Devikalyan Das

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Summary

I am a **Masters** in **Visual Computing** student at Universität des Saarlandes with a background in **3D vision and graphics** and 2+ years of **industrial experience**. I have completed my masters thesis in a joint collaboration between **CVMP Lab** at Saarland University and **MPI Informatics** under the guidance of Prof. Dr. Eddy Ilg and Dr Jan Eric Lenssen. For my thesis, I have developed an approach for the 3D reconstruction of dynamic objects from videos captured in a strictly monocular setup, which will enhance the content creation in AR and VR applications.

Education

Oct 2020 - Present **M.Sc. in Visual Computing** — *GPA: 1.4*
Universität des Saarlandes, Saarbrücken, Germany — (Best:1.0, Worst: 5.0)

May 2013 - May 2017 **B.Tech. in Electronics and Telecommunication** — *GPA: 8.04/10*
Veer Surendra Sai University of Technology, Burla, India — (Best:10.0, Worst: 5.0)

Experience

Nov 2022 - Present **Research Assistant** - *Supervisor: Prof. Dr. Eddy Ilg & Dr. Jan Eric Lenssen*
Max Planck Institute for Informatics, Saarbrücken, Germany

- Worked on **3D reconstruction** of dynamic objects from monocular videos using a **point-based rasterization** approach. [Arxiv Link]
- The method follows a two-stage approach that models the object's deformation using a **point template** obtained only from observations that drive high-quality reconstruction.
- It also achieves photorealistic as well as new view consistent reconstruction in **real-time**.
- This work has been accepted at **CVPR 2024**.

Jun 2020 - Sep 2020 **Deep Learning Intern** - *Supervisor: Prof. Dr. Shayam Lal*
National Institute of Technology, Karnataka, India

- Designed an automated liver cancer nuclei segmentation model for segmenting different classes of nuclei from histopathology images.
- Explored both CNNs and Transformer-based segmentation models.
- The project was fully funded by the Ministry of Electronics and Information Technology, Govt. of India, and completed with a very good rating.

May 2018 - Dec 2019 **Software Engineer**
Tech Mahindra Ltd, Bhubaneswar, India

- Designed and delivered data reporting solutions for Finance domains.
- Designed an end-to-end automated **data visualization** workflow using pandas, Matplotlib, and Plotly for creating quarter-close reports.
- Worked in an **agile environment**.

Projects

Jun 2021 - Jul 2022 **Perception Enhanced Super Resolution using GAN** [Report] [Code]
High Level Computer Vision, Saarland University

- Designed a GAN-based superresolution with wider activation channels, and a novel perceptual loss function based on LPIPS.
- Addressed the convergence issue of GAN-based super-resolution due to the deterministic behavior of the discriminator by making it stochastic through noise.

Jun 2021 - Jul 2022 **Automated Traffic Control Monitoring** [Report] [Code]
Data Science, Saarland University

- Designed an end-to-end ML pipeline to estimate traffic density from smartphone 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 interfacing.

Nov 2021 - Jan 2022 **Ray Tracing in C++** [Webpage] [Code]
Computer Graphics, Saarland University

- Built a ray tracer from scratch in C++, with salient features such as acceleration structures, distributed ray tracing, bump mapping, smooth triangles, Depth of Field, etc. for participating in the Rendering Competition of Saarland University.
- Won the BVH speed test by beating other teams in terms of speed of loading the triangle primitives of the scene.

Mar 2023 - Apr 2023 **Pokémon Diffusion** [Code]
Deep Generative Diffusion Models, Saarland University

- Built end-to-end diffusion model for generation of Pokémon images using DDPM approach.
- Incremented this approach with classifier-free guidance conditioned on the Pokémon types.

Skills

Knowledge 3D reconstruction, SLAM, Computer Vision, Deep Learning, Computer Graphics
Languages Python, C++, MATLAB, C, Bash, SQL
Libraries PyTorch, TensorFlow, OpenCV, PyTorch3D, Open3D, Scikit-learn, Pandas, OpenMP
Tools AWS, Docker, Slurm, Git, Mitsuba Renderer, Linux, CMake, LaTeX

Relevant Coursework

- **Image Synthesis:** Computer Graphics, Realistic Image Synthesis, Deep Generative Diffusion Models, CV and ML for Computer Graphics.
- **Image Analysis:** High-Level Computer Vision, Advanced Image Analysis, Digital Image Processing.
- **Image Capture:** Image Acquisition Methods, Ultrasound Imaging.
- **Artificial Intelligence:** Data Science, Machine Learning, Optimization for Machine Learning
- **Miscellaneous:** Embedded Systems, Digital Signal Processing, Data Structures and Algorithms.