Xuan Liu

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Research Interests

AI4Engineer(Signal Processing, Robotics), Transfer Learning, Diffusion Model, AI4Science

Education

Xi'an Jiaotong University	Supervisor: **Prof. Jinglong Chen**	**Xi'an, Shaanxi, China**
M.S. in Mechanical Engineering; Avg. Score: 86.06		Sept. 2021 - Jun. 2024(Expect)
Xi'an Jiaotong University		**Xi'an, Shaanxi, China**
B.E. in Mechanical Engineering; Avg. Score: 87.15 (Top10%)		Sept. 2017 - Jun. 2021
2nd B.E. in Computer Science and Technology; Co-trained by XJTU and CAS		Jul. 2019 - Jun. 2021

Publications

X. Liu*, Z. Li*, J. Chen, K. Zhang "Intelligent Fault Diagnosis for imbalanced multiple working conditions via Dynamic Unsupervised Domain Adaptation with Sample and Margin Regularization". *Measurement (Under Review)*.

X. Liu, J. Chen, K. Zhang, S. Liu, S. He, Z. Zhou "Cross-domain intelligent bearing fault diagnosis under class imbalanced samples via transfer residual network augmented with explicit weight self-assignment strategy based on meta data". *Knowledge-Based Systems*, June 2022. [paper]

Z. Shi, **X. Liu**, J. Chen, Y. Zi, Z. Zhou "A multi-branch redundant adversarial net for intelligent fault diagnosis of multiple components under drastically variable speeds". *ISA transactions*, Jan 2022. [paper]

Research Experience

High-quality Vibration Signals Generatation via Diffusion Model   **Xi'an, Shaanxi**

Research Assistance, advised by **Prof. Jinglong Chen**   Jun. 2023 - Current

* Developed a diffusion-based model for signal generation across diverse operating conditions.
* Explored using cross-modal information as top-down attention to guide the generation process
* Conducted initial validation experiments to confirm the method's effectiveness.

DUIDA for Intelligent Diagnosis under Imbalanced Conditions   **Xi'an, Shaanxi**

Research Assistance, advised by **Prof. Jinglong Chen**   Jul. 2022 - Jan.2023

* Co-first author of a paper addressing the challenges of imbalances in unsupervised domain adaption fault diagnosis.
* Poroposed a Dynamic Domain Adaptation diagnosis algorithms with Sample and Margin Regularization.
* Employed dynamic mechanisms to stabilize training and utilized boundary regularization to refine the decision-making boundary.

Meta-data Driven Transfer Residual Network with Explicit Weight Strategy   **Xi'an, Shaanxi**

Research Assistance, advised by **Prof. Jinglong Chen**   Jul. 2021 - May.2022

* First author of a paper addressing the challenges of imbalances in cross-domain diagnostic performance for intelligent fault diagnosis.
* Poroposed a Transfer Residual Network with an Explicit Weight Self-assignment Strategy(TRN-EWM).
* Utilized metadata to optimize sample weights, striking a balance for class-imbalance in cross-domain diagnosis.
* Carried out validation experiments, achieving over 99% accuracy.

Projects Experience

Low-Cost Remote Control Servo Quadruped Robot   Xi'an, Shaanxi

Product Design Course Project, advised by **Prof. Dun Lv**   Sept. 2020 - Jan. 2021

* Deployed an eight-servo quadrupedal gait with pitch control
* Implemented a bluetooth-enabled remote control system with its corresponding mobile application
* Mechanism design (via Solidworks) and fabrication (via 3D print)

Indoor Assistive Robot for Elderly People   Xi'an, Shaanxi

Role: Leader, co-advised by **Sr. Eng. Yue Jing & Sr. Eng. Liang Gui**   Aug. 2019 - Nov. 2020

* Secured the National First Prize in the Chinese University Students' Mechanical Innovation Competition
* Developed and deployed an SSD-based face detection algorithm
* Designed a lifting mechanism tailored to the natural curvature of the human body (via Solidworks) and strength check (via Ansys)

ABU Robocon Competitive Robot Project   Xi'an, Shaanxi

Role: Mechanism Design, advised by **Prof. Jun Xu**   Sept. 2018 - Jun. 2019

* Secured the National First Prize of Chinese Asian-Oceanian College Robot Competition
* Designed and fabricated two competition-ready robots (Including wheeled mobility, obstacle navigation, and projectile tasks)
* Mechanism design(via Solidworks, AutoCad) and fabrication (via 3D print, CNC)

Working Experience

Teaching Assistant   Xi'an, Shaanxi

Mechanical Fault Diagnosis Course, advised by **Prof. Jinglong Chen**   Apr. 2021 - Jun. 2021

* Daily course QA; Send and receive assignments
* Grade assignments, quizzes, and finals

Reserch internship   Beijing, China

CAS, advised by **Prof. Xue Wang & Prof. Bingshan Liu**   Jul. 2019 - Aug. 2019

* Attended lab meetings and gaining a basic understanding of Point Cloud Matching
* Gained insights into Visual Navigation and Light-Curing 3D Printing

Honors and Awards

QU&HE Fault Diagnosis Scholarship	2021
Outstanding Graduate Student, Xi'an Jiaotong University	2021
National First Prize of Chinese University Students' Mechanical Innovation Competition	2020
National First Prize of Chinese Asian-Oceanian College Robot Competition	2019
SMC Scholarships, SMC	2019
School Scholarships, Xi'an Jiaotong University	2018, 2020, 2022
Merit Student, Xi'an Jiaotong University	2018, 2020

Skills

Programming	Python(Pytorch,Tensorflow), Matlab, LaTeX, C/C++, Linux(Ubuntu)
Mechanical Design	Solidworks, AutoCad, Inventor, Ansys
Productivity Tools	Microsoft Office, Markdown
Languages	Mandarin (Native), English (Fluent)