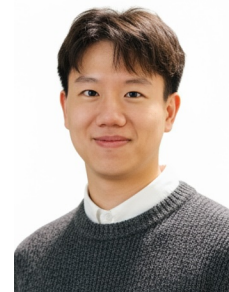


段润霖



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教育背景

- 普渡大学，机械工程专业，博士学位 美国，西拉法叶，2020.05-至今
- 导师：Prof. Karthik Ramani, C Design Lab
- 卡内基梅隆大学，机械工程专业，硕士学位 美国，匹兹堡，2017.08-2018.12
- 导师：Prof. Kenji Shimada, CER Lab
- 西安交通大学，飞行器设计与工程专业，学士学位 中国，西安，2013.08-2017.06

工作经历

- 卡内基梅隆大学，研究助理 美国，匹兹堡，2019.01-2020.03
- 导师：Prof. Kenji Shimada and Prof. Levent Burak Kara
- 设计了一个改进版 ResNet，用于识别工程图纸中的关键参数。
 - 搭建了一个基于 ROS 的机器人仿真平台，利用 Turtlebot 模拟与部署路径规划 (SLAM) 算法 (基于采样规划与梯度优化)，成果发表于 [C.1]。
- 普渡大学，助教 美国，西拉法叶，2023.01-2024.05
- 课程：ME444: Computer-Aided Design and Prototyping 课程主页
- 普渡大学，助教 美国，西拉法叶，2025.01-至今
- 课程：ME553: Product and Process Design 课程主页

研究经历

- 课题 I：设计——基于生成式 AI (GenAI) 的工业设计，发表论文 [C.4] [C.6] [J.2]
- DesignFromX: Empowering End-User Product Design using Reference Design Features Drawn from Everyday Products* [C.4] (2024.03-2025.06)
- 通过采访设计专家，总结了广泛应用于产品设计的功能性和美学特征分类法。
 - 提出了结合基于图像的零件分割模型和多模态生成模型的工作流程，以迭代生成功能性和美学特征。
 - 开发了一个基于 HTML 的网页界面，与后端 AI 模型集成，使普通用户能够参与个性化产品设计。
- ConceptVIS: Generating and Exploring Design Concepts for Early-stage Ideation using Large Language Models* [J.2] (2023.01-2024.05)
- 设计了一个用于早期产品设计创意阶段的人机协作框架。
 - 开发了一个基于生成式 AI 的交互式知识图谱结构，促进人类设计师与 AI 设计代理之间的多模态知识共享。
 - 实现了一个网页界面，用于评估人类与 AI 在概念生成和迭代开发中的合作效果。
- 课题 II：建模——利用 AI 和多模态交互支持 CAD (Computer-Aided Design) 参数化建模，发表 (在投) 论文 [C.6] [J.3]
- JustShape: Exploring Co-Speech Gestures for Multimodal LLM-Empowered Generative Parametric Modeling* [C.6] (2024.10-2025.09)
- 提出了一套多模态融合管线 (Multi-modal fusion pipeline)，通过加入由手势识别提取的数值参数来增强语言输入在建模任务的准确性
 - 开发了一种利用多模态大语言模型的生成式 CAD (Computer-Aided Design) 建模流程
 - 设计并实现了一个基于 Unity 的增强现实 (AR) 界面，使用户能够通过自然的手势和语音与生成式 AI 代理进行 3D 建模交互。

pARametric: Empowering In-Situ Parametric Modeling in Augmented Reality for Personal Fabrication [J.3] (2023.05 –2024.03)

- 提出了一个端到端的工作流程，通过手绘草图和虚拟几何模型的交互生成参数化 3D 模型。
- 实现了基于 Transformer 的生成式模型，从手绘输入中提取参数化草图。
- 开发了一个增强现实 (AR) 参数化建模系统，使初学者能够利用环境信息，创建定制化的参数化产品模型。

课题 III：教育与技能学习——基于 AI 和增强现实的专业技能迁移，发表 (在投) 论文 [C.2] [C.7] [J.1] [J.4] [↗](#)

Ubi-TOUCH: Ubiquitous Tangible Object Utilization through Consistent Hand-object interaction in Augmented Reality [C.2] (2023.01 –2023.10)

- 开发了一个 AR 界面，用于映射真实物体，允许用户选择所需的交互方式和相应的虚拟对象，从而实现将现实物体映射进虚拟空间使用，增强 AR 中可交互物体的真实性。

The Design of a Virtual Prototyping System for Authoring Interactive Virtual Reality Environments From Real-World Scans [J.1] (2020.09 –2022.05)

- 实现了一个深度神经网络，用于将用户扫描的点云编码为关键对象的特征向量，从而将现实物体的点云映射到相似的虚拟资产上。
- 提出了一个算法，使用神经网络提取的特征，从点云中匹配虚拟对象来创建一个虚拟现实场景，进行焊接技能训练。

发表 (在投) 论文

[C-会议文章, J-期刊文章, PP-预印本]

[C.9] **Dynamic-eDiTor: Training-Free Text-Driven 4D Scene Editing with Multimodal Diffusion Transformer.** [↗](#) 2026.06 (已接收)

Dong In Lee*, Hyungjun Doh*, Seunggeun Chi, **Runlin Duan**, Sangpil Kim, Karthik Ramani, *Conference on Computer Vision and Pattern Recognition 2026 (CVPR 2026)*. 会议评级: CCF-A

[C.8] **JustShape: Exploring Co-Speech Gestures for Multimodal LLM-Powered 3D Parametric Modeling.** [↗](#) 2026.04 (已发表, 并获得 CHI26 荣誉提名奖, Top 5%)

Runlin Duan*, Yuzhao Chen*, Yichen Hu, Ziyi Liu, Chenfei Zhu, Xiyun Hu, Dizhi Ma, Xinyi Wang, Karthik Ramani, *The ACM CHI conference on Human Factors in Computing Systems 2026 (CHI26)*. 会议评级: CCF-A

[C.7] **AmIWrite: Enabling Scalable One-on-One Handwriting-Based STEM Tutoring with an LLM-Powered AI Tutor.** [↗](#) 2026.04 (已发表)

Ziyi Liu*, Yuzhao Chen*, Haoyu Ji, **Runlin Duan**, Xiyun Hu, Zhengzhe Zhu, Karthik Ramani, *The ACM CHI conference on Human Factors in Computing Systems 2025 (CHI26)*. 会议评级: CCF-A

[C.6] **SketchConcept: Sketching-based Concept Recomposition for Product Design using Generative AI.** [↗](#) 2026.03 (已接收)

Runlin Duan*, Chenfei Zhu*, Yuzhao Chen, Dizhi Ma, Jingyu Shi, Ziyi Liu, Karthik Ramani, *ACM Designing Interactive Systems Conference (DIS) 2026*, 论文接收率: 21%. 会议评级: CCF-C

[C.5] **Canvas3D: Empowering Precise Spatial Control for Image Generation with Constraints from a 3D Virtual Canvas.** [↗](#) 2025.10 (已发表, 预印本)

Runlin Duan*, Yuzhao Chen*, Rahul Jain, Yichen Hu, Jingyu Shi, Karthik Ramani, *The 2026 ACM Conference on Intelligent User Interfaces (ACM IUI 26)*. 会议评级: CCF-B

[C.4] **DesignFromX: Empowering Consumer-Driven Design Space Exploration by Structuring Feature Composition of Existing Products.** [↗](#) 2025.07 (已发表)

Runlin Duan*, Chenfei Zhu*, Yuzhao Chen, Yichen Hu, Jingyu Shi, Karthik Ramani, *ACM Designing Interactive Systems Conference (DIS) 2025*, 论文接收率: 25%, 会议评级: CCF-C

[J.4] **Virtual Reality in Manufacturing Education: A Scoping Review Indicating State-of-the-Art, Benefits, and Challenges Across Domains, Levels, and Entities.** [↗](#) 2025.07 (审稿中, 预印本)

Ananya Ipsita, Ramesh Kaki, Ziyi Liu, Mayank Patel, **Runlin Duan**, Lakshmi Deshpande, Lin-Ping Yuan, Victoria Lowell, Ashok Maharaj, Kylie Pepler, Steven Feiner, Karthik Ramani, *Computers in Industry*. 影响因子: IF-9.1
期刊评级: 中科院一区

[PP.2] Investigating Creativity in Humans and Generative AI Through Circles Exercises. [🔗](#)

2025.03 (预印本)

*Runlin Duan**, Shao-Kang Hsia*, Yuzhao Chen, Yichen Hu, Ming Yin, Karthik Ramani, *arXiv preprint*.

[J.3] pARAmetric: Empowering In-Situ Parametric Modeling in Augmented Reality for Personal Fabrication. [🔗](#)

2024.08 (已发表)

*Runlin Duan**, Xiyun Hu*, Min Liu, Jingyu Shi, Karthik Ramani, *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE 2024)* and collected in *The ASME Journal of Computing and Information Science in Engineering (JCISE)*. 影响因子: IF-3.3 期刊评级: 中科院三区

[J.2] ConceptVIS: Generating and Exploring Design Concepts for Early-stage Ideation using Large Language Model. [🔗](#)

2024.08 (已发表)

Runlin Duan, Nachiketh Karthik, Jingyu Shi, Rahul Jain, Maria C. Yang, Karthik Ramani, *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE 2024)* and collected in *The ASME Journal of Computing and Information Science in Engineering (JCISE)*. 影响因子: IF-3.3 期刊评级: 中科院三区

[PP.1] Understanding Generative AI in Art: An Interview Study with Artists on G-AI from an HCI Perspective. [🔗](#)

2023.10 (预印本)

Jingyu Shi, Rahul Jain, *Runlin Duan*, Karthik Ramani, *arXiv preprint*.

[J.1] The Design of a Virtual Prototyping System for Authoring Interactive Virtual Reality Environments From Real-World Scans. [🔗](#)

2023.07 (已发表)

Ananya Ipsita*, *Runlin Duan**, Hao Li*, Subramanian Chidambaram, Yuanzhi Cao, Min Liu, Alex Quinn, Karthik Ramani, *The ASME Journal of Computing and Information Science in Engineering (JCISE)*. 影响因子: IF-3.3 期刊评级: 中科院三区

[C.3] Ubi-TOUCH: Ubiquitous Tangible Object Utilization through Consistent Hand-object Interaction in Augmented Reality. [🔗](#)

2023.05 (已发表)

Rahul Jain*, Jingyu Shi*, *Runlin Duan*, Zhengzhe Zhu, Xun Qian, Karthik Ramani, *ACM Symposium on User Interface Software and Technology (UIST 2023)*. 会议评级: CCF-A

[C.2] VRFromX: From Scanned Reality to Interactive Virtual Experience with Human-in-the-loop. [🔗](#)

2021.05 (已发表)

Ananya Ipsita, Hao Li, *Runlin Duan*, Yuanzhi Cao, Subramanian Chidambaram, Min Liu, Karthik Ramani, *Extended Abstracts of the ACM CHI Conference on Human Factors in Computing Systems (CHI EA 2021)*.

[C.1] Robotic Exploration of Unknown 2D Environment Using a Frontier-based Automatic-Differentiable Information Gain Measure. [🔗](#)

2020.07 (已发表)

Di Deng, *Runlin Duan*, Jiahong Liu, Kuangjie Sheng, Kenji Shimada, *IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM 2020)*.

发明专利

[P-专利]

[P.1] Method and system for interactive visualization of large language model design knowledge [🔗](#)

US Non-Provisional Patent

2024.10

获奖荣誉

唐仲英奖学金, 西安交通大学, 2013.09-2016.09

优秀学生干部, 西安交通大学, 2014.09

专业技能

编程语言: Python, C#, Matlab, C++, JavaScript, HTML

技术: Pytorch, OpenCV, MRTK, Streamlit, ROS, Cero, AutoDesk