

EDUCATION

PhD in Computer Vision and Machine Learning

- Supervised by Prof. [Roberto Cipolla](#) ([Machine Intelligence Laboratory](#))
- **Research interest:** 3D reconstruction from monocular image/video

University of Cambridge

Oct 2019 - Present

MPhil in Machine Learning and Machine Intelligence

- **Commendation** (final mark: 73/100)
- **Dissertation:** Approximate Depth Estimation in Colonoscopy Images

University of Cambridge

Oct 2018 – Sep 2019

BSc in Physics

- **First Class Honours** (final mark: 84/100)
- **Awards:** Best 3rd Year Project, Best Performance in Laboratory Physics, Gordon Rogers Scholarship (3,000 GBP)

King's College London

Sep 2012 – Aug 2015

PUBLICATIONS

Estimating and Exploiting the Aleatoric Uncertainty in Surface Normal Estimation

ICCV (Oral)

Gwangbin Bae, Ignas Budvytis, Roberto Cipolla

2021

- Estimated and evaluated the aleatoric uncertainty in CNN-based surface normal estimation
- Proposed a novel decoder framework where pixel-wise MLPs are trained on a subset of pixels selected based on the estimated uncertainty, in order to solve the bias in training towards large planar surfaces

Deep Multi-View Stereo for Dense 3D Reconstruction from Monocular Endoscopic Video

MICCAI

Gwangbin Bae, Ignas Budvytis, Chung-Kwong Yeung, Roberto Cipolla

2020

- Proposed adaptive depth candidate sampling based on a pre-trained monocular depth estimation network
- Introduced a patch embedding network and novel soft-contrastive training loss for fast and accurate multi-view matching

EXPERIENCES

AI Research Intern

NISI HK

- Developed monocular/multi-view depth estimation methods for colonoscopy images
- Collaborated remotely with the research team in Hong Kong to develop various AI features
- Delivered multiple technical presentations in technology forums and workshops

Oct 2019 - Oct 2020

Machine Learning Developer

Precycler

- Designed an autonomous recycling bin that can sort the incoming garbage based on sound
- Developed garbage classification algorithms based on MFCC analysis and machine learning

July 2017 – Apr 2018

Assistant Drill Instructor & Squad Leader

50th Infantry Division – ROK Army

- Instructed new recruits in basic combat skills including riflmanship and hand grenade
- Awarded two Meritorious Service Medals for distinguished performance

Oct 2015 – July 2017

Research Intern

King's College London

- Conducted a research on Quirks (imaginary particles introduced to explain missing mass problem)
- Constructed computer simulations to generate Quirks collisions under varying conditions

July 2014 – Aug 2014

AWARDS

Kwanjeong Educational Foundation Scholarship (30,000 USD)

Jun 2018

- Awarded to talented Korean students studying in international universities

SK National Start-Up Competition – Grand Prize (1st Place)

Nov 2017

- Presented the project on Precycler (autonomous recycling bin)

25th International Young Physicists' Tournament – Gold Medal (1st Place)

July 2012

- Korean team coach - supervised national team members conducting researches on 17 topics

24th International Young Physicists' Tournament – Gold Medal (1st Place)

July 2011

- Korean team captain - highest score of the tournament for the research on flame dynamics under electric field

TECHNICAL SKILLS

Deep Learning and Computer Vision

- Proficient in designing and training neural networks, using **PyTorch** and **TensorFlow**
- Extensive experience with computer vision libraries, such as **OpenCV** and **OpenSfM**

Programming Languages

- Highly proficient in **Python**, good working knowledge of **MATLAB** and **C++**

Graphic Software

- Extensive experience with Adobe Creative Suites (e.g. **Photoshop**, **Lightroom**, **InDesign**) and **Final Cut Pro**
- Experiences of generating and rendering synthetic 3D scenes using **Blender**