# YONGYUN SONG

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# Research Interests

- **3D Reconstruction**
- **Pattern Analysis**
- **Segmentation**
- **SLAM**
- **Object Detection**
- **Motion Estimation**
- **Computer Vision**
- **Semi-supervised Learning**
- **Camera Calibration**

# Education

**Mar. 2016 – Current**

**Hanyang University** *Ansan, Korea*
B.S in Electrical Engineering (Major)
B.S in Mathematics (Dual Major)

- Expected graduation in February 2023
- GPA 3.24/4.0 (89.9%)

**Sep. 2020 – June. 2021**

**Senior Project**
Carried out an end-to-end project to detect turtlenecks for people's health.

- The model can operate in real time with 1,000 small pieces of data, using Transfer learning which is already learned with 60,000 pieces of COCO data.
- Tuned hyperparameters and used an early stopping.
- Data collection was done with MongoDB.

# Work Experiences

**Sep. 2021 – Feb. 2022**

**Korea Electric Power Research Institute** *Daejeon, Korea*
*Intern (paid $1,394/Month)*
Worked in the robotics department and participated in Development of Integrated Operation Technology for Anti-drone Protection of Electricity Facilities (R20IA03) and built drone detection system to prohibit a drone from coming to an electrical substation. Besides I

made autonomous patrol robots using Turtlebot3, Jetson tx1, lidar, and IMU sensor for the electrical substation in Korea Electric Power Research Institute where It is a national research institute established for electricity supply in South Korea.

- Cropped out a large video data one by one in 40 frames to prevent overfitting due to similar data and backgrounds.
- Connected AI and robot with ROS programming.
- Created an autonomous robot using SLAM algorithm to be mapping and localization, if a person falls, the topic is handed over and checked on the server computer.
- Utilize camera calibration and pose estimation.

**Jan. 2021 – Feb. 2021**

## DeepInsight Corp. *Pangyo, Korea*

*Intern (paid $1,255/Month)*

Development of Intelligent Image Security System Technology Based on Integrated 2D/3D Image Analysis of Unmanaged Store Environment project at Deep Insight Corp., which creates artificial intelligence technology and 3D sensing technology.

- Researched 3D-vision with dissertations.
- Designed 3d point cloud center-based detection using the abnormal behavior detection algorithm and kalman filter.

**Dec. 2019 – Dec. 2020**

## Hanyang University *Ansan, Korea*

*Undergraduate Research Assistant (paid $209/Month)*

Participated in projects such as a Whole-Scene 3D Video Reconstruction of General Environments Containing Dynamic Deformation, Reconstruction of Super Resolution 3D Shape Using Multi-Projector, Visual Memory Storage and Collection Networking in Professor Lee Min-sik's 3D computer vision laboratory.

- Created a hierarchical agglomerative clustering algorithm by Euclidean distance to understand PointNet++ dissertation.
- Preprocessing data, converting the 3D point cloud to a 2D image using intrinsic and extrinsic matrix.
- The converted 2D image’s background acting as noise was removed using the Solov1 instance segmentation algorithm.
- The data removed noise background was used to increase detection accuracy with both MMDetection and Detectron2 algorithms.

- Visualized 3d embedding space to compare prediction to ground truth.

**Jul. 2017 – Aug. 2017**

**Hanyang University** *Ansan, Korea*
*Undergraduate Research Assistant (paid $139/Month)*
Studied and presented computer vision at the weekly seminar to lay the foundation for Professor Lee Min-sik's 3D computer vision courses.

- Studied how to operate Linux operating system.
- Programmed coin detection algorithms using Hough Transform and Canny edge on Matlab.

# Major Courses Taken

- **Machine Learning**
  *Prof. Dai-Gyoung Kim*
- **C programming**
  *Prof. Scott Uk-Jin Lee*
- **Calculus 1,2**
  *Prof. Joonwoo Bae, Eunsang Kim*
- **Linear Algebra**
  *Prof. Kyungyul Ryu*
- **General Topology**
  *Prof. Hyeyoung Jung*
- **Graph Theory**
  *Prof. Seoung-Soo Kim*
- **Matrix Analysis**
  *Prof. Eunsang Kim*
- **Probability & Stochastic Processes**
  *Prof. Minsik Lee*
- **Optimization And Applications**
  *Prof. Dai-Gyoung Kim*

# Technical Skills

**Languages:** Python, C++, Matlab, ROS

**Technologies/ Frameworks:** Linux, Pytorch, GitHub, Docker, Mongo DB, Open CV, CUDA

# Services and Activities

**Jun. 2022 - Current**

- Taught students deep learning of multi-layer perceptron, loss, backpropagation.

**Jan. 2022 - Apr. 2022**

- Taught foreign students Korean of grammar and vocabulary.

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| **Oct. 2020 - Jan. 2022** | • Participated in the reading club at Reading Us Club and played a role in a MC to discuss smoothly a lot of agendas with morality, such as a frozen person, an AI, a gender issue, etc. |
| **Apr. 2020 – Sep. 2020** | • Donated regularly at Save the Children. |
| **Sep. 2019** | • Played guitar in an apartment festival, wishing to eradicate Covid-19. |
| **Aug. 2019** | • Played guitar in a police retirement ceremony when I served in an army as a police officer. |
| **Oct. 2019** | • Memorized 12 songs and played the guitar outside with a successor to the army. |
| **Apr. 2017 – Jun. 2018** | • Participated in the kendo club at the University and play a role in a kendo teacher to teach a freshman. |

# Certifications

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| **Aug. 2022** | 3D Reconstruction Multiple Viewpoints - *Coursera* |
| **Apr. 2022** | IELTS OVERALL 6.5 (Listening 7.5, Reading 7.0, Writing 6.0, Speaking 6.0) |
| **Sep. 2021** | Chinese Character Qualification Test Level 3 - *Korea Association for the Promotion of Hanja Education* |

# References

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