Zixian Su

zixian.su@liverpool.ac.uk (+86) 15370044006 kiwi12138.github.io

RESEARCH PROJECTS

Transfer Learning

- **Adaptive and Generalizable Medical Image Analysis**
  * Pioneered advanced segmentation techniques for multimodal medical imaging (MRI-CT, MRI ceT1-hrT2) with minimal labeling, notably enhancing diagnostic precision and applicability in clinical settings.
  * Created a strategy for generalizing models to effectively handle unseen, related medical datasets that differ significantly from the training data, significantly improving model reliability and adaptability.
- **Autonomous Vehicle Systems under Diverse Environments**
  * Established an innovative unsupervised learning framework to dynamically adapt self-driving systems to new environments, substantially reducing error rates under uncertainty.
  * Explored solutions for autonomous vehicles under diverse and unpredictable conditions, advancing the field's approach to environmental adaptation.

Trustworthy AI

- **Robust Unsupervised Fine-tuning at Deployment Phase**
  * Developed an online fine-tuning framework that enables model adaptation during deployment phase, enabling swift, real-time adjustments to effectively interpret and respond to the incoming data stream without labels.

AI for Science

- **AI for Cardiac Risk Prediction**
  * Facilitated an AI initiative for cardiac risk prediction, collaborating with hospital partners to develop tailored solutions aligned with clinical needs and guiding students to enhance predictions of Major Adverse Cardiac Events (MACE).
- **AI for Low-Dimensional Materials Property Study**
  * Directed a cutting-edge project to decode transport properties in low-dimensional materials, integrating TensorFlow programming and spearheading research publications, contributing to advancements in material science.

PUBLICATIONS

Su, Z., Guo, J., et al. Unraveling Batch Normalization for Realistic Test-Time Adaptation[C]. AAAI, 2024. [CCF A, Oral]

Su, Z.*, Yao, K.*, et al. Rethinking data augmentation for single-source domain generalization in medical image segmentation[C]. AAAI, 2023. [CCF A]

Su, Z., Yao, K., et al. Mind The Gap: Alleviating Local Imbalance for Unsupervised Cross-Modality Medical Image Segmentation[J]. IEEE Journal of Biomedical and Health Informatics, 2023. [SCI Q1, IF 7.7]

Yao, K.*, **Su, Z.***, et al. A novel 3D unsupervised domain adaptation framework for cross-modality medical image segmentation[J]. IEEE Journal of Biomedical and Health Informatics, 2022. [SCI Q1, IF 7.7]

Yao, K., **Su, Z.**, et al. Explore Epistemic Uncertainty in Domain Adaptive Semantic Segmentation[C], ACM Conference on Information and Knowledge Management (CIKM), 2023. [CCF B, Oral]

See full list in Google Scholar.

INTERNSHIP

Bosch Automotive Products (Suzhou) Co.Ltd. *2020.1-2020.11*

* Supported digital transformation by managing projects and enhancing data visualization with Power BI. Built a streamlining project that improves operational efficiency, making complex data easily understandable and actionable.

Shejero Visiontech Pte. Ltd. *2019.3-2019.12*

* Collaborated with the bone conduction headset R&D team, focusing on product innovation and patent documentation. Facilitated key communications with Enterprise Singapore to strategize product commercialization and ensure compliance.

ABOUT ME

I am a last-year Ph.D. candidate in Department of Computer Science at University of Liverpool. My research focuses on creating adaptable AI solutions that address real-world challenges, specializing in **transfer learning with applications in medical image analysis and autonomous driving systems**. To this end, I excel in devising algorithms that adeptly manage diverse datasets and unpredictable scenarios. Additionally, I thrive in collaborative environments, working with experts from multiple scientific disciplines to not only merge theoretical insights with practical implementations but also to significantly expand the reach and effectiveness of AI.

EDUCATION

University of Liverpool
Ph.D. Candidate - Computer Science
Supervisor: Dr. Xi Yang, Prof. Kaizhu Huang, Dr. Qiufeng Wang and Prof. Frans Coenen.
2020.12 - 2024.12 (expected)

National University of Singapore
Exchange Student
2019.7 - 2019.12

Soochow University
Bachelor of Science - Physics
Supervisor: Prof. Hua Jiang
2016.9 - 2020.6

SKILLS

Programming	Python (PyTorch, Tensorflow), C++.
Miscellaneous	Linux, LaTeX, Origin, Solidworks, Power BI.

HONORS AND AWARDS

2024 - Graduate Student Scholarship, AAAI.

2022 - Best Presenter, CMVIT.

2021 - Top 5 in CrossMoDa2021 Challenge.

2020 - Full Doctoral Scholarship, University of Liverpool.

2020 - Outstanding Graduate Award, Soochow University.

2016-2020 - Soochow University Scholarships.

LANGUAGES

Chinese (Native)
English (Fluent) *IELTS 7.5 GRE 321*

苏 子贤

zixian.su@liverpool.ac.uk (+86) 15370044006 kiwi12138.github.io

研究项目

迁移学习

- 自适应与可泛化的医学图像分析

* 针对跨模态医学场景，提出创新的多模态影像分割技术（MRI-CT, MRI ceT1-hrT2），极大提高了跨模态医学图像诊断精度，为精准医疗提供了技术支撑。
* 针对训练数据与实际应用数据差异性较大且未知的场景，提出一种域自适应增广技术，使在单一域训练的模型可以在未知域上有很好的泛化结果。有效提升了模型在未知数据上的泛化能力和可靠性，增强了模型的实用价值。

- 复杂环境下的自动驾驶系统

* 设计并实施了一种新型无监督学习框架，用于提升自动驾驶系统对新环境的适应性，显著降低了系统操作中的不确定性错误率，提高了系统的安全性和可靠性。
* 探索并开发了适用于自动驾驶的环境适应技术，使得自动驾驶系统能够在多样化和不可预测的路况中稳定运行，旨在推动自动驾驶技术在复杂环境下的应用。

可信人工智能

- 鲁棒性增益的无监督微调

* 开发了一种无监督在线微调框架，能够使模型在应用阶段进行领域自适应，实现对数据流分布偏移快速且实时的反馈，以增强模型在应用阶段的鲁棒性。

AI 在科学研究中的应用

- AI 在心脏病风险预测的应用

* 参与并指导一个与三甲医院合作项目：通过 AI 技术构建心脏病风险预测模型。此项工作通过精确模拟心脏疾病发展的不同阶段，有望显著提升主要不良心脏事件（MACE）的预测精度，旨在优化患者治疗和预后方案。

- AI 在低维材料性质研究中的应用

* 主导了一个研究低维材料输运性质的创新项目，通过整合先进的机器学习技术与传统的理论计算结果，验证了机器学习在低维材料输运性质预测的可能性。该项目为新型材料的设计和性质分析提供了可靠的科学依据。

精选论文

Su, Z., Guo, J., et al. Unraveling Batch Normalization for Realistic Test-Time Adaptation[C]. AAAI, 2024. [CCF A, Oral]

Su, Z., Yao, K., et al. Rethinking data augmentation for single-source domain generalization in medical image segmentation[C]. AAAI, 2023. [CCF A]

Su, Z., Yao, K., et al. Mind The Gap: Alleviating Local Imbalance for Unsupervised Cross-Modality Medical Image Segmentation[J]. IEEE Journal of Biomedical and Health Informatics, 2023. [SCI Q1, IF 7.7]

Su, Z., Yao, K., et al. A novel 3D unsupervised domain adaptation framework for cross-modality medical image segmentation[J]. IEEE Journal of Biomedical and Health Informatics, 2022. [SCI Q1, IF 7.7]

Yao, K., **Su, Z.**, et al. Explore Epistemic Uncertainty in Domain Adaptive Semantic Segmentation[C], CIKM, 2023. [CCF B, Oral]

完整列表请查看 谷歌学术.

实习经历

博世汽车部件（苏州）有限公司 *2020.1-2020.11*

参与数字化转型项目，负责利用 Power BI 提升数据可视化效果。主导设计并实施了一个项目管理系统，通过自动抓取 web 端项目数据并与本地数据库同步，实现了实时数据监控。通过精细的可视化分析，系统能够精确评估员工的工作负载和项目进度，从而实现对项目资源的优化配置。

世捷罗信息科技有限公司 *2019.3-2019.12*

与骨传导耳机研发团队紧密合作，参与了产品创新和专利编写。同时推动了与新加坡企业发展局的合作，制定了新产品的商业化战略，确保技术开发与市场法规的一致性。

自我介绍

我是一名利物浦大学计算机科学系的四年级博士在读生。我的研究方向主要集中于开发能够应对现实世界问题的自适应 AI 解决方案，**特别是在医学图像分析和自动驾驶系统的迁移学习应用方向**。在此过程中，我专注于设计能有效处理多样化数据集和不可预见环境的算法。同时，我也擅长在多学科团队中工作，与来自不同科学领域的专家合作，将理论研究与实际应用相结合，去推动 AI 技术的实际效用和影响力。

至今，我已撰写数十篇人工智能相关论文，其中多篇发表于 AAAI，CIKM，MedIA 等顶级会议和期刊，拥有多年计算机视觉算法研究经历和学术写作的能力。我具备坚实的自驱力和对技术的深刻理解，擅长应对复杂的科研问题。我始终保持一个积极的态度，致力于在科技领域实现突破性的进展。

教育经历

利物浦大学 (*2020.12 - 现在*)

博士生 - 计算机科学

指导教师: 杨曦博士、黄开竹教授、王秋锋博士、*Frans Coenen* 教授

新加坡国立大学 (*2019.7 - 2019.12*)

交换学生

苏州大学 (*2016.9 - 2020.6*)

理学学士 - 物理学

指导教师: 江华教授

技能

编程 Python（PyTorch, Tensorflow）, C++

其他 Linux, LaTeX, Origin, Solidworks, Power BI

荣誉与奖项

2024 - 第三十八届 AAAI 会议研究生奖学金

2022 - 第六届 CMVIT 会议最佳报告者

2021 - CrossMoDa2021 挑战赛前 5 名

2020 - 利物浦大学全额博士奖学金

2020 - 苏州大学优秀毕业生奖

2016-2020 - 苏州大学奖学金

语言能力

中文（母语）

英语（流利） *雅思 7.5 GRE 321*