Seonho Park

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Research Interests

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

Education

Ph.D. Industrial and Systems Engineering **2017-2021**
University of Florida, GPA: 3.91/4.0 *expected*
Advisor: Dr. Panos M. Pardalos
Supervisory Committee Members: Dr. Jose C. Principe, Dr. Hongcheng Liu, Dr. Mostafa Reisi-Gahrooei

M.S. Mechanical Engineering **2012**
Hanyang University, GPA: 3.88/4.0
Thesis: Sequential Approximate Optimization using Dual Subproblems based on Diagonal Quadratic Approximation
Advisor: Dr. Dong-Hoon Choi

B.S. Mechanical Engineering **2010**
Hanyang University, summa cum laude, GPA: 3.81/4.0

Research Experiences

Research Assistant **Aug.2019-Present**
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

Medical Imaging Deep Learning Research Intern **May.2019-Aug.2019**
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

Senior Research Engineer **Oct.2016-May.2017**
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

Research Engineer/Senior Research Engineer/Manager **2012-May.2016**
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

Awards and Honors

KSEA-GFC Scholarship, *Korean-American Scientists and Engineers Association* **2020**
Awarded in recognition of outstanding research in STEM area and/or dedicated service for KSEA-GFC

Korean Scholastic Excellence Award, *Herbert Wertheim College of Engineering, University of Florida* **2019**
Awarded in recognition of scholastic excellence in graduate studies

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 Unversity* **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 IEEE Transactions on Geoscience and Remote Sensing, 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

exponential neural estimation of mutual information: MINE+

Deep learning method for automatic assessment of acrosome reaction on figurations of plasma membrane changes and acrosome status in sperm

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

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

Professional Activities

Reviewer

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

Professional Development Activities

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

Services

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

Courses Taken

- Applied Probability Methods in Engineering, ESI6325
- Fundamentals of Methematical Programming, ESI6420
- Linear Programming & Network Optimization, ESI6417
- Global Optimization, ESI6492
- Stochastic Modelling and Analysis, ESI6546
- Numerical Linear Algebra, MAD6406
- Machine Learning for Time Series, EEE6504
- Fundamentals of Machine Learning, EEL5840

Computer Skills

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

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*