Kaveh Safavigerdini
Curriculum Vitae

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🎓 Google Scholar

EDUCATION

2021 – 2025	**Computer Science, PhD** *University of Missouri - Columbia*
2021 – 2022	**Computer & Elecrical Engineering, M.Sc.** *University of Missouri - Columbia*
2010 – 2016	**Dynamical & Control Systems, M.Sc. & B.Sc.** *Sharif University of Technology*

DOCTORAL RESEARCH (ALGORITHMS)

"3D Point Tracking in Monocular Videos"

Developed an end-to-end deep learning framework to estimate 3D trajectories, scene geometry, and camera motion from monocular videos.

"Coarse-to-fine feature keypoint tracks using Transformer"

Developed a Transformer-based method for accurate keypoint tracking at the pixel level, improving SfM and feature tracking applications.

"Real-Time Feature Tracking in Monocular Videos"

Developed high-speed algorithms for real-time feature tracking

"Gram-Schmidt Feature Reduction Class Activation Map"

Developed an XAI framework to generate multiple visual explanations via feature decomposition using Gram-Schmidt theory.

"3D Measurement Tool for WAMI dataset"

Developed a cross-platform 3D measurement tool and GUI annotation tool for analyzing large photogrammetric datasets.

DOCTORAL RESEARCH (APPLICATIONS)

"3D Scene Mapping for Augmented Reality and Robotics"

Using a differentiable SfM framework to generate dense 3D maps for robust AR and autonomous navigation.

"Kinematic Analysis and Shape Estimation of CNT Pillars"

Using developed feature tracking algorithms to analysing carbon nanotube growth rate and ocillation and estimating thier pillar shapes.

"Horse Lameness Detection through Video Feature Tracking"

Developed a highly accurate feature tracking pipeline for analyzing horse skeleton movement to detect lameness.

ACADEMIC SKILLS

- Computer Vision: Object Detection and Tracking, Image classification/Segmentation, GANs, Pose Estimation
- Control Theory: Control Systems, System Identification, Dynamical Systems and Algorithm Optimization
- Programming: Pytorch, Python, C++, Qt

AWARDS

2016 Best Thesis Award for Practical Application, Sharif University

PROFESSIONAL SKILLS

- Team Leadership, Project Management and Valuable Industry Contributor
- Business Strategy and Analysis (MBA degree)

PUBLICATIONS

K Safavigerdini, et al. **ICCV** (2025). GFR-CAM: Gram-Schmidt Feature Reduction for Hierarchical CAMs.

K Safavigerdini, et al. **ICCV** (2025). Automated Feature Tracking for Real-Time Kinematic Analysis and Shape Estimation of Carbon Nanotube Growth.

K Safavigerdini, et al. IEEE **ICIP** (2023). Predicting Mechanical Properties of CNT Images Using MLS.

K Safavigerdini, et al. IEEE **AIPR** (2023). Creating semi-Quanta MLS CNT images using CycleGAN.

Surya,.. **K Safavigerdini**, et al. **Carbon** (2024). CNT Forest Self-Assembly Insights from In-situ ESEM Synthesis.

Yaghooti, **K Safavigerdini**, et al. *Proc.* **ImechE** (2023). Stabilizing unstable periodic orbit of unknown fractional-order systems via adaptive delayed feedback control.

Yaghooti, Siahi, **K Safavigerdini**, et al. *Proc.* **ImechE** (2020) Adaptive synchronization of uncertain fractional-order chaotic systems using sliding mode control techniques.

WORK EXPERIENCE

MAY 2023 – AUG 2023 (FT)
Motion and Eye-Tracking Data in AR
Internship Researcher

OCT 2018 – OCT 2019 (FT)
Online Monitoring of Tehran's Air Pollution
Team Leader

REFERENCES

Dr. Kannappan Palaniappan

POSITION Dist. Prof., ECE, UM-Columbia
CONTACT pal@missouri.edu, +1 573-884-9266

Dr. Filiz Bunyak

POSITION Assist. Prof., ECE, UM-Columbia
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Dr. Matthew R. Maschmann

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