

# JUNAM SONG

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## EDUCATION

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**KAIST, South Korea**  
M.S. in Electrical Engineering

*September 2014 - August 2016*

**Kyungpook National University, South Korea**  
B.S. in Electronics Engineering

*March 2008 - August 2014*

## CAREER OBJECTIVE

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Building AI solutions to meet our needs. And I believe that the plausible methodology itself is meaningless if it is not possible to implement what was thought.

## PROJECTS

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### **To enable generative AI models on NPUs**

Lead a project to enable LLMs on NPUs. This has been verified to have excellent performance.

### **Deep learning based image recovery solution to achieve yield improvements**

As the pixels of the sensor become finer, the production yield decreases. Accordingly, a deep learning-based image restoration algorithm was developed to bring dead pixels to life.

### **Deep learning based segmentation solution on mobile devices**

Deep learning-based segmentation was developed and applied to get more bokeh effect in portrait mode.

### **Dual camera solution on sensor ISP**

Image synthesis technology using heterogeneous dual cameras was developed.

### **Low light image enhancement technology on sensor ISP**

Noise in low-light environments is a major cause of sensor image quality degradation. In order to improve the image quality deterioration, multi-frame image denoising was applied.

### **Face detection in large-scale surveillance system**

In video surveillance system, the exposure of a person's face is a serious threat to personal privacy. To protect the personal privacy in large amount of videos, an automatic face detection method is required to locate and mask the person's face.

## TECHNICAL STRENGTHS

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<b>Languages</b>	C, C++, Python, Matlab
<b>Technologies</b>	Latex
<b>Tools</b>	Tensorlow, Tensorflow Lite, Pytorch, Caffe
<b>Accelerators</b>	GPU, XNNPACK, NNAPI
<b>Version Control</b>	Github, Docker Hub

## WORK EXPERIENCE

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Samsung Electronics, South Korea(January 2015 - Present)

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> **System LSI division** > **AP S/W development team**  
*AI Software Engineer*

August 2023 - Present

- Experience in converting models for deployment on specific hardware, such as TF/PyTorch to ONNX, TF to TFLite, etc. Collaborated with compiler, SDK developer, and system software engineering team to re-architecture the sLLM model for optimal utilization of NPU on the edge device.

› **System LSI division › Sensor product development team**      December 2020 - August 2023  
*AI Software Engineer*

- Image recovery solution to defect data has been developed, and released to industrial field. The following process was involved in commercializing AI solutions for the first time as a practical engineer: find points where deep learning technology can be applied, define problem statements, create scenarios for the entire system using SOTA technology in deep learning, and build optimized systems using tensorflow lite and accelerators in a mobile environment. This is the first case of mass production to apply self-developed deep learning technology.

› **System LSI division › Multimedia development team**      December 2018 - December 2020  
*AI Software Engineer*

- As part of the application of the dual photodiode sensor, a bokeh solution was developed by fusion of segmentation technology and the depth map using phase information. The architecture of segmentation was designed from the previously proposed Deeplab. In addition, deeplabv3 uses MobileNet as its backbone, resulting in a lightweight deep neural network. It significantly reduces the number of parameters when compared to networks with regular convolutions with the same depth in the network. And an attempt was made to apply the quantization aware training(QAT) methodology to highly optimize the architecture.
- With the prosperity of deep learning, there was a movement to replace the existing remosaic algorithm to deep learning methods. It is a converter to bayer from image sensor overlaid with non-bayer CFA.
- In order to develop our own deep learning technology, we started with the development environment configuration for the first time. We have configured and deployed a Docker environment that can be used to train deep learning models using multiple GPUs in a Linux environment. We also created a simple mobile-oriented prototype to construct the entire development scenario.

› **System LSI division › Sensor product development team**      August 2016 - December 2018  
*Engineer*

- We developed a dual camera fusion algorithm using wide and tele. For this fusion algorithm to work, it must be assumed that two input images are registered.
- The sensor image suffers from image quality degradation due to noise in a low-light environment. To alleviate this, we designed a multi-frame-based denoising algorithm by matching multiple images.

**Samsung Electronics Internship Program**      January 2015 - January 2015  
*Intern*

- It was time to understand the overall flow of image processing methods that are essential for mobile image sensors.

## ACHIEVEMENTS

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**National Science and Engineering Undergraduate Scholarship**    *March 2008 - February 2014*

## PUBLICATIONS

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Junam Song, Hyung-Il Kim, and Yong Man Ro "Robust and Fast Face Detection using CNN based Facial Component Heat Map and Face Bound Regression," Journal of Korea Multimedia society, vol. 19, no. 8, pp. 1310-1319, August. 2016.

Junam Song, Seung Ho Lee, Hyung-Il Kim, and Yong Man Ro "Fast Face Detection Robust to Low Illumination for Privacy Protection in Large-scale Surveillance Video," Korea Multimedia society, vol. 18, no. 2, pp. 30-33, Nov. 2015.