

Seonho Park

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Research Interests

- Machine Learning, Stochastic Optimization, Uncertainty Quantification, Variational Inference

Education

Ph.D. Industrial and Systems Engineering

University of Florida, GPA: 3.91/4.0

Advisor: Dr. Panos M. Pardalos

Supervisory Committee Members: Dr. Jose C. Principe, Dr. Hongcheng Liu, Dr. Mostafa Reisi-Gahrooei

Dissertation title: Uncertainty-aware neural networks and applications

2017-2021

expected

M.S. Mechanical Engineering

Hanyang University, GPA: 3.88/4.0

Thesis: Sequential Approximate Optimization using Dual Subproblems based on Diagonal Quadratic Approximation

Advisor: Dr. Dong-Hoon Choi

2012

B.S. Mechanical Engineering

Hanyang University, *summa cum laude*, GPA: 3.81/4.0

2010

Research Experiences

Research Assistant

Airforce Research Laboratory

- Research on navigation of unmanned aerial systems in GPS-denied environments by using deep neural network based image retrieval techniques

- Principal investigator: Maciej Rysz, Kaitlin L. Fair

Aug.2019-Present

Medical Imaging Deep Learning Research Intern

Siemens Healthineers, Princeton, NJ

- Research on active learning with uncertainty-aware neural network to select Chest XRay images to be annotated
- Develop and deploy 3D ResNet architecture to classify rotator-cuff tears
- Mentors: Florin C. Ghesu, Sasa Grbic

May.2019-Aug.2019

Senior Research Engineer

PIDOTECH R&D Center, Seoul, Republic of Korea

- Developed Machine Learning Regression Algorithms for Large-scale Data: Ensemble of Decision Trees and Deep Neural Networks

Oct.2016-May.2017

Research Engineer/Senior Research Engineer/Manager

MIDASIT R&D Center, Seong-Nam, Republic of Korea

- Developed CNN Architectures to diagnosis Alzheimer's Disease from fMRI T1 Images
- Developed and Implementing Optimization Algorithms for Commercial Computer Aided Engineering Software

2012-May.2016

Awards and Honors

QSR Data Challenge Competition Finalist, *Quality, Statistics and Reliability (QSR) Section of INFORMS*
COVID19 CT Scan images classification competition

2020

KSEA-GFC Scholarship, *Korean-American Scientists and Engineers Association*

Awarded in recognition of outstanding research in STEM area and/or dedicated service for KSEA-GFC

2020

Korean Scholastic Excellence Award, *Herbert Wertheim College of Engineering, University of Florida*

Awarded in recognition of scholastic excellence in graduate studies

2019

Altair Optimization Contest Gold Prize, Altair Engineering Korea	2011
Brain Korea 21 Scholarships, Korea Student Aid Foundation	2011
Science Technology Scholarships, Hanyang University	2010-2011
Academic Excellence Award, Hanyang University	2010
Merit-based Academic Scholarships, Hanyang University	2007-2009
Achievement Scholarship, Guwon Scholarship Foundation	2007

Publications

1. **Seonho Park**, Maciej Rysz, Kaytlin L. Fair, Panos M. Pardalos, *SAR Image-based Positioning in GPS-denied Environments using Deep Cosine Similarity Neural Networks*, Submitted to Inverse Problems Imaging, 2020
2. **Seonho Park**, George Adosoglou, Panos M. Pardalos, *Interpreting Rate-Distortion of Variational Autoencoder and Using Model Uncertainty for Anomaly Detection*, Preprint [pdf] [code], 2020
3. **Seonho Park**, Seung Hyun Jeong, Panos M. Pardalos, *Combining Stochastic Adaptive Cubic Regularization with Negative Curvature for Nonconvex Optimization* [paper] [code], Journal of optimization theory and applications, 184, pp. 953–971, 2020
4. **Seonho Park**, Seung Hyun Jeong, Gil Ho Yoon, Albert A. Groenwold, Dong-Hoon Choi, *A globally convergent sequential convex programming using an enhanced two-point diagonal quadratic approximation for structural optimization*, Structural and Multidisciplinary Optimization 50 (5), pp.739-753, 2014
5. Seung Hyun Jeong, **Seonho Park**, Dong-Hoon Choi, Gil Ho Yoon, *Toward a stress-based topology optimization procedure with indirect calculation of internal finite element information*, Computers & Mathematics with Applications 66 (6), pp.1065-1081, 2013
6. Seung Hyun Jeong, **Seonho Park**, Dong-Hoon Choi, Gil Ho Yoon, *Topology optimization considering static failure theories for ductile and brittle materials*, Computers & Structures, 110, pp.116-132, 2012

Work in Progress

Seonho Park, Maciej Rysz, Kaitlin L. Fair, and Panos M. Pardalos, *Fully Deep Neural Network aided Navigation*

Sang-Hee Lee, Seonho Park, Heemoon Yoon, Tianyang Jiang, Qibo Tang, Byeong Ho Kang, Mira Park, *Deep learning method for automatic assessment of acrosome reaction on figurations of plasma membrane changes and acrosome status in sperm*

George Adosoglou, Seonho Park, Gianfranco Lombardo, Panos M. Pardalos, *Portfolio selection based on document embedding and stock network*

Seonho Park, Panos M. Pardalos, *Out of distribution detection based on Radon-nikodym derivative and mutual information*

Talks

1. *Uncertainty-aware Neural Networks For Medical Image Analysis*, INFORMS annual meeting, Seattle, Washington, 20-23 Oct. 2019
2. *Stochastic Adaptive Cubic Regularization with Negative Curvature for Nonconvex Optimization*, INFORMS annual meeting, Seattle, Washington, 20-23 Oct. 2019
3. *Diagnosis of Alzheimer's disease with deep learning*, Hanyang University, 4 Jul. 2016
4. *A filtered Sequential Approximate Optimization Algorithm based on Dual Subproblems using an Enhanced Two-point Diagonal Quadratic Approximation for Structural Optimization*, 12th AIAA Aviation Technology, Integration, and Operations (ATIO) Conference and 14th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, Indianapolis, Indiana, 17-19 Sep. 2012
5. *Development of External Module for Stress-based Topology Optimization using Commercial CAE Software Package*, The 7th China-Japan-Korea Joint Symposium on Optimization of Structural and Mechanical Systems, Huangshan, China, 18-21 Jun. 2012
6. *A New Convex Separable Approximation based on Two-point Diagonal Quadratic Approximation for Large-scale Structural Design Optimization*, 9th World Congress on Structural and Multidisciplinary Optimization, Shizuoka, Japan, 13-17 Jun. 2011

7. *Dual Optimization Approach based on Two-point Diagonal Quadratic Approximation*, The Korean Society of Mechanical Engineer 2010 Fall Conference Korean, Jeju, South Korea, 03-05 Nov. 2010
8. *Optimization for Optical Performances of LCD/BLU Using Pseudo Sensitivity*, The Korean Society of Mechanical Engineer 2009 Fall Conference Korean, Pyeongchang, South Korea, 04-06 Nov. 2009

Teaching Experiences

- o Teaching Assistant, ESI6346 Decision making under uncertainty, Spring, 2019
- o Teaching Assistant, ESI6552 Systems architecture, Spring, 2019

Professional Activities

Reviewer.....

- o Annals of Mathematics and Artificial Intelligence
- o International Journal of Bioinformatics Research and Applications
- o SN Operations Research Forum
- o Journal of Global Optimization

Professional Development Activities.....

- o Participant, *INFORMS Doctorate Student Colloquium*, Phoenix, Arizona, November 2-3, 2018

Services.....

- o Student Council Member, *Korean-American Scientists and Engineers Association Gainesville Florida Chapter*, 2018-present

Courses Taken

- o Applied Probability Methods in Engineering, ESI6325
- o Fundamentals of Mathematical Programming, ESI6420
- o Linear Programming & Network Optimization, ESI6417
- o Global Optimization, ESI6492
- o Stochastic Modelling and Analysis, ESI6546
- o Numerical Linear Algebra, MAD6406
- o Machine Learning for Time Series, EEE6504
- o Fundamentals of Machine Learning, EEL5840
- o Introduction to Data Analytics, EIN6905
- o Statistical Methods in Research I, STA6166

Computer Skills

- o Programming Languages: C/C++(Professional), Python(Professional), MATLAB(Experienced), Java(Experienced), R(Experienced), FORTRAN(Experienced)
- o Others: Tensorflow, Pytorch, Theano, Scikit-learn, SQL, Gams, git, L^AT_EX

References

Panos M. Pardalos

Distinguished Professor, Industrial and systems engineering, University of Florida

pardalos@ise.ufl.edu

Maciej Rysz

Assistant Professor, Information Systems & Analytics, Farmer school of business, Miami University

ryszmw@miamioh.edu