Vemburaj Chockalingam Yadav

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📍 Trippstadter Strasse 115, 67663 Kaiserslautern, Germany
ℹ Date Of Birth : **01.10.1994**, Sex : **Male**, Nationality : **Indian**

☰ SKILLS

Programming	Python, C/C++, MATLAB, Simulink
Frameworks	**Tensorflow**, **Pytorch**, Scikit-learn, **OpenCV**, NumPy, SciPy, Pandas, Matplotlib
Distributed Computing	**CUDA**, Open MPI
Development Tools	**PyCharm**, Spyder, Visual Studio, **Git**
Operating Systems	Linux Ubuntu, Linux Centos, Windows
Practical Background	**Deep Learning**, **Computer Vision**, Convolutional Neural Networks, Graph Neural Networks, **Object Detection**, **Semantic Segmentation**, **Optical flow**
Languages	English (Fluent), German (Intermediate), Tamil (Mother tongue)

🎓 EDUCATION

October 2017 March 2021	Master of Science in Computational Sciences in Engineering (CSE) | Grade : 1.5 / 1.0 *Technische Universität Braunschweig (TU Braunschweig), Braunschweig, Germany* › Specialization : **Machine Learning, Scientific Computing, Computer Vision**
July 2012 June 2016	Bachelor of Technology in Mechanical Engineering | Grade : 8.6 / 10 *Veermata Jijabai Technological Institute (VJTI), Mumbai, India*
August 2010 May 2012	Higher Secondary School Education | Grade : 90.67 / 100 *Birla College of Arts, Science and Commerce, Kalyan, India*

💼 EXPERIENCE

March 2022
Present
	Researcher | Deutsches Forschungszentrum für Künstliche Intelligenz ()DFKI | Kaiserslautern, Germany
	  › Conducted research in computer vision, specializing in optical flow techniques, 3D reconstruction, and generalizable novel view synthesis, contributing to the development of advanced algorithms for motion estimation and free-viewpoint rendering.
	  › Incorporating object detection, depth estimation, and Visual SLAM techniques to create cutting-edge solutions for augmented reality and urban micro-mobility applications, enhancing the overall user interactions in social settings.
	  › Developed cross-platform compatible eXtended Reality (XR) applications with interactive data visualizations, and immersive flood visualizations on global-scale 3D maps for an EU project aimed at developing immersive functionalities for a user-in-the-loop experimentation framework.
	`Python` `C++` `C#` `Pytorch` `Unity` `Meta Quest` `Hololens` `Docker` `Mixed Reality Toolkit (MRTK3)`

June 2018
February 2022
	Student / Research Assistant | TU Braunschweig | Braunschweig, Germany
	Worked on a diverse range of projects applying computer vision, deep learning, predictive modeling, interactive mesh manipulation, computational modeling, physics-based solver development, embedded code generation, and software testing to address challenges in automotive and aerospace domains.
	  › Developed a machine learning framework to identify optimal sensor placements on vehicles and accurately predict aerodynamic forces and moments.
	  › Designed and implemented novel, memory-efficient physics-based solvers for simulating material deformations.
	  › Applied Object Detection and Multi-Object Tracking (MOT) techniques to detect and track the evolution of fragmented ice crystals across video frames.
	  › Enhanced an in-house Reduced-Order Modeling (ROM) library by developing interactive mesh manipulation plugins and performing rigorous testing using PyTest.
	`Python` `Pytorch` `Tensorflow` `OpenCV` `Scikit-learn` `Numpy` `Matplotlib` `ParaView` `MATLAB/Simulink` `Pytest`

September 2020 February 2021	**Research Assistant | German Aerospace Center (DLR) | Braunschweig, Germany** › Contributed towards the development of **user-focused driver assistance systems** for autonomous vehicles to reduce the subjective uncertainty of its users › Programmed an analysis pipeline with different data filtering and smoothing algorithms for the evaluation of **Eye-Tracking** and **Physiological data** from a real driving study › Developed **statistical models** for quantifying the arousal level of users of automated vehicles `Python` `Pandas` `Matplotlib`
April 2019 September 2019	**Intern | Automated Driving Research, Volkswagen AG | Wolfsburg, Germany** › Developed an automated tool for extracting and visualising the targets for **semantic and instance segmentation** training from the Multi-Label annotations obtained in raw JSON formats › Implemented and customized **Convolutional Neural Network** architecture based models to segment traffic participants from camera images for autonomous driving › Boosted the performance of the already existing deep learning models by incorporating the recent architectural advances in semantic segmentation › Developed a trigger function by detecting edges on the **projection of 3D LiDAR point clouds on 2D camera image space** to estimate the effectiveness of segmentation models in inference mode `Python` `Tensorflow` `NumPy` `Matplotlib` `OpenCV`

🖥 PROJECTS

August 2020 March 2021	**Master Thesis | Department of Computer Science, Technische Universität München** 🎧 *Simulation of Fluid Flows based on the Data-driven Evolution of Vortex Particles* › Investigated a novel approach for **deep learning** based animations for **computer graphics** with **point clouds** of vortex particles as the fluid representation › Conceptualized a Neural Network architecture to model inter-particle interactions and predict particle dynamics for flows in an open domain › Implemented the devised and a **Graph Neural Network** based approach for comparative evaluations › Boosted the performance of the models for flows in presence of solid boundaries by complementing it with a model based on **Physics-Informed Neural Networks** `Python` `Tensorflow` `Pytorch` ☑ `PhiFlow` `NumPy` `Matplotlib` `Github`
October 2019 February 2020	**Student Research Project | Institute of Communication Technology, TU Braunschweig** 🎧 *Self-Supervised Learning of Optical Flow from Camera Images* › Implemented a framework in Pytorch for **Unsupervised learning of Optical flow** with state-of-the-art network architectures and loss functions › Trained and evaluated models with different unsupervised loss settings on the **KITTI** dataset › Demonstrated the importance of specific self-supervision signals by achieving similar or better performances with three-times lower complexity models and without any pre-training on synthetic datasets `Python` `C++` `Pytorch` `NumPy` `Matplotlib` `CUDA` `Github`

📄 PUBLICATIONS

› Yadav, V., Pagani, A., Stricker, D. **OptSplat : Recurrent Optimization for Generalizable Reconstruction and Novel View Renderings**. Submitted to the British Machine Vision Conference (BMVC-2025). Under review.

› Yadav, V., Pagani, A., Stricker, D. **Dynamic Cost Volumes with Scalable Transformer Architecture for Optical Flow**. In : Irish Machine Vision and Image Processing Conference (IMVIP-2023), August 30 – September 1, 2023, Galway, Ireland.

› Yadav, V., Pagani, A., Stricker, D. **Camera-based Position Analysis System for Cyclists Ordering in Bicycle Swarms**. In : Workshop on Smart Urban Micromobility, Mensch und Computer (MuC-2023), September 3–6, 2023, Zürich, Switzerland.

› Nunnari, F., Avramidis, E., Yadav, V., Pagani, A., Hamidullah, Y., Mollanorozy, S., España-Bonet, C., Woop, E., Gebhard, P. **Towards Incorporating 3D Space-Awareness into an Augmented Reality Sign Language Interpreter**. In : Proceedings of the Eighth International Workshop on Sign Language Translation and Avatar Technology (SLTAT-2023), co-located with ICASSP 2023, June 10, Rhodes, Greece.