








Antyanta BANGUNHARCANA

Student Researcher | 3D Computer Vision / Robot Perception / Deep Learning

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As a dedicated computer vision researcher, I am currently pursuing a Ph.D. in the Mechatronics, Systems, and Control (MSC) Lab at KAIST's Department of Mechanical Engineering, under the mentorship of Prof. Soohyun Kim and Prof. KyungSoo Kim. My research expertise encompasses a broad spectrum of 3D computer vision applications, specifically emphasizing (self-)supervised depth estimation via monocular or stereo cameras, visual odometry and SLAM, and long-term visual localization. With a strong foundation in these areas, I am committed to advancing the field and contributing to innovative solutions.

EDUCATION

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- | | |
|----------------|--|
| 2019 - present | PhD in Mechanical Engineering Korea Advanced Institute of Science and Technology (KAIST)
Recipient of KAIST International Student Scholarship 2019-2023.
Thesis - <i>Deep Iterative Refinements for Long-term Visual Localization</i> .
Expected graduation date : February 2024 |
| 2017 - 2019 | MSc in Mechanical Engineering Korea Advanced Institute of Science and Technology (KAIST)
Recipient of KAIST International Student Scholarship 2017-2019.
Thesis - <i>3D Object Detection in Disparity Space Using Context Guided Stereo Matching</i> . |
| 2013 - 2017 | BSc in Mechanical Engineering Korea Advanced Institute of Science and Technology (KAIST)
Recipient of KAIST International Student Scholarship 2013-2017. |

PUBLICATIONS

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- | | |
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| DUALREFINE : SELF-SUPERVISED DEPTH AND POSE ESTIMATION THROUGH ITERATIVE EPIPOLAR SAMPLING AND REFINEMENT TOWARD EQUILIBRIUM | 2023 |
|  github.com/antabangun/DualRefine  antabangun.github.io/projects/DualRefine
Antyanta Bangunharcana , Ahmed Magd Aly, and Kyung-Soo Kim
To be presented at the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2023 | |
| REVISITING THE RECEPTIVE FIELD OF CONV-GRU IN DROID-SLAM | 2022 |
| Antyanta Bangunharcana , Soohyun Kim, and Kyung-Soo Kim
In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2022, pp. 1906-1916 | |
| ROBOTIC MAPPING APPROACH UNDER ILLUMINATION-VARIANT ENVIRONMENTS AT PLANETARY CONSTRUCTION SITES | 2022 |
| Hong, Sungchul, Pranjay Shyam, Antyanta Bangunharcana , and Hyuseoung Shin
In Remote Sensing 14, no. 4 (2022) : 1027 | |
| VISUAL SLAM-BASED ROBOTIC MAPPING METHOD FOR PLANETARY CONSTRUCTION | 2021 |
| Hong, Sungchul, Antyanta Bangunharcana , Jae-Min Park, Minseong Choi, and Hyu-Soung Shin
In Sensors 21 (22), 7715 | |
| CORRELATE-AND-EXCITE : REAL-TIME STEREO MATCHING VIA GUIDED COST VOLUME EXCITATION | 2021 |
|  github.com/antabangun/coex  antabangun.github.io/projects/CoEx
Antyanta Bangunharcana , Jae Won Cho, Seokju Lee, In So Kweon, Kyung-Soo Kim, and Soohyun Kim
In 2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), pp. 3542-3548. IEEE, 2021 | |
| RETAINING IMAGE FEATURE MATCHING PERFORMANCE UNDER LOW LIGHT CONDITIONS | 2020 |
| Pranjay Shyam, Antyanta Bangunharcana , and Kyung-Soo Kim
In 2020 20th International Conference on Control, Automation and Systems (ICCAS), pp. 1079-1085. IEEE, 2020 | |

PROJECTS

ADVANCED DENTAL X-RAY IMAGE ENHANCEMENT FOR DIAGNOSTIC SUPPORT

2021 - 2022

Collaboration : DIGIRAY Corp

Description : Designed an image enhancement software for dental X-ray images utilizing contrast amplification and deep-learning-based super-resolution techniques. The software aids dentists in making diagnoses by reducing noise and enhancing the images to high-resolution. Implemented in C++ and using TensorRT for model conversion, the system enables inference on $\sim 4000 \times 4000$ resolution images within 1 second.

Python PyTorch Keras OpenCV TensorRT C++

VISION-BASED TERRAIN MAPPING ON A LUNAR ROVER FOR PLANETARY CONSTRUCTION

2019 - 2021

Collaboration : Korea Institute of Civil Engineering and Building Technology

Description : Developed camera-based terrain mapping software for a lunar rover using state-of-the-art self-supervised depth estimation and SLAM techniques. The system operates close to real-time (~ 15 fps) on a laptop with RTX 3070, mapping a terrain area of $50\text{m} \times 40\text{m}$.

Python PyTorch OpenCV ROS

AUTOMATED FILLET WELD GAP DETECTION AND CLASSIFICATION

2019 - 2020

Collaboration : Hyundai Heavy Industry

Description : Engineered an innovative welding solution employing a custom-built 4k resolution stereo camera to detect and classify fillet weld gaps. As welding is a hazardous process, automating it can significantly reduce the risk of human injury. By collecting and training our system on a targeted dataset, the software achieved a 1mm precision in detecting welding gaps with the camera positioned at a distance of approximately 1 meter.

Python PyTorch OpenCV MATLAB ROS

MSC LAB AUTONOMOUS ELECTRIC VEHICLE DEVELOPMENT

2018 - 2023

Description : Contributed to the research and development of MSC Lab's autonomous electric vehicle, focusing on vision-based systems. Key responsibilities included surround-view depth estimation, visual odometry and localization, 3D object detection, and traffic sign, light, and line detection, classification, and segmentation.


Python PyTorch OpenCV TensorRT C++ ROS

AWARDS

2ND PLACE - ROBOTIC VISION SCENE UNDERSTANDING (RVSU) CHALLENGE

2022

As part of the CVPR 2022 Embodied AI Workshop.


 Robotic Vision Scene Understanding Challenge : MSCLab Report

Bangunharcana, Antyanta, Soohyun Kim, and Kyung-Soo Kim

HONORABLE MENTION (=2ND PLACE) - ARGOVERSE STEREO DEPTH ESTIMATION CHALLENGE

2022

As part of the CVPR 2022 Workshop on Autonomous Driving.

 Deep Equilibrium Model for Memory Efficient Stereo Matching on the High-Resolution Argoverse Dataset

Bangunharcana, Antyanta, Soohyun Kim, and Kyung-Soo Kim

LANGUAGES

Indonesian ● ● ● ● ●
English ● ● ● ● ○
Korean ● ● ○ ○ ○

SKILLS

Programming Languages Python, MATLAB, C++
Frameworks PyTorch, Keras, OpenCV, TensorRT, ROS