLAM algorithm to achieve image feature key point matching of different scales and rotations.
- Optimized SIFT algorithm to detect extreme values in spatial scale and orientation assignment.
- Generated final panorama with undistorted edges after setting the image height and width.

Optimization of Human Facial Feature Vectors Disentanglement based on TL-GAN

Beijing, China

LEADER OF A 4-MEMBER GROUP, INSTRUCTOR: DR. FAGUO ZHOU

Dec. 2020 - March 2021

- Broke down the drawback of using orthogonalization for solving facial feature vectors entanglement
- Analyzed the reasons of the entanglement, proposed Data Balance among Features to address entanglements in GAN-generated images
- Compared experimental and control groups to prove the practicality of using TL-GAN as the quality inspector of different feature extractors
- pointed out the pre-existing bias in the open-source datasets like CelebA, which can potentially contribute to more injustice in our society

Database Design and the Analysis of Hazardous Chemicals

Beijing, China

COURSE PROJECT, INSTRUCTOR: DR. BO TAN

Mar. 2021 - July 2021

- Collected the data of potential hazardous chemicals in the existing production process, form a relatively complete database, and visualize the data and analyze the development trend of accidents caused by the hazards.
- Based on MySQL, the basic operations such as joint table query, data deletion and sorting of the hazardous chemical hazard database are carried out, and a relatively complete database table of hazardous chemical hazard database is formed.
- Used Python to connect MySQL tables, resorted to matplotlib to visualize data of different kinds of chemical hazards, and formed a comprehensive reports on the prediction of accident development trends under current national production conditions.

Publication

Disentanglement of Human Facial Features and the Inspection of Feature Extractor's Quality Based on TL-GAN

Shiwei He, Yutong Gao, Guanghan Wang, Peiyu Xu (*equal contribution)

Recent research on Generated Adversarial Network (GAN) models has made progress in generating images on demand. Transparent Latentspace GAN analyzes the latent space to find feature axes, providing a novel perspective and easy implementation. However, detailed experiments revealed drawbacks in the model's original axis disentanglement, leading to potential ethical issues. To address this, the paper proposed a new training mode that reduces bias and manages disentanglement. The model's architecture can be generalized to universal functions, with the feature extractor's quality evaluation being the most practical. This finding can help improve the TL-GAN model's performance by identifying a more accurate, effective, and robust feature extractor.

Work Experience

Zillnk Co., Ltd.

Beijing, China

SOFTWARE ENGINEER, INTERN

July 2022 - Sept. 2022

- Coded for the log system of remote radio unit (RRU) with C/C++, such as fetching physical parameters to calibrate the RRU's status
- Established SSH with the distributed unit's linux terminal, and used petalinux to build the project for the RRU's testing phase
- Scripted Shell for preset terminal commands to perform different mostly-used tasks required by the customers like "GetHardwareDescr"
- The final codes passed the CI test in Project Hertz+, updated onto nearly 1000 RRU products, improving fault fetching ratio by around **10%**

GeoVIS Co., Ltd.

Beijing, China

FULL-STACK DEVELOPER, INTERN

July 2021 - Sept. 2021

- Wrote Node.js programs that sends the obtained JSON files to the cloud database, and then parses the package on our servers.
- Used Matplotlib, Apache ECharts to visualize the parsed data, creating programs that generates graphs like Users Distribution Heatmaps
- Coded front-end pages in JavaScript, Vue.js, HTML, and CSS to build a BI platform for **3** client enterprises
- Built user interfaces to support importing more than **30** data file formats, **10** types of relational databases (MySQL, Oracle DB, etc.)

Honors & Cert.

2021	3rd Prize , National Software and IT Innovation Competition Third Prize	Online
2022	3rd Place , Lanqiao Cup 12th Individual Competition Python Group	Beijing, China
2021	Awardee , Academic Year Merit Student Scholarship	Beijing, China
2019	Top Award , Campus 1st Creative Writing Contest	Beijing, China
2022	Certificate , Data Science Practitioner	IBM
2021	Certificate , Machine Learning and Data Science II – Development and Frameworks (A)	Path Academics

Extracurricular Activity

Student Union Activities & Arts Department

Beijing, China

MINISTER

Sept. 2018 - Feb. 2020

- Organized 4 large-scale activities with 1000 audiences, such as the "12•9" Campus Chorus Competition, and the 110th Anniversary Party
- Designed 8 small and medium-sized activities with 200 audiences, like the New Year's Party, Colleg Best Singer Contest

CUMTB Choir

Beijing, China

TENOR

Sep. 2018 - Feb. 2020

- Participated in large-scale campus performances, including "Edelweiss", "Scarborough Fair", and other classic operas
- Performed "Victory" in the Beijing University Student Film Festival and the National Grand Theater.

About me

LANGUAGE: English (Proficiency: IELTS: 8; speaking: 8); Mandarin: First Language; Japanese: Beginner

INTERESTS: Piano, guitar, music production, writing, reading, sports, meditation

PERSONALITY: Outgoing, ambiverted, rational, persistent