

# Dr. Ashraf Siddique

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## Employment History

2022 – . . . . .  **AI and Computer Vision Engineer**, OPIN INC. , South Korea.  
Developing deep learning vision solution for industrial automation requires creating a robust and scalable API for **Defect Detection, Object Detection, Semantic Segmentation, and Anomaly Detection**. Additionally, tasks include **Camera Calibration, Object Alignment, and Image Enhancement**. Develop Deep Learning Training and inference API for EVT (Eye Vision Technology [www.evt-web.com](http://www.evt-web.com)).

2015 – 2022  **Research Assistant**, PerCV Lab, Kyung Hee University, South Korea.  
Learning computer vision algorithms and deep learning techniques, Developing novel ideas in the fields of **Semantic Segmentation, Video Processing in 3D Space, and 3D Reconstruction**.

2013 – 2015  **Technical Analyst**, Standard Chartered Bank, Dhaka, Bangladesh.  
Desktop support for in-house banking software

## Education

2015 – 2022  **MS and Ph.D. (Combined), Computer Science and Engineering**, Kyung Hee University, South Korea  
Thesis Title: **Object-wise Video Synthesis and Editing in Epipolar Geometry of 3D Space**.

2009 – 2012  **BSC. Institute of Information Technology**, University of Dhaka, Bangladesh.

## Research Publications

### Journal Articles

- 1 A. Siddique and S. Lee, "Sym3dnet: Symmetric 3d prior network for single-view 3d reconstruction," *Sensors*, vol. 22, no. 2, p. 518, 2022.
- 2 A. Siddique and S. Lee, "Object-wise video editing," *Applied Sciences*, vol. 11, no. 2, p. 671, 2021.
- 3 S. Rahman, H.-J. Jeong, A. Siddique, Y.-J. Moon, and B. Lawrance, "Near-real-time 3d reconstruction of the solar coronal parameters based on the magnetohydrodynamic algorithm outside a sphere using deep learning," *The Astrophysical Journal Supplement Series*, vol. 271, no. 1, p. 14, 2024.
- 4 S. Rahman, A. Siddique, S. Shin, *et al.*, "Fast reconstruction of 3d density distribution around the sun based on the mas by deep learning," *The Astrophysical Journal*, vol. 948, no. 1, p. 21, 2023.
- 5 M. I. Hossain, A. Siddique, M. A. Hossain, M. D. Hossain, and E.-N. Huh, "Batch entropy supervised convolutional neural networks for feature extraction and harmonizing for action recognition," *IEEE Access*, vol. 8, pp. 206 427–206 444, 2020.
- 6 S. Rahman, Y.-J. Moon, E. Park, A. Siddique, I.-H. Cho, and D. Lim, "Super-resolution of sdo/hmi magnetograms using novel deep learning methods," *The Astrophysical Journal Letters*, vol. 897, no. 2, p. L32, 2020.

## Conference Proceedings

- 1 A. Siddique and S. Lee, "Video inpainting for arbitrary foreground object removal," in *2018 IEEE Winter Conference on Applications of Computer Vision (WACV)*, IEEE, 2018, pp. 1755–1763.
- 2 S. Rahman, Y.-J. Moon, and H.-J. Jeong, "Near real-time construction of solar coronal parameters based on mas by deep learning," in *AAS/Solar Physics Division Meeting*, vol. 55, 2023, pp. 110–09.
- 3 S. Rahman, S. SHIN, H.-J. Jeong, Y.-J. Moon, and A. Siddique, "Fast construction of 3-d solar coronal density distribution based on mas simulation by deep learning," in *AGU Fall Meeting Abstracts*, vol. 2021, 2021, SH25F-2156.
- 4 A. Siddique and S. Lee, "Video inpainting for object removal," 2016, pp. 1078–1080.

## Projects

2024 – · · · ·

- **3D Alignment for Precision Logo Printing on Baseballs**  
This framework aligns a baseball to a canonical orientation for accurate logo printing by calculating its rotation along the x, y, and z axes. First, three calibrated cameras capture images of the baseball, each positioned to reveal most of the seams. Then, a deep-learning model detects the 2D seam points in each view. By intersecting these 2D seam points with a virtual 3D spherical model of the baseball, the framework reconstructs the 3D seam points. Finally, the baseball's rotation is determined by comparing these calculated 3D seam points to the canonical seam points, enabling precise alignment for logo application.

2023 – 2024

- **Industrial Defect Detection via Semantic Segmentation**  
Develop a training and inference API for EVT's Drag and Drop Vision Software using U-Net and Deeplabv3 models for semantic segmentation. This API will enable pixel-level detection of defects like scratches, dents and other anomalies, tailored for production industries.

2022 – 2023

- **Unsupervised Anomaly Detection**  
Develop an API using unsupervised anomaly detection for industry automation. The API employs a variational auto-encoder (VAE) to train and test a single-class anomaly detection. The model learns from images (without anomalies) to generate similar images, enabling it to detect anomalies by comparing input images (with anomalies) with the generated output.
- **Text detection-recognition**  
Develop a plugin for EVT that receives an image as input, allowing it to identify the text's position within the image and accurately recognize the text as a string.

2019 – 2021

- **Single-View 3D Reconstruction**  
We propose Sym3DNet for single-view 3D object reconstruction, which employs a 3D reflection symmetry structure prior of an object. On the ShapeNet13 dataset, it achieves a 0.68 IoU and 0.44 F-score.

2016 – 2020

- **Object-Wise Video Editing**  
We introduce a 3D-based video editing method that calculates scene details like camera parameters and depth using techniques like SfM, SLAM, and bundle adjustment. Our approach removes objects, inpaints the video, stabilizes it, and creates new views. Our inpainting work was published in WACV 2018.

## Skills

Languages	■ Bangla and English.
Coding	■ C++, Python, Matlab
Tools	■ Tensorflow, Pytorch, OpenCV, Blender, SLAM, GitHub, CUDA
Application	■ 3D Reconstruction, Semantic Segmentation, Anomaly Detection, OCR, Camera Calibration, Object Detection

## Miscellaneous Experience

### Awards and Achievements

2015-2018	■ <b>Presidency Scholarship</b> , Kyung Hee University, S. Korea.
2002-2008	■ <b>Best Player award for Basketball, Soccer, Hokey and Cricket</b> , Jhenidah Cadet College.

## References

<b>Seungkyu Lee</b> Associate Professor Department of Computer Science and Engineering Kyung Hee University seungkyu@khu.ac.kr	<b>Yong-Jae Moon</b> Professor Department of Astronomy and Space Science Kyung Hee University moonyj@khu.ac.kr
<b>Kazi Muheymin-Us-Sakib</b> Professor Institute of Information Technology University of Dhaka muheymin@gmail.com	