CHAHAT KALSI

Computer Graphics — Visualization — HCI — AR/VR/XR — Computer Vision

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Education

Stony Brook University — New York, United States
Master of Science in Computer Science, 3.78 / 4.0 GPA — Aug'23 - May'25 (Expected)
- **Awards:** Graduate Tuition Scholarship, Graduate Fee Scholarship

Panjab University — Chandigarh, India
Bachelors of Engineering in Computer Science, 9.04 / 10.0 GPA — Aug'19 - June'23

Research Experience

Immersive Visualization Framework for Stereoscopic Display — Jan'24-Sept'24
- Built an OpenGL-based framework for Silo, a stereoscopic cylindrical tiled-display system with 168 LCD panels and 619M pixels.
- Designed per-instance off-axis projections and view rotations for seamless 360° stereoscopic rendering.
- Integrated VRPN protocol for synchronized real-time interaction using OptiTrack IR cameras and gamepad controllers.

Conformal Retargeting to Visualize Missing Information in Immersive Systems — June'24-Sept'24
- Developed an OpenGL ray-tracing solution to render scenes based on input conformal mappings.
- Applied this technique to visualize missing information in immersive displays, addressing floor and ceiling gaps in Silo.
- Enhanced visualization by integrating optimal transport with conformal mapping to emphasize specific areas of interest.

Interactive Volume Rendering Engine for Immersive Displays — Oct'24-Present
- Developed a VTK-based volume renderer for immersive facilities, supporting high-resolution stereoscopic visualization.
- Created a D3.js iPad GUI for real-time adjustments to transfer functions, shading, blend modes, and clip planes.
- Enabled synchronized interaction via WebSocket communication with the rendering engine.

Publications

D. E. Gutierrez-Rosales, S. Boorboor, A. Shoaib, C. Kalsi, Y. Wang, Y. Cao, X. Gu, and A. E. Kaufman. Silo: Half-Gigapixel Cylindrical Stereoscopic Immersive Display. *IEEE Virtual Reality*, 2024 (Under review)

Graduate and Undergraduate Research Assistantships

Center for Excellence in Wireless and Information Technology — New York, United States
Graduate Assistant — Sept'24-Present
- Conducted comprehensive hyperparameter tuning using RayTune and ablation studies to evaluate model performance across different architectures, ensuring optimal performance for real-time applications.
- Enhanced Fast-SCNN with adaptive anti-aliasing techniques to improve real-time detection accuracy.
- Refined model accuracy through iterative fine-tuning and annotation on a custom drone image dataset.

Research Assistant — Jun'24-Aug'24
- Designed a distributed PyTorch-based segmentation framework for real-time powerlines detection in drone imagery, leveraging and modifying advanced architectures like U-Net, DeepLabV3, DeepLabV3+, MANet, LinkNet, PSPNet, PAN, and FPN.
- Integrated attention mechanisms, rich convolutional features, and object association methods into these models, significantly improving model performance, achieving an IoU of 0.70 on the TTPLA dataset.

Nottingham Trent University — Chandigarh, India (Remote)
Research Intern — Jul'21-Mar'22
- Led a project on ADHD assessment, involving denoising EEG signals utilizing advanced techniques such as Independent Component Analysis (ICA), bandpass and notch filtering, and wavelet transforms.
- Developed interactive EEG signal visualization tools in Python, significantly improving data analysis efficiency.

Teaching Experience

Stony Brook University   New York, United States
Graduate Teaching Assistant   Aug'24 - Present
- Teaching assistant for CSE 528 (Graduate-Level Computer Graphics) with over 30 students.
- Guided students in debugging C++ and OpenGL code and understanding graphics-related mathematics.
- Graded assignments and exams, managed attendance, and supported course administration.

Industry Experience

Goldman Sachs   Bengaluru, India
Software Development Intern   Feb'23-Jun'23
- Automated firm-wide Cash Gap report generation using Apache Spark (Java) for data processing and Apache Kafka for data streaming.
- Developed a Java Spring Boot MVC backend to streamline the Cash Gap report approval process.
- Implemented comprehensive unit tests using Mockito and JUnit.

Summer Analyst Intern   Jul'22-Sep'22
- Developed a Java Spring Boot application to integrate static CSV data into the database.
- Wrote unit and integration tests for the applicatioon.

Honors and Awards

Graduate Fee Scholarship   Fall 2024
Stony Brook University

Graduate Tuition Scholarship   Fall 2024
Stony Brook University

HackUIET, 2021   Nov 2021
UIET, Panjab University
- Won the hackathon in two categories: Overall Third and Best Solo

HackHer413, 2021   Feb 2021
University of Massachusetts Amherst
- Won the First Place prize in the Category "Make your own Social Media Website"

Technical Skills

Languages: C, C++, C#, Python, Java, JavaScript, SQL, HTML/CSS
Graphics APIs: OpenGL, GLSL, VTK
Visualization Libraries: d3.js, Matplotlib, Seaborn
Engines: Unity, Ren'Py, RPGMaker

References

Arie E. Kaufman
Distinguished Professor, former Chair of Computer Science at Stony Brook University and Director of CVC
- **Relationship:** Advisor
- **Email:** ari@cs.stonybrook.edu

Saeed Boorboor
Principal Research Scientist at Center of Visual Computing at Stony Brook University
- **Relationship:** Mentor and Supervisor
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Hong Qin
Professor and Member of Center of Visual Computing at Stony Brook University
- **Relationship:** TA under his guidance for Fall '24 CSE 528 (Computer Graphics)
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