Ananth Kalyanasundaram

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PROFESSIONAL STATEMENT

Highly motivated professional with 7 years of research/project experience in 2D/3D Computer Vision, Machine Learning using Python. Proven expertise in developing high quality machine learning solutions, including generative AI such as GANs, diffusion models and LLMs.

EDUCATION

Technical University of Munich　　　　　October 2021 - September 2024
MSc. Informatics　　　　　*Munich, Germany*
GPA: 3.75/4.0
Advisor: Prof. Dr. Matthias Niessner

SRM Institute of Science and Technology　　　　　July 2016 - June 2020
B.Tech (Computer Science and Engineering)　　　　　*Chennai, India*
GPA: 3.82/4.0

WORK EXPERIENCE

Stealth　　　　　November 2024 - Present
CTO / Founding Computer Vision Engineer　　　　　*Bengaluru, India*
· Designed and deployed a large-scale football video analytics platform, utilizing advanced object detection models based on DETR and trackers to extract detailed player statistics from multi-camera setups.

Virtual Staging AI　　　　　April 2024 - July 2024
Applied Research Intern　　　　　*Munich, Germany*
· Increased output quality of furniture removal product by 75%, by developing depth-aware models based on Stable Diffusion Inpainting.
· Created a pipeline across multiple GPUs for processing around 200,000 raw real-life images into a trainable format.

Technical University of Munich　　　　　March 2022 - January 2024
Research Assistant　　　　　*Munich, Germany*
· Enhanced autopilot collision detection by 20% using Delaunay triangulation and Graph Neural Networks.
· Annotated 400 scenes for the ScanNet++ dataset.
· Developed meta learning pipelines for the prediction of ground water levels in satellite imagery.

Human Analysis Lab, Michigan State University　　　　　September 2020 - October 2021
Research Intern　　　　　*East Lansing, Michigan, USA*
· Achieved 5M (20%) parameter reduction in neural networks for multi-task learning on the CUB dataset, using shared weights within layers, under the supervision of Professor Vishnu Boddeti.

KPMG India　　　　　July 2020 - October 2020
Data Analyst Intern　　　　　*Mumbai, India*
· Created automation software for OTP verification; identified redundant internal processes for the Tax Technology and Transformation team thereby reducing processing time by 10%.

SRM Medical College　　　　　August 2019 - June 2020
Research Intern　　　　　*Chennai, India*
· Developed a novel loss function for super-resolution which improved SSIM by 0.01 and published a paper on the same at the IEEE EMBC 2020 conference.
· Analyzed, cleaned and preprocessed 1,000 real-life Knee MRI images for training AI models in biomedical imaging.

Healthcare Technology Innovation Centre(HTIC), IIT-Madras　　　　　May 2018 - July 2019
Research Intern　　　　　*Chennai, India*
· Achieved a top 20 position in the leaderboard of segmentation and classification challenges held by ISBI and SPIE Medical Imaging conferences.
· Conducted research using different architectures for the task of Super-resolution on Brain MRI.

PUBLICATIONS

- **MRI Super-resolution using Laplacian Convolutional Neural Networks with Isotropic Undecimated Wavelet Loss.** S.Ramanarayanan, B.Murugesan, **A.Kalyanasundaram**, S.Prabhakaran, S.Patil, M.Sivaprakasam. 42nd Annual International Conference of the IEEE Engineering in Medicine and Biology Society 2020 (EMBC 2020).

PROJECTS

View Consistent Rendering using Neural Textures
Created view consistent attention layers in the ControlNet architecture based on Stable Diffusion and further improved consistency by using NeRFs for temporal smoothening.

ChessLlama
Developed a Llama3.2-based language model trained on chess game data with PyTorch to generate chess moves. Utilized chess game datasets from HuggingFace and integrated evaluation metrics to assess model performance against existing chess engines, such as Stockfish.

Text-DiffScene: Text-driven 3D Scene Synthesis with Permutation Equivariant Graph Diffusion
Proposed a novel idea to generate 3D indoor scenes from just sentences using the ScanNet dataset. Diffusion models were used to generate objects and the layout, condtioned on text prompts.

Inverse Rendering by Shape, Light, and Material Decomposition from Images using Monte Carlo Rendering and Denoising
Developed and optimized inverse rendering for 3D scenes (geometry, lighting, material) from multi-view images using Monte Carlo rendering and denoising techniques.

3D Flow Solvers using Physics Informed Deep Learning
Our team worked on creating a dataset consisting of 3D simulations of karman vortices and the consequent vortex shedding. Developed physics informed 3D UNets which predicted the karman vortices in a recurrent fashion, which is 10 times faster than just the physics simulator. Done under Prof. Dr. Nils Thuerey's group.

3D Semantic Reconstruction from a Single RGB Image
Developed a novel transform, ensuring feature propagation of pretrained 2D models into the 3D space, thereby predicting 3D meshes of objects with semantic labels from a single RGB image. Done as a part of the elite ADL4CV course offered by Prof. Dr.Matthias Niessner's group at TUM.

COURSES

University Courses
- IN2064 Machine Learning
- IN2346 Introduction to Deep Learning
- IN2390 Advanced Deep Learning for Computer Vision : Visual Computing (elite course for the top 20 students.)
- IN2298 Advanced Deep Learning for Physics
- IN2375 Computer Vision III: Detection, Segmentation and Tracking
- IN2354 3D Scanning and Motion Capture

TECHNICAL SKILLS

Proficient in deep learning / machine learning techniques in computer vision and graphics with related programming languages and tools.

Skills:	Machine Learning, 3D Computer Vision, Generative AI, Large Language Models
Programming Languages:	Python, C++, MATLAB, SQL, Bash
Frameworks:	PyTorch, Keras, OpenCV, OpenGL, HuggingFace, scikit-learn, Pandas, Kivy
Developer Tooling:	Unix, Git, Google Cloud Platform (GCP), Amazon Sagemaker, MongoDB