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Akshay Mundra

Summary

I am an **M.Sc. Visual Computing** student at Saarland University with a background in **3D vision & graphics**, and 2+ years of **industrial experience**. I am completing my master's thesis at **MPI Informatics**, supervised by Prof. Dr. Christian Theobalt. For my thesis, I developed a method that creates photorealistic 3D hand avatars from 2D images, enabling a personalized and intuitive interface for VR and AR applications.

Education

Oct '20 - Present	**Saarland University** *M.Sc. in Visual Computing*	*Saarbrücken, Germany* *GPA: 1.4* [1]
Aug '14 - May '18	**Birla Institute of Technology and Science** *B.E. (Hons.) in Electronics and Instrumentation*	*Pilani, India* *GPA: 7.91/10*

Work Experience

Aug '21 - Present · **Max Planck Institute for Informatics** · *Saarbrücken, Germany*
Research Assistant — Supervisor: Prof. Dr. Christian Theobalt `Thesis`

- Created a **NeRF-based approach** to learn personalised 3D hand avatars from multi-view images [webpage].
- The model renders human hands in **real-time** with photorealistic details. It also models hand-pose and camera-view dependent changes in the hand texture.
- Implemented a live demo to **track** the user's hand and **render** it in real-time.
- The work is currently under review at **ICCV 2023**.

Jun '18 - Sep '20 · **DreamVu Inc.** · *Hyderabad, India*
Computer Vision Engineer

- Built a Generative Adversarial Network **(GAN) based image restoration model** to remove imaging artefacts such as defocus, noise and optical specularity.
- Developed a structured-light based **camera calibration** method to convert optically coded images to 360° stereo panoramas, significantly enhancing the camera's imaging capabilities.
- Involved in the company's assembly line in Johor Bahru, Malaysia, overseeing the process from an imaging perspective.

Jun '17 - Dec '17 · **Computer Vision Centre** · *Barcelona, Spain*
Research Intern — Supervisor: Dr. Antonio López `Thesis`

- Developed a navigation system for an **autonomous vehicle** in a virtual environment, using imitation learning techniques.
- Fine-tuned the model with real-world data to make it navigate in the real world.
- Showcased the work at Smart City Expo World Congress 2017.

Projects

Nov '20 - Jan '21 · **Ray tracer in C++**

- Built a ray tracer from scratch in C++, with salient features such as acceleration structures and distribution ray tracing.
- Showcased the ray tracer in a rendering competition [webpage].

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[1] German grading system – Best: 1.0, Worst: 5.0.

Jun '21 - Jul '21	**Automated Traffic Control Monitoring** [Report]

○ Developed an end-to-end ML pipeline to estimate traffic density from smartphone and vehicle dashcam images.
○ Pre-processed an in-the-wild dataset and trained a lightweight MobileNetV2 model on it.
○ Deployed the model on an android compatible application for real-time inferencing.

Jun '21 - Jul '21	**Multi-Frame Super Resolution for Smartphone Photography** [Report]

○ Generated bursts of low-resolution images synthetically, imitating tremors common in hand-held photography.
○ Applied transfer learning to a *Residual Feature Attention* based model for multi-frame super-resolution.

Skills

Knowledge 3D reconstruction, SLAM, Computer Vision, Deep Learning, Imaging, Computer Graphics

Languages Python, MATLAB C++, Java, C, Bash

Libraries PyTorch, TensorFlow, OpenCV, PyTorch3D, Metashape, Scikit-learn, Pandas, OpenMP

Tools AWS, Jupyter, Docker, Slurm, Git, POV-Ray, Linux, CMake, LaTeX

Soft skills Problem Solving, Research, Teamwork, Communication, Leadership

Relevant Coursework

○ **Image synthesis:** Computer Graphics, Realistic Image Synthesis, CV and ML for Computer Graphics
○ **Image analysis:** Digital Image Processing, High-Level Computer Vision, Advanced Image Analysis
○ **Image capture:** Image Acquisition Methods
○ **Artificial Intelligence:** Data Science, Machine Learning, Machine Learning in Cyber Security, Neural Networks and Fuzzy Logic
○ **Miscellaneous:** Data Structures and Algorithms, Operating Systems, Programming, Microprocessor Programming, Human-Computer Interaction