


I am a graduate student researcher in FHL Vive Center, leading the OpenARK team in EECS Dept @UC Berkeley, working closely with the director Dr. Allen Y. Yang. My research interests focus on 3D Vision, Human-AI Interaction and Autonomous Robots with a strong emphasis on their integration into Architectural Construction and Urban Accessibility. Prior to this, I gained experience in the AEC industry and obtained my Bachelor of Architecture from Zhejiang University, leading the robotic fabrication lab in Civil-Eng. Dept.

Recent Highlights

12/2023. The OpenARK team will showcase our latest progress in the 6DoF pose estimation algorithm and a robot tracking dataset at the Vive Center Gala on December 1st.

10/2023. I will be giving a 2-hour online talk at Xi'an University of Architecture and Technology. The topic is "From Robotic Fabrication to 3D Scene Understanding."

10/2023. We are releasing DTTD v2!  A 3D object tracking dataset and a transformer-based 6DoF object pose estimation network that is robust to sensor depth noise.

08/2023. Our paper "MARL: Multi-scale Archetype Representation Learning for Urban Building Energy Modeling" is accepted at ICCV workshop 2023, CVAAD.

01/2023. We won the MIT RealityHACK 2023 in Spatial Audio Track! 

Peer-Reviewed Publications

Robust Digital-Twin Localization via An RGBD-based Transformer Network and A Comprehensive Evaluation on a Mobile Dataset

TPAMI (under review)



Keywords: 6D Pose Estimation, LiDAR, Transformer, Point Cloud Denoising

MARL: Multi-scale Archetype Representation Learning for Urban Building Energy Modeling

ICCVW 2023



Keywords: VQ-VAE, Representation Learning, Building Energy Estimation

Robotic Fabrication of Sustainable Hybrid Formwork with Clay and Foam for Concrete Casting

SiGraDi 2020



Keywords: 3D Clay Printing, Robotic Hot-wire Cutting, Mass Customization

Fabrication of Topology Optimized Concrete Components Utilizing 3D Printed Clay Mould

IASS 2019



Keywords: Additive Manufacture, Robotic Fabrication, Topology Optimization

Encoding Urban Ecologies: Automated Building Archetype Generation through Self-Supervised Learning for Energy Modeling

ACADIA 2023

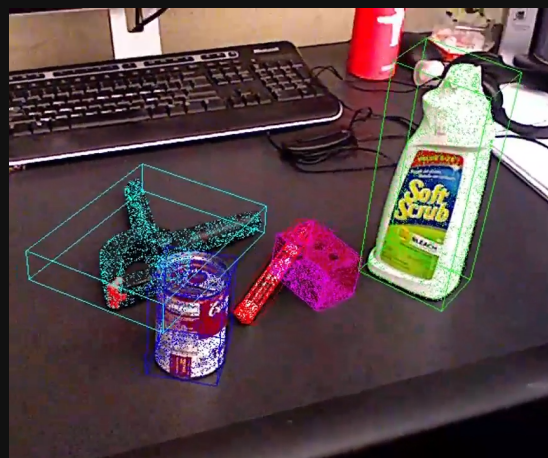



Keywords: Self-supervised Learning, Archetype, Building Energy Estimation

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3D Vision

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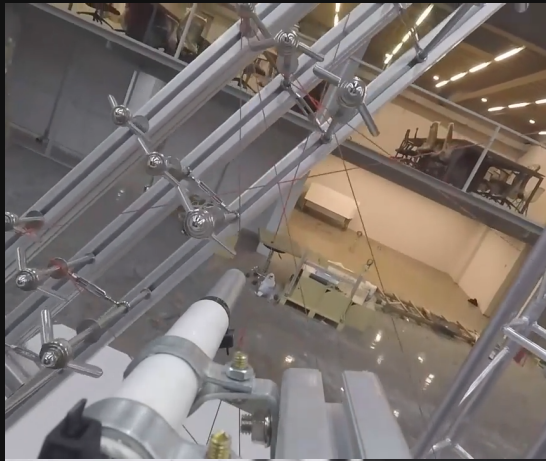


 Robust Digital-Twin Localization via An RGBD-based Transformer Network and A Comprehensive Evaluation on a Mobile Dataset

Zixun Huang*, Keling Yao*, Seth Z. Zhao*, Chuanyu Pan*, Tianjian Xu, Weiyu Feng, *supervised by* Dr. Allen Y. Yang

[\[github\]](#) [\[arxiv\]](#) [\[bibtex\]](#) [\[dataset\]](#) *in submission to TPAMI*

Are current pose estimation methods robust enough to ignore the distortion and interpolation noise in widely-adopted iPhone's LiDAR measurements? 🤖 Our DTTD-Net introduced Fourier-transform enhanced MLP and fusion-robustifying Transformer into 3D Object Tracking Tasks.



Jieyuan Shrine: Advancing Modular Architecture Construction with a Robotic Carbon-Fiber Weaving System

Kuanting Lai*, Zhe Liang*, **Zixun Huang***, Peiyi Huang, Yuhong Ha
[video] [animation] [poster] featured in: [archdaily, domus, goood]

🎨 Our work has been featured in the most prestigious architectural media. 🎨

🎨 We achieved China's first all carbon-fiber structure designed architecture. Density of the structure is controlled at 18KG per cubic meter and the bearing capacity of 400KG is achieved.



Efficient Discrete Construction: An Experimental Design-to-Fabrication Workflow with Automatic UAV Integration

Zhe Guo*, **Zixun Huang***, Xuhui Lin*, Kai Xiao*, Sijie Gao*, Ziyue Hu, Xiaoliang Ying, Yitian Lu, You Lyu, Qixin Li, Lihua Zhang, Likai Wei, Hongxin Wang, Zihao Zhang, supervised by Prof. Xiang Wang*
[video] [poster] drawing credit: zczlx3@ucl.ac.uk

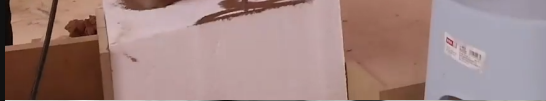
! We integrated drone tracking (via MoCap) and controlling (via ROS) into Grasshopper3D; Achieved discrete stacking with utilizing a UAV gripping system crafted from Raspberry Pi, PX4 and 3D printed hardware, etc.



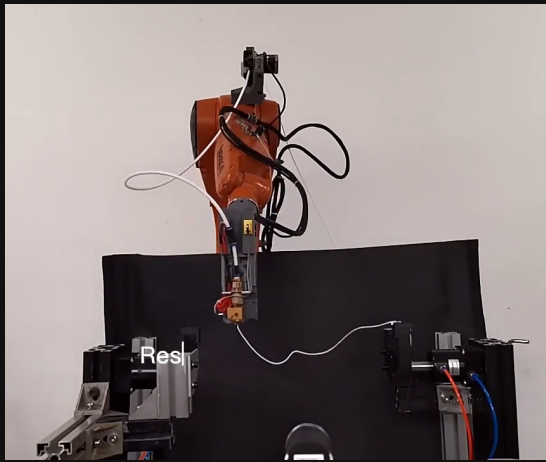
A Series: Towards Mass Customization Techniques in Casting Mold Production Using 6-Axis Robotic Arms

Zixun Huang*, Kunshen Huang*, Zee Liang*, Sihan Wang, Weishun Xu, Prof. Raspall Felix
[IASS 2019] [SiGraDi 2020] [poster] [demo installation] [video3] This is a continuing series of researches on efficient mass customization. * denotes equal contribution. To check other students' work co-mentored by me and Zee Leong.

! We developed a rapid 3D clay printing system and hot-wire cuttingsystem using high-torque



stepper motors, Arduino, KUKA Robots, etc. 🤖 I also enabled non-planar robotic printing on quadric surfaces!!



Advancing Autonomous Resin Printing in the Air: Shaping with Gravity

Zixun Huang, supervised by Dr. Dan Luo

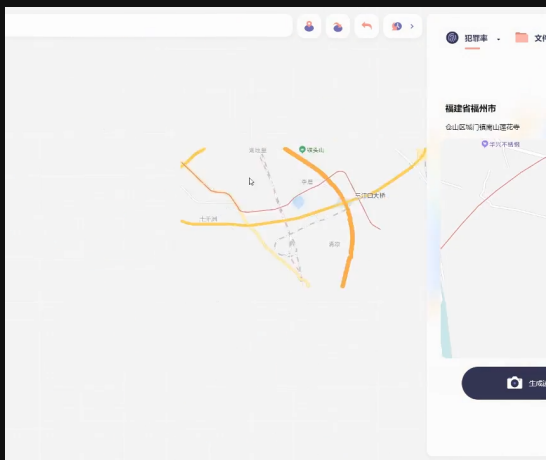
[\[video\]](#) for real-world data exploration.

We achieved 3D printing in the air with the resin solidifying and being molded by gravity drop; parameterized the robotic printing behavior with extrusion speed, motion speed and dwell time, etc. Then we evaluated the capacities of imitation learning and offline reinforcement learning on training an autonomy for the resin shaping with gravity.

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Human-AI Interaction

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Discovering the City Through an Urban Researcher's Lens: See What They See

Zixun Huang, Prof. Hao Zheng, Hang Gao

[\[demo video\]](#) [\[poster\]](#) in submission to Ubicomp 2024

We are releasing "Urban Lens"!! 🤖 This work provides the public a novel way to aware our urban environment in a professional but visible way. We invited over 100 urban designers to collaborate on metrics evaluating!!



Can Machine Learning Uncover Insights into Vehicle Travel Demand from Our Built Environment?

Zixun Huang, supervised by Prof. Hao Zheng

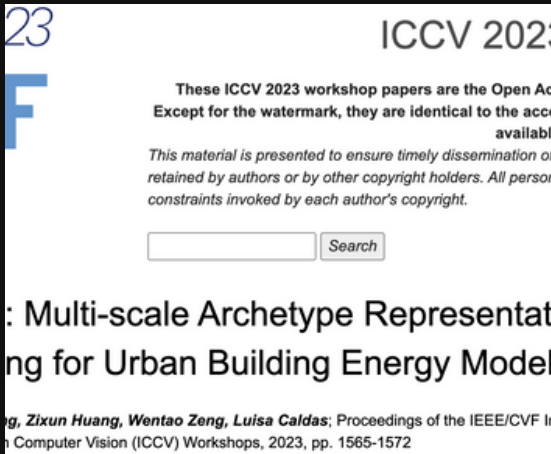
[manuscript] [poster] in submission to Cities

We demonstrated that predicting people's travel demand is achievable through the observation of Points of Interest (POI) spatial distribution. Surprisingly, we found that people's activities at various times of the day are influenced by urban design—an effect that extends across different cities.

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Built Environment

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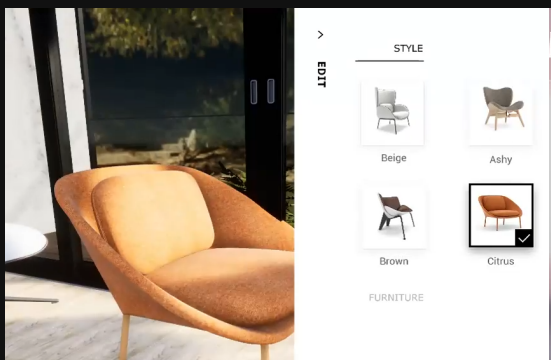


MARL: Multiscale Archetype Representation Learning for Urban Building Energy Modeling

Xinwei Zhuang*, **Zixun Huang***, Wentao Zeng, supervised by Prof. Luisa Caldas

[github] [ICCVW 2023] [bibtex] [poster]

Our work was accepted at ICCV workshop 2023, CVAAD. We achieved over 100x less computation time on urban-scale building energy estimation with significantly more accurate results.



Building Your Dream Home: Just Like Crafting with LEGO

Xiao Jin*, **Zixun Huang***, Qianlong Zhao*, Hang Gao, Hanzhi Zhang, Qingyang Zong, supervised by Prof. Hao Zheng

[video1] [video2] [video3] executable file: [exe, apk]

We developed a modular building information management (BIM) system from 0 to 1; Enabled efficient and scalable structure customization with real-time 3D visualization; Achieved an immersive

user experience built on Android using Unreal Engine and Blueprints.

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Augmented Reality

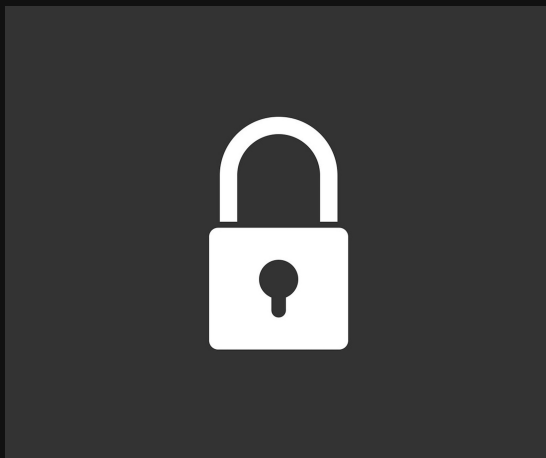
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MIT RealityHACK Winner: Crafting an Immersive XR Work Environment with Spatial Audio

Zixun Huang*, Weiyu Feng*, Yuehui Du*, Yola Wu*, Qianchen Bao
[\[project page\]](#) [\[github\]](#)

🏆 We won the MIT RealityHACK 2023, in the track of the Best Use of Spatial Audio. Thanks to my teammates!!! Thanking Dolby.io and Snapdragon AR for their excellent SDKs.



📄 Universal AR-Enhanced Interface for ROS: Enabling Multi-Type Robot Control

Erin Fan*, **Zixun Huang***, *supervised by* Dr. Allen Y. Yang
[\[project page\]](#) *under construction*

This is a minimal prototype for NASA Suits 2024. Welcome to our MDes Open Showcase, we will achieve real-time Mars Rover localization and test user experiences for the LMCC (Local Mission Control Console).

Recognition

> Awards & Scholarships.

MIT Reality HACK 2023 Winner - Spatial Audio Track. Massachusetts Institute of Technology, MA, USA. 2023

MDes Distinguished Scholar Award. Jacobs Institute of Design Innovation, University of California, Berkeley, CA, USA. 2022

Excellent in SRTP (Student Research Training Project). School of Civil Engineering and Architecture, Zhejiang University, Hangzhou, China. 2018

ZJU Merit-based Scholarship. School of Material Science and Engineering, Zhejiang University, Hangzhou, China. 2016

Third Prize in CMO (Chinese Mathematical Olympiad). Zhejiang Province, China. 2015

> Invited Talks.

A010125: AI Architecture Before and After. Dept. of Architecture. Xi'an University of Architecture and Technology. Oct. 24th, 2023

Design@Large Panel: Landing a Research Position. Jacobs Institute of Design Innovation, University of California, Berkeley. Sep. 22nd, 2023

Architectural Robotics: From Design to Construction. College of Civil Engineering and Architecture, Zhejiang University. Nov. 20th, 2019

> Selected Press.

Shrine of Whatslove / Wutopia Lab. ArchDaily. Mar. 27th, 2019

China's first all carbon-fiber structure designed architecture. Gooood. May. 13th, 2019

Discrete Elements Construction of Automatic UAV. SOHU. Aug. 16th, 2019

 Find Where am I



The one in the middle holding the drone.



The one on the left with the grey mask.



The one on the right most.



Row 2; Col 3.



The one standing on the ladder.



The robotic arm and me.



Wearing the Snapdragon AR glasses.



Me with my twin sister.

FEATURED IN



NAVIGATION

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GET IN TOUCH

I like dancing and painting.
 My favorite TV play is Quartet.
 zixun [at] berkeley [dot] edu

