Vardeep Singh SANDHU

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SUMMARY

As a deep learning/computer vision engineer with a strong background in the field, I have a deep understanding of various neural network architectures and have hands-on experience in implementing computer vision models for **object detection**, **segmentation**, and **classification** tasks both in 2D and 3D. I am well-versed in programming languages such as **Python**, **C++** and have expertise in using deep learning frameworks such as **TensorFlow**, **PyTorch**, and **OpenCV**. I have also worked on endpoint deployment of Deep Learning models using **TensorRT** and **Cuda**. I have experience working with various types of data sets, including image, video, and point cloud data, and have a track record of delivering high-quality results on time and within budget. I am a dedicated, hardworking professional who is always looking to stay current with the latest advancements in the field, and I am excited to bring my skills and expertise to new challenges and opportunities.

EXPERIENCE

MOTORAI
March 2023 – Present

PERCEPTION ENGINEER (RADAR)

- Performed synchronization and extrinsic calibration of Radars with other sensors.
- Utilizing Radars for velocity estimation in the perception pipeline.
- Developed 3D object detector and tracking pipeline with low-level fused Radar and Lidar points.
- Developed TensorRT engine, Post-processor, and Pre-processor in Cuda for in-house 3D Object Detector model.
- **Improvement in the performance and inference speed of 3D Object Detector pipeline.**

CARIAD SE
May 2022 – Nov 2022

MASTER THESIS STUDENT

- Solved the task of "RADAR-based Moving Object Segmentation" in outdoor scenarios.
- Developed a novel transformer network in the temporal domain on the RadarScenes dataset to solve this task.
- **Achieved state-of-the-art results with 12% improvement over baseline.**

ROBIDIA GMBH
Jan 2022 – Mar 2022

COMPUTER VISION INTERN

- Developed an identity tracking and motion prediction suit for the camera slider.
- Implemented Kalman Filter-based motion prediction of the person-of-interest.
- The entire system worked at 60 fps which was critical for the smooth operation of the camera.
- **Resulted in four new enterprise customers.**

SCREWERK GMBH
Jun 2021 – Dec 2021

DEEP LEARNING INTERN

- Developed a deep network to classify camera images based on the density of screws.
- Established WebSocket connection of frontend UI with the Deep Learning model from scratch.
- **Resulted in full automation of the machine.**

STACHNISS LAB, UNIVERSITY OF BONN
Aug 2020 – Mar 2021

GRADUATE STUDENT ASSISTANT, HIWI

- Researched intensity calibration to improve the localization of the ego vehicle in LiDAR data.
- Implemented state-of-the-art research work in this domain.
- Developed a non-learning-based approach for the removal of dynamic objects from LiDAR scan.

EDUCATION

UNIVERSITY OF BONN
Oct. 2019 – Nov 2022

M.SC IN MOBILE SENSING AND ROBOTICS

- Studied courses like Computer Vision, Techniques of Self-Driving Cars, Mobile Sensing Robotics, Sensor and State Estimation, Deep Learning for Visual Recognition, and Point Cloud Processing.
- Took additional elective courses like Modern C++ for Computer Vision and Vision System which provided practical PyTorch and C++ experience.

Grade - 1.4

GURU NANAK DEV UNIVERSITY *Jul. 2013 – Apr. 2017*

B.TECH. IN ELECTRONICS AND COMMUNICATIONS ENGINEERING

• The course covered essential topics in Embedded Systems, Microelectronics, and mathematical topics like Linear Algebra, Statistics, and Higher-Order Calculus.
• I also took elective courses from the Computer Science Department like Computer Architecture and Fundamentals in Computer Sciences.
Grade - 1.7

PUBLICATIONS

Matthias Zeller, Vardeep S. Sandhu, Benedikt Mersch, Jens Behley, Michael Heidingsfeld, Cyrill Stachniss, **"Radar Velocity Transformer: Single-scan Moving Object Segmentation in Noisy Radar Point Clouds"** published at *IEEE International Conference on Robotics and Automation (ICRA)* (ICRA 2023).

PROJECTS

VIDEO FRAME PREDICTION USING CONVLSTM [CODE][REPORT] *Dec 2021 – Apr 2022*
• Developed deep video frame prediction model from scratch using ConvLSTM.
• The model predicted the future 10 frames given 10 seed frames.
• Researched different evaluation metrics and loss functions to improve the performance of the model.

MOVING OBJECT SEGMENTATION USING 3D LIDAR DATA [PAPER] *Oct. 2021 – April 2022*
• Developed deep neural network architecture for MOS on the SemanticKITTI dataset.
• Detected and tracked 3D objects over time to determine their motion.

3D OBJECT DETECTION AND PREDICTION FOR AUTONOMOUS VEHICLES *April 2021 – Sept 2021*
• Trained and tested SOTA 3D detectors on the Waymo Open dataset.
• Predicted the trajectories of the detected objects by utilizing Social GAN and Constant Velocity Model.

BAG OF VISUAL WORDS *April 2020 – Sept 2020*
• Solved the task of Place Recognition using the bag of visual words algorithm.
• Implementation was done in C++14 with more than 90% test completion.

SKILLS

PROGRAMMING LANGUAGES Python | C++ | CUDA | Java | Bash | MATLAB | LaTeX
FRAMEWORKS & LIBRARIES Jupyter | Matplotplib | Numpy | Pandas | Scikit-learn | Gym | PyTorch | Tensorflow
LANGUAGES ***Fluent:*** English ***Beginner:*** German

EXTRA

• Winner of Inter-University Olympiad 2014
• Voted as President of Campus Student Forum for the year 2016-2017