Sk Aziz Ali

skazizali.007@gmail.com | +49-15215025965 | https://cvi2.uni.lu/profile-sk-azi-ali | https://github.com/saali14

Research Interest

3D Computer Vision, Deep Learning and Machine Learning Methods for Resource-Constrained and Explainable AI, Intelligent Perception for Autonomous Driving Systems using Vision-Language models, Point Set Registration, Globally Consistent Scene and Shape Reconstruction, NLP + Geometric Deep Learning for Scan-to-CAD Reverse Engineering.

Education

Ph.D in Computer Science, RPTU Kaiserslautern, Germany *2017 - 2023*

- Thesis Title "Fast Robust Rigid and Non-Rigid Registration for Globally Consistent 3D Scene and Shape Reconstruction" (**Grade:** Summa Cum Laude, i.e., with Highest Distinction)

M.Sc in Computer Science, TU Kaiserslautern, Germany *2014 - 2017*

- Specialized in Computer Vision, Graphics, and Intelligent Systems (**Grade:** 2.0 i.e, 80%)

B.Tech in Information Technology, West Bengal University of Technology, India *2007 - 2011*

- Specialized in Data Structuring and Computer Science (**Grade:** 7.66 CGPA, i.e., 76.6%)

Research Experience

Postdoctoral Researcher, University of Luxembourg *Dec 2021 - Oct 2023*

- Conducting research at the CVI² (Computer Vision, Imaging and Machine Intelligence) group headed by Prof. Dr. Djamila Aouada.
- The main research areas focus on NLP and Geometric Deep Learning-Based 3D Reverse Engineering (RE) for CAD modeling from raw scans in close collaboration with world's one of the best 3D scanners production industry Artec3D (www.artec3d.com).

Scientific Researcher, German Research Center for Artificial Intelligence *Nov. 2018 - Nov. 2021*

- Worked on learning systems for 4D analysis of complex scenes at the Augmented Vision (AV) research group, headed by Prof. Dr. Didier Stricker.

Research Assistant, German Research Center for Artificial Intelligence *Sep. 2016 - Mar. 2017*

- Work on Point Set Registration and 3D Surface Reconstruction methods in Computer Vision and Pattern Recognition. The primary research task was to implement parallel Levenberg-Marquardt Optimization for Non-rigid Structure from Motion.

Research Assistant, German Aerospace Center (DLR) *Jan. 2016 - June. 2016*

- Worked on the scientific visualization and PUCK's failure tensor analysis on Fiber Reinforced Composite (FRC) materials that helps structure designing engineers of Shrouded Rotor Blades.

Research Assistant, Fraunhofer Institute for Industrial Mathematics, Germany *Jan. 2015 - Feb. 2016*

- Worked on Modular Algorithm for Volume Images, MAVI, obtained from PET, MRI, & CT -- Semantic Segmentation and Probabilistic Distribution analysis on Volume Images using RAndom Closed Sets (RACS).

Teaching Experience

University of Luxembourg Lectures on Course Module: Computer Vision and Image Analysis (CVIA) (SS2022)

RPTU Kaiserslautern TA on Course Module: CV, Object and People Tracking (SS2019)
TA on Course Module: Advanced Computer Vision and Deep Learning (SS2021)

Peer Reviewer

TPAMI 2022, IEEE/CVF 3DV 2021, 2023, CVPR 2021

Selected Publications

[1] Dimitrios Mallis, **Sk Aziz Ali**, Elona Dupont, Kseniya Cherenkova, Ahmet Serdar Karadeniz, Mohammad Sadil Khan, Anis Kacem, Gleb Gusev, Djamila Aouada, "SHARP Challenge 2023: Solving CAD History and pArameters Recovery from Point clouds and 3D scans. Overview, Datasets, Metrics, and Baselines", *In IEEE/CVF International Conference on Computer Vision (**ICCV**) workshop (2023).*

[2] **Sk Aziz Ali**, Djamila Aouada, Gerd Reis, Didier Stricker, "DELO: Deep Evidential LiDAR Odometry using Partial Optimal Transport", *In IEEE/CVF International Conference on Computer Vision (**ICCV**) workshop (2023).*

[3] Ahmet Serdar Karadeniz, **Sk Aziz Ali**, Anis Kacem, Elona Dupont, Djamila Aouada, "TSCom-Net: Coarse-to-Fine 3DTextured Body Shape Completion Network", *In European Conference for Computer Vision (**ECCV**) workshop 2022, doi: 10.1007/978-3-031-20062-5_1*

[4] Elona Dupont, Kseniya Cherenkova, Anis Kacem, **Sk Aziz Ali**, Iliya Aryhannikov, Djamila Aouada, "CADOps-Net: Jointly Learning CAD Operation Types and Steps from Boundary-Representations", *In IEEE/CVF International Conference on 3D vision (**3DV**) 2021.*

[5] Jameel Malik, Soshi Shimada, Ahmed Elhayek, **Sk Aziz Ali**, Vladislav Golyanik, Christian Theobalt, Didier Stricker , "HandVoxNet++: 3D Hand Shape and Pose Estimation using Voxel-Based Neural Networks", *In IEEE Transactions on Pattern Analysis and Machine Intelligence (**TPAMI**) 2021, doi: 10.1109/TPAMI.2021.3122874.*

[6] **Sk Aziz Ali**, Kerem Kahraman, Gerd Reis, Didier Stricker , "RPSENet: nd-to-End Trainable RigidPoint Set Registration Network using Barnes-Hut 2^D-Tree Representation", *In IEEE /CVF Conference on Computer Vision and Pattern Recognition (**CVPR**) 2021.*

[7] **Sk Aziz Ali**, Kerem Kahraman, Christian Theobalt, Didier Stricker, Vladislav Golyanik, "Fast Gravitational Approach for Rigid Point Set Registration with Ordinary Differential Equations", *In IEEE **Access** Journal 2021, doi: .*

[8] **Sk Aziz Ali**, Sikang Yan, Wolfgang Dörnisch, Didier Stricker, "FoldMatch: Accurate and High Fidelity Garment Fitting Onto 3D Scans", *In IEEE International Conference for Image Processing (**ICIP**) 2020.*

[9] Jameel Malik, Ibrahim Abdelaziz, Ahmed Elhayek, Soshi Shimada, **Sk Aziz Ali**, Vladislav Golyanik, Christian Theobalt, Didier Stricker, "HandVoxNet: Deep Voxel-Based Network for 3D Hand Shape and Pose Estimation from a Single Depth Map", *In IEEE International Conference on Computer Vision and Pattern Recognition (**CVPR**) 2020.*

[10] **Sk Aziz Ali**, Vladislav Golyanik, Didier Stricker, "NRGA: Gravitational Approach for Non-rigid Point Set Registration", *In IEEE/CVF International Conference on 3D Vision (**3DV, Oral**) 2018.*

[11] Vladislav Golyanik, **Sk Aziz Ali,** Didier Stricker, "Gravitational Approach for Point Set Registration", *In IEEE/CVF In IEEE International Conference on Computer Vision and Pattern Recognition (**CVPR**) 2016.*

International Workshops

[1] Organizing Committee Member of SHARP (Solving CAD History and pArameters Recovery from Point clouds and 3D scans) Workshop In IEEE International Conference on Computer Vision (**ICCV**) 2023, https://cvi2.uni.lu/sharp2023/

[2] Technical Committee Member of SHApe Recovery from Partial Textured 3D Scans (**SHARP**) Workshop, IIn IEEE/CVF International Conference on Computer Vision and Pattern Recognition (**CVPR**) 2023, https://cvi2.uni.lu/sharp2022/

Invited Talks

- On "Robust Registration, Reconstruction and Reverse Engineering of 3D Shapes/Scene" at the Indian Institute of Science (IISc), - on **Jan, 23**
- On "Robust Registration, Reconstruction and Reverse Engineering of 3D Shapes/Scene" at TCS research - **Feb, 2023**

Skills

- **Deep Learning:** PyTorch, TensorFlow, Keras
- **Programming-Languages:** Python, C++, CUDA, R
- **Latex Coding:** Advanced Scientific Writing
- **HPC:** Distributed Model Training, Sharding
- Advance PyTorch-Lightning, Expert in several Scientific Visualization Simulation, Data-Science tools
- Creative Thinking