Farzeen MUNIR
Deep Learning and Visual Perception Professional

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Skillful and adaptable professional with experience in developing deep learning based visual perception solutions for robotics and computer vision applications.

EDUCATION

2017-Expected 19.Aug,2022	**PhD**, Electrical Engineering and Computer Science, Gwangju Institute of Science and Technology (GIST), Gwangju, South Korea. **Thesis:**" Dynamic visual perception for Autonomous vehicles". **Research Area :** Deep learning , Autonomous Driving, Visual Perception and Representation Learning)
2014-2015	**MS**, System Engineering, Pakistan Institute of Engineering and Applied Sciences (PIEAS), Pakistan. **Thesis:** "Spatio-Temporal Visual Object Tracking".
2009-2013	**BS**, Electrical Engineering, Pakistan Institute of Engineering and Applied Sciences (PIEAS), Pakistan. **Thesis:**"Implementation of motor control system for Humanoid Arm.".

EXPERIENCE

Mar'2017 – Aug'2022 — **Graduate Researcher, Machine Learning and Vision Lab, EECS, GIST, Gwangju, South Korea**

In this role, I successfully carried out research on the visual perception of the autonomous vehicle at Machine Learning and Vision Lab, Gwangju Institute of Science and Technology (GIST), Gwangju, South Korea. I explored the effectiveness of non-traditional sensors such as thermal cameras and dynamic vision sensors in autonomous vehicle perception.

Key achievements :

- Successfully developed the perception module of the autonomous vehicle using the limited amount of sensors suite.
- Successfully designed a convolutional encoder-decoder architecture for lane segmentation using the dynamic vision sensor.
- Explored the thermal camera in the context of sensor fusion with the RGB camera for robust object detection in the low-illumination conditions.
- Successfully developed a self-supervised contrastive learning approach for object detection by fusing feature representation obtained from traditional RGB and Thermal cameras.
- Published the research in peer-reviewed journals and international conferences as lead author and co-author.

Sep'2016 – Mar'2017 — **Research Assistant, Machine Learning and Vision Lab, EECS, GIST, Gwangju, South Korea**

- Successfully carried out research for calibrating the Lidar and camera for far-away object detection.
- Successfully developed the HD-map for the autonomous vehicle localization in the known environment.

Jan'2014 – Nov'2015 — **Researcher, Pakistan Institute of Engineering and Applied Sciences, PIEAS, Pakistan**

- Successfully developed a new tracking algorithm and a real-time application for controlling the computer mouse cursor by tracking eye movements.
- Developed a spatio-temporal context learning algorithm combined with Kalman filter that helps the tracker to model the dynamics of the motion of the target.
- Successfully designed a real time wearable eye tracker, that tracks the eye movement to control a computer mouse cursor.

Transferable Skills

ML/DL	CNN, RNN/LSTM, Transformers, VAE, GAN.
Programming	Python, Javascript
DL Libraries	Pytorch, Keras
Computer Vision	Semantic Segmentation, Object detection
Middleware	Robot Operating System (ROS)
Autonomous Driving Datasets	CamVid, Cityscapes, NuScenes, Lyft, ApolloScapes, Agroverse, Udacity, Davis Driving Dataset
Autonomous Driving Simulation Softwares	Autoware, CARLA, CarMaker
Operating System	Linux (Preferable), Windows, Docker (virtualization)
Office Automation	LaTeX, Pack Office(Word, Excel, PowerPoint).

Publications

Journals

- **F. Munir**, S. Azam, M.A. Rafique, A.M. Sheri, M. Jeon and W. Pedrycz, "Exploring thermal images for object detection in underexposure regions for autonomous driving", Applied Soft Computing (IF : 6.725), Accepted, March 2022
- **F. Munir**, S. Azam, M. Jeon, B. Lee and W. Pedrycz, "LDNet : End-to-End Lane Marking Detection Approach using a Dynamic Vision Sensor", IEEE T. Intelligent Transportation Systems (IF : 6.492), accepted, June 2021.
- Y. Ko, Y. Lee, S. Azam, **F. Munir**, M. Jeon and W. Pedrycz. "Key Points Estimation and Point Instance Segmentation Approach for Lane Detection", IEEE T. Intelligent Transportation Systems (IF : 6.492), June 2021.
- S. Azam, **F. Munir**,M. A. Rafique, AM. Sheri, MI Hussain and M. Jeon, "N2C : Neural Network Controller Design Using Behavioral Cloning", IEEE Transactions on Intelligent Transportation Systems (IF : 6.492). Jan 2021.
- S. Azam, **F. Munir**, A.M. Sheri, J. Kim and M. Jeon, "System, Design and Experimental Validation of Autonomous Vehicle in an Unconstrained Environment", Sensors (IF : 3.576), accepted, Oct 2020.
- V. Dinh, , **F. Munir** , S. Azam , K. Yow and M. Jeon, "Transfer Learning for Vehicle Detection Using Two Cameras with Different Focal Lengths" , Information Sciences (IF : 6.795), Vol. 514, April 2020, Pages 71-87.
- V. Dinh, **F. Munir**, A.M. Sheri, M. Jeon, " Disparity Estimation Using Stereo Images with Different Focal Lengths" IEEE T. Intelligent Transportation Systems (IF : 6.492), accepted, Nov 2019.
- **F. Munir**, S.Gul, A. Asif, and, A. Minhas, "MILAMP : multiple instance prediction of amyloid proteins." IEEE/ACM Transactions on Computational Biology and Bioinformatics, (IF : 2.428), accepted, Aug 2019.

Conferences

- Zafran Khan, Ishfaq Hussain, **Farzeen Munir**, Unse Fatima, Shoaib Azam and Moongu Jeon, "Modified RC Car for uni-modal Autonomous Parking", Korea Software Congress 2021, 2021.12.20 - 12.22. (Domestic)
- **Farzeen Munir**, Shoaib Azam, Unse Fatima and Moongu Jeon, "ARTSeg : Employing Attention for Thermal images Semantic Segmentation", Asian Conference on Pattern Recognition (ACPR), Jeju, Korea, Nov. 2021.
- **Farzeen Munir**, Shoaib Azam, and Moongu Jeon, "SSTN : Self-Supervised Domain Adaptation Thermal Object Detection for Autonomous Driving", IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) in Prague, Czech Republic. Sept.27-Oct.1, 2021.
- Shoaib Azam, **Farzeen Munir**, Unse Fatima and Moongu Jeon, "EMGNet : Driver' s Intent Prediction using Neurosignals", 36th ICROS, Yeosu, South Korea, 2021.06.23-06.25. (Domestic)
- Shoaib Azam, **Farzeen Munir** and Moongu Jeon, "Channel Boosting Feature Ensemble for Radar-based Object Detection", IEEE Intelligent Vehicles Symposium (IV), Nagoya University, Nagoya, Japan , July 11-15, 2021.
- **Farzeen Munir**, Shoaib Azam, Hwang Seong-min, Jeong Ji-hoon and Moongu Jeon. "Semantic Mapping and Autonomous Navigation using TurtleBot ", Korea Software Congress 2020, (Domestic)

- **Farzeen Munir**, Shoaib Azam, and Moongu Jeon. "Visuomotor Steering angle Prediction in Dynamic Perception Environment for Autonomous Vehicle ", IEEE International Conference On Consumer Electronics (ICCE) Asia, 2020.

- Muhamamd Ishfaq Hussain, Shoaib Azam, **Farzeen Munir**, Zafran Khan, and Moongu Jeon, "Multiple Objects Tracking using Radar for Autonomous Driving", IEEE International IOT, Electronics and Mechatronics Conference (IEMTRONICS), Online, September 9-12, 2020.

- Shoaib Azam, **Farzeen Munir** and Moongu Jeon, "Dynamic Control System Design for Autonomous Car", 6th International Conference on Vehicle Technology and Intelligent Transportation Systems, Prague, Czech, May 2-4, 2020.

- Linh Van Ma, Shoaib Azam, **Farzeen Munir**, Jinho Choi and, Moongu Jeon, "Automated Taxi Booking Operations for Autonomous Vehicles", IEEE International Conference on Signal Processing and Communication Systems (ICSPCS), Gold Coast, Australia, 2019.

- **Farzeen Munir**, Shoaib Azam, Ko Yoengmin, Jihyo Jeon and Moongu Jeon. "Motion Prediction and Obstacle Avoidance for Self-driving Car", Korea Software Congress, 2019. (Domestic).

- Shoaib Azam, **Farzeen Munir**, Ahmad Muqeem Sheri, Ishfaq Hussain, YeongMin Ko and Moongu Jeon, "Data fusion of Lidar and Thermal Camera for Autonomous driving", Applied Industrial Optics Meeting, Washinton DC, USA, July 8-10, 2019.

- **Farzeen Munir**, Shoaib Azam, Ahmad Muqeem Sheri, YeongMin Ko and Moongu Jeon, "Where Am I : Localization and 3D Maps for Autonomous Vehicles", VEHITS, Crete, Greece, May 2-5, 2019.

- **Farzeen Munir**, Shoaib Azam, Ishfaq Hussain, Ahmad Muqeem Sheri, and Moongu Jeon, "Autonomous Vehicle : The Architectural Aspect of Self Driving Car", Sensors, Signal and Image Processing(SSIP), 2018, Prague, Czech.

- Shoaib Azam, **Farzeen Munir**, Aasim Rafique, YeongMin Ko, Ahmad Muqeem Sheri and Moongu Jeon, "Object Modeling from 3D Point Cloud Data for Self-Driving Vehicles", IEEE Intelligent Vehicles Symposium(IV) 2018, June 25-30, China.

- **Farzeen Munir**, Shoaib Azam, Aasim Rafique, and Moongu Jeon, "Automated Labelling of 3D Point Cloud Data", Korea Software Congress, 2017. (Domestic).

- **Farzeen Munir**, Fayyaz Minhas, Abdul Jalil and Moongu Jeon, "Kalman Extended Spatio-Temporal Context Filtering for Real Time Eye Tracking", International Workshop of Pattern Recognition (IWPR), May 1-3, 2017, Singapore

References

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