

Qiang Zeng

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Education

Hohai University

Expected May 2025

Bachelor of Computer Science and Technology (GPA: 87.83, 4.32 / 5.00, Rank 25%)

NanJing, JiangSu

- **TOEFL(First Score):** 81(R:21 L:26 S: 17 W:17)
- **Relevant Coursework:** Programming Basics(C, 94), Algorithm Design and Analysis(C++, 85), Computer Graphics(C++, 89), Artificial Intelligence(Python, 95), Machine Learning(Python, 95), Data Structures(C++, 86), Computer Networks(92), Academic Writing and Research(99)

Experience

Machine Learning in Biomedical Sciences and Bioengineering

March 2024 – May 2024

International Curriculum, Course Grade: A

Prof. James Choi, Imperial College London (London, UK)

- Deep Learning Fundamentals-Introduction to neural networks and deep learning; Deep learning applications in healthcare, particularly imaging; Overview of convolutional neural networks (CNNs).
- Biomedical Imaging and Machine Learning-Cutting-edge studies in medical imaging using machine learning; Learn how machine learning is enhancing the interpretation and analysis of complex imaging data.

Key Laboratory of Digital Technology on Graphics and Orthopaedic implants

April 2023 – June 2024

Student, Supervised by Prof. JunFeng Jiang

ChangZhou, JiangSu

- Engaged in orthopedic-related work, including vertebra segmentation and detection in X-rays, and registration of intraoperative X-rays with preoperative CT scans.
- Experienced in submitting to MICCAI24 and BIBM24, one paper was accepted by BIBM24(CCF-B) as short paper.

Medical Imaging Laboratory, SIBET, Chinese Academy of Sciences

June 2024 – April 2025

Visiting Student(Full-time), Supervised by Prof. ZhiYong Zhou

SuZhou, JiangSu

- Engaged in clinical-related tasks, closely communicating with doctors and building/training models as needed to diagnose rare diseases through medical imaging and classify disease types.
- Focused on segmentation and classification tasks, such as tumor lesion segmentation, vascular invasion assessment and severity grading.

Publications

ABLSpineLevelCheck | *Vertebrae Localization, Fluoroscopy, Abductive Learning, Semi-supervised Learning*

- Accepted by *IEEE International Conference on Bioinformatics and Biomedicine (BIBM) 24*, third author(Second student author).
- It will be submitted to *ACADEMIC RADIOLOGY* after refinement and extension and I will be the first author.
- We propose an abductive learning approach, which belongs to neuro-symbolic paradigms, for vertebrae localization in a semi-supervised strategy.
- The neural network first estimates the pseudo-labels. Then the pseudo-labels are abduced by logic reasoning to check whether the logical facts grounded by the pseudo-labels are compatible with the knowledge base. Finally, the abduced result is sent back to retrain the neural network.
- I contribute the idea of two-stage pre-training and key vertebrae, and participated in the whole experiment.

Developments

Intelligent Recognition and Retrieval System for Medical Documents | *Spring Boot, Vue.js, ElasticSearch, BERT, openNMT*

- Addressing current industry pain points, constructed an efficient medical document management system through the integration of various technologies.
- Achieved over 90% accuracy in OCR recognition of images within PDF documents.
- Supports distributed deployment, with system response speed leading among similar systems.
- Awarded the National Third Prize in the China College Students' Service Outsourcing Innovation and Entrepreneurship Competition.

Fraud APP intelligent identification and analysis system | *Spring Boot, Vue.js, Transformer, MITMProxy*

- We developed a comprehensive system for analyzing fraudulent applications, utilizing the Vue+SpringBoot architecture.
- My primary focus was on APK analysis. I implemented dynamic analysis using emulator tools and MITMProxy. Additionally, I employed JADX and Selenium to facilitate APK download and static parsing.
- I actively contributed to the design of the system architecture, as well as its overall integration and coordination.
- Awarded the National Third Prize in the China Software Cup Competition.

Research

Pedicle Screw Planning | *Segmentation, Pedicle Landmark, Surgical planning*

- Pedicle screws provide a good three-dimensional fixation mode, which can be used for the reconstruction of various cervical disorders such as cervical instability and cervical deformity. In traditional surgery, determining the passage of pedicle screws requires comprehensive consideration of the size, orientation, and shape of the patient's pedicle, and also determines the screw size according to the patient's spinal anatomy.
- To design the method of screw planning automatically, we segment the vertebra first, to locate the vertebral pedicle and annotate the data and use nnUNet to segment the 3D CT images, then we use maximal inscribed circle to locate the planning line.
- I completed the whole experiment and method design independently.

Dual-Energy CT Tumour-infiltrating Lymphocyte (TIL) Prediction in Breast Cancer | *Classification, Multimodal*

- Tumour-infiltrating lymphocytes (TILs), as a new prognostic biomarker, are of important clinical value and have an association with improved survival rates and higher response rates to neoadjuvant therapy and immunotherapy in breast cancer.
- We want to build a new network that fuses omics/clinical/imaging features to achieve better results. Specifically, we hope to build a multimodal fusion pipeline framework based on CrossTransformer and KNN omics feature screening.
- This work was carried out in collaboration with the Radiology Department of Lishui Central Hospital. We plan to submit it to the *International Journal of Surgery*, and I will work with clinicians as co-first author.

CT Section Segmentation of Nasopharynx | *Segmentation*

- The ethmoidal chamber of the posterior frontal sinus is a possible structure in the frontal sinus, located in the last part of the frontal sinus, and is highly associated with the risk of chronic sinusitis.
- We hope to determine whether the patient has this structure through the segmentation of CT sections, so as to achieve the purpose of assisting doctors in diagnosis.
- This work is in cooperation with the Department of Otolaryngology of Nanjing Tongren Hospital, and is expected to be published in *BMC Medical Imaging*, I anticipate working with clinicians as co-first authors.

Technical Skills

Languages: C++, Python, Go, JavaScript, PHP

Technologies: Linux, Vue.js, Spring Boot, PyTorch, Bootstrap, Node.js

Achievements

- 13th China Software Cup, 3rd Prize.
- 15th Jiangsu Province LanQiao Cup Competition Region, 1st Prize.
- 2022-2023 Hohai University Scholarship for Academic Progress.
- The 14th China College Student Service Outsourcing Innovation Competition, 3rd Prize.
- The 2023 ICPC Jiangsu Provincial Programming Contest, Bronze Prize.
- 2021-2022 Hohai University Scholarship for Academic Progress.
- The 22th Hohai University Algorithm Design Creativity Show, 1st Prize.
- The 10th Hohai University Programming Contest, 1st Prize(Rank 2).

Social Engagements

Minister: Science and Technology Association, College of Computer Science and Software Engineering, Hohai University

曾强

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教育背景

河海大学

计算机科学与技术(GPA: 87.83, 4.32 / 5.00, 排名25%)

预期2025年5月毕业

南京, 江苏

- **TOEFL(First Score):** 81(R:21 L:26 S: 17 W:17)
- **CET-4:** 510, **CET-6:** 454
- 全国计算机二级、三级
- 相关课程: 程序设计基础(C, 94), 算法设计与分析(C++, 85), 计算机图形学(C++, 89), 人工智能(Python, 95), 机器学习(Python, 95), 数据结构(C++, 86), 计算机网络(92), 学术写作与研究(99)

经历

Machine Learning in Biomedical Sciences and Bioengineering

2024年3月 - 2024年5月

国际课程, 成绩: A

Prof. James Choi, Imperial College London (London, UK)

- 深度学习基础-神经网络和深度学习入门; 深度学习在医疗中,特别是在医学图像领域中的应用; 卷积神经网络(CNN)概述。
- 生物医学成像和机器学习——利用机器学习进行医学成像的前沿研究; 了解机器学习如何增强复杂成像数据的解释和分析。

河海大学-百度松果菁英班

2023年5月 - 2023年12月

优秀结业学员

常州, 江苏

- 人工智能与机器学习课程与实践, 学习PaddlePaddle相关课程。
- 完成基于循环神经网络实现情感分类, 基于卷积神经网络实现美食分类, 图像风格迁移等课程实践内容, 在结课比赛中的图像分类、新闻主题分类两个题目获得校内第一。

常州市图形图像与骨科植入物数字化技术重点实验室

2023年4月 - 2024年6月

学生, 导师: 蒋俊锋教授

常州, 江苏

- 主要从事骨科相关工作, 包括椎体X线片分割与检测, 术中X线与术前CT扫描的配准等。
- 有MICCAI24和BIBM24投稿经验, 其中1篇论文被BIBM24(CCF-B)接收为Short Paper。

中国科学院苏州生物医学工程技术研究所, 医学影像研究室

2024年6月 - 2025年4月

访问学生(全职), 导师: 周志勇研究员

苏州, 江苏

- 主要从事临床相关工作, 通过与医生密切沟通了解其需求, 并基于此训练深度学习模型; 通过医学影像诊断罕见病, 分类疾病类型。
- 主要关注于分割和分类任务以及多任务模型, 如肿瘤病灶分割、血管侵犯评估和严重程度分级等。

发表论文

ABLSpineLevelCheck: Localization of Vertebral Levels on Fluoroscopy via Semi-supervised Abductive Learning

- 被IEEE International Conference on Bioinformatics and Biomedicine (BIBM)接收, 第三作者(第二学生作者)。
- 后续计划按审稿人意见修改与补充后投递至ACADEMIC RADIOLOGY, 我将作为第一作者。
- 我们提出了一种用于半监督策略下的椎骨定位的溯因学习方法, 属于神经符号范式。
- 神经网络首先对伪标签进行估计。然后对伪标签进行逻辑推理, 检验伪标签所建立的逻辑事实是否与知识库相容。最后, 将获取的结果返回给神经网络进行再训练。
- 我提出了两阶段预训练和关键椎体的想法作为整篇论文的创新点之一, 并参与了所有实验和数据准备。

开发经历

医学文献智能识别与检索系统 | *Spring Boot, Vue.js, Elasticsearch, BERT, openNMT*

- 针对当前行业痛点，通过多种技术的整合，构建高效的医疗文档管理系统。我们的系统在测试PDF文档集中实现了超过90%的OCR图像识别准确率，同时支持分布式部署，系统响应速度在同类竞赛系统中领先。
- 我主要负责了后端程序的编写以及智能算法的调用/均衡负载等问题的处理，同时也参与了前端页面的设计与编写。
- 本作品在全国大学生服务外包创新创业大赛中获得全国三等奖。

诈骗APP智能识别分析系统 | *Spring Boot, Vue.js, Transformer, MITMProxy*

- 我们利用Vue+SpringBoot架构开发了一个全面的系统来分析欺诈应用程序。
- 我的主要关注点是APK分析。我使用模拟器工具和MITMProxy实现了动态分析。此外，我还使用JADX和Selenium来实现了APK自动下载和静态解析。
- 我参与了整个系统的技术选型和架构设计，起到了组织协调的作用。
- 本作品在中国软件杯大赛中获得全国三等奖。

研究经历

椎弓根螺钉规划 | 分割, 手术规划

- 椎弓根螺钉提供了良好的三维固定方式，可用于颈椎不稳、颈椎畸形等各种颈椎疾患的重建。在传统手术中，确定椎弓根螺钉的通过需要综合考虑患者椎弓根的大小、方向和形状，并根据患者的脊柱解剖结构确定螺钉的大小。
- 为了设计自动规划螺钉的方法，我们首先对椎体进行分割，定位椎弓根并对数据进行注释，然后使用nnUNet对三维CT图像进行分割，然后使用最大内接圆对规划线进行定位。
- 我独立完成了整个实验和方法设计。

双能CT对乳腺癌浸润性淋巴细胞 (TIL) 的预测 | 分类, 多模态

- 肿瘤浸润淋巴细胞 (Tumor Infiltrating Lymphocyte, TIL) 作为一种新的预后生物标志物，具有重要的临床价值，与乳腺癌患者生存率的提高、新辅助治疗和免疫治疗的应答率有关。
- 我们希望建立一个融合组学/临床/成像特征的新网络以获得更好的结果。具体来说，我们希望建立一个基于CrossTransformer和KNN组学特征筛选的多模态融合流水线框架。
- 这项工作是与丽水中心医院放射科合作进行的。我们预计投递至*International Journal of Surgery*，我将与临床医生合作作为共同第一作者。

额窦后筛房CT切片分割与分类 | 分割, 分类

- 额窦后筛房是额窦内的一种可能存在的结构，位于额窦的最后一部分，与慢性鼻窦炎的风险高度相关。
- 我们希望通过CT切片的分割来判断患者是否存在这种结构，从而达到辅助医生诊断的目的。
- 这项工作是与南京同仁医院耳鼻喉科合作的，预计将在*BMC Medical Imaging*上发表，我将与临床医生合作作为共同第一作者。

技能

编程语言: C++, Python, Go, JavaScript, PHP

相关技术: Linux, Vue.js, Spring Boot, PyTorch, jQuery, Bootstrap, Node.js

获奖经历

- 第十三届中国软件杯三等奖
- 第十四届服务外包创新创业大赛全国三等奖
- 2023年ICPC江苏省程序设计大赛（华为杯）铜奖
- 第十五届蓝桥杯江苏省赛区一等奖
- 2022-2023河海大学学业进步奖学金
- 2021-2022年河海大学学业进步奖学金
- 第22届河海大学算法设计创意大赛一等奖
- 第十届河海大学程序设计大赛一等奖(Rank2)

社会经历

2022-2023 河海大学物联网工程学院学生科协部长