

Wonseok Jeon

POSTDOCTORAL RESEARCHER AT MILA/MCGILL UNIVERSITY

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Education

Korea Advanced Institute of Science and Technology (KAIST)

PH.D. IN ELECTRICAL ENGINEERING

- Advisor: Prof. Sae-Young Chung
- Research area: Information theoretic approach to wireless communication and electromagnetism
- Thesis: "Improving spatial degrees of freedom using superdirectivity"

Daejeon, S. Korea

Mar. 2011 - Aug. 2017

Yonsei University

B.S. IN ELECTRICAL AND ELECTRONIC ENGINEERING

- National Scholarship for Science and Engineering (fully-funded)

Seoul, S. Korea

Mar. 2007 - Feb. 2011

Experience

Mila - Quebec AI Institute, McGill University

POSTDOCTORAL RESEARCHER IN COMPUTER SCIENCE

- Advisor: Prof. Joelle Pineau
- Research area: learning from demonstration (imitation learning, multi-agent learning, inverse reinforcement learning, offline reinforcement learning)

Montréal, Quebec, Canada

May. 2019 - Current

Korea Advanced Institute of Science and Technology (KAIST)

POSTDOCTORAL RESEARCHER IN COMPUTER SCIENCE

- Advisor: Prof. Kee-Eung Kim
- Research area: reinforcement learning, imitation learning, Monte-Carlo tree search, Bayesian inference

Daejeon, S. Korea

Sep. 2017 - Apr. 2019

Publications

OptiDICE: Offline Policy Optimization via Stationary Distribution Correction Estimation

ICML 2021 / ICLR Workshop 2021

J. LEE*, W. JEON*, B.-J. LEE, J. PINEAU, K.-E. KIM (*EQUAL CONTRIBUTION)

Short talk

- Summary: We present an offline reinforcement learning algorithm (reinforcement learning with priorly gathered data and no additional interaction) that estimates optimal stationary distribution correction and is free from an overestimation issue. Our algorithm performs comparably with the state-of-the-art offline RL algorithm.

Regularized Inverse Reinforcement Learning

ICLR 2021 / NeurIPS Workshop 2020

W. JEON, C.-Y. SU, P. BARDE, T. DOAN, D. NOWROUZEZHAI, J. PINEAU

Spotlight presentation (167/2997=5.57%)

- Summary: In regularized Markov decision processes (MDPs), we optimize the sum rewards under strongly convex policy regularization, which leads to a unique optimal policy. We solve the inverse problem of it, where we seek a reward function leading to the expert's behavior in regularized MDPs.

Adversarial Soft Advantage Fitting: Imitation Learning without Policy Optimization

NeurIPS 2020

P. BARDE*, J. ROY*, W. JEON*, J. PINEAU, C. PAL, D. NOWROUZEZHAI (*EQUAL CONTRIBUTION)

Spotlight presentation (395/9454=4.07%)

- Summary: Adversarial imitation learning is often complexified due to its reinforcement learning inner loop. With a novel discriminator architecture resembling one at the optimality, we present an imitation learning algorithm that can be completely done with supervised learning.

Scalable and Sample-Efficient Multi-Agent Imitation Learning

AAAI Workshop 2020

W. JEON, P. BARDE, D. NOWROUZEZHAI, J. PINEAU

Poster presentation

- Summary: We empirically found that the proper choice of both multi-agent RL algorithm and reward approximator is crucial to the scalability and sample complexity of multi-agent imitation learning.

Monte-Carlo Tree Search in Continuous Action Spaces with Value Gradients

AAAI 2020

J. LEE, W. JEON, G.-H. KIM, K.-E. KIM

Poster presentation

- Summary: We present Monte-Carlo Tree Search (MCTS) method in continuous controls that exploits the approximate value gradient to decide its action at each node and show that our method highly outperforms the baselines.

Trust Region Sequential Variational Inference

ACML 2019

G.-H. KIM, Y. JANG, J. LEE, W. JEON, H. YANG, K.-E. KIM

Poster presentation

- Summary: While conventional Sequential Variational Inference (SVI) uses simple stochastic gradient descent, we use a trust-region method motivated by Trust-Region Policy Optimization (TRPO) in reinforcement learning and can improve the stability and performance of SVI.

A Bayesian Approach to Generative Adversarial Imitation Learning

NeurIPS 2018

W. JEON, S. SEO, K.-E. KIM

Spotlight presentation (168/4856=3.46%)

- Summary: Generative Adversarial Imitation Learning (GAIL) involves the classification between expert and agent demonstrations. By involving Bayesian classification, the sample complexity of GAIL can be hugely improved.

Capacity of Continuous-Space Electromagnetic Channels with Lossy Transceiver

IEEE Trans. on Inf. Theory 2018

W. JEON, S.-Y. CHUNG

- Summary: We analyze the number of information-theoretic degrees of freedoms (DoFs, the number of information-theoretic channels that can be effectively used for information transmission) for spherical transceivers when the electromagnetic dielectric loss factor is considered.

Asymptotic Analysis on Directivity and Beamwidth of Uniform Circular Array

IEEE Antenn. Wirel. Pr. 2017

J. H. KIM, W. JEON, S.-Y. CHUNG

- Summary: We analyze the directivity and beamwidth of uniform-circular-array antennas relative to the number of antenna elements and the size of the array.

Effect of Mutual Coupling on Uniform Circular Arrays with Vector Antenna Elements

IEEE Antenn. Wirel. Pr. 2017

W. JEON, J. H. KIM, S.-Y. CHUNG

- Summary: The number of DoFs for vector (polarimetric) uniform circular antenna arrays is analyzed. In contrast with the analysis on prior work, the much higher number of DoFs is shown to be achieved.

Interference Mitigation using Antenna Mutual Coupling

ACSSC 2015 / ITA Workshop 2016

W. JEON, S.-Y. CHUNG

Invited paper / Invited talk

- Summary: The number of DoFs in information-theoretic multiple access channels (where multi-transmitters desire to send their messages to a unique receiver) is considered. The method of mitigating two users' interference for a spherical antenna array is proposed.

Improving Degrees of Freedom of Wireless Channels using Superdirectivity

IEEE ISIT 2015

W. JEON, S.-Y. CHUNG

Talk

- Summary: The number of DoFs for both transmit and receive sides are analyzed in addition to the scattering effects.

Noise Spatial Correlation and Receive Superdirectivity in Wireless Channels

ITA Workshop 2015

W. JEON, S.-Y. CHUNG

Invited paper

- Summary: The number of DoFs at the receiver side is analyzed when a spherical antenna array is considered. With thermodynamic consideration, we show that the number of degrees-of-freedom is unbounded.

The Capacity of Wireless Channels: A Physical Approach

IEEE ISIT 2013

W. JEON, S.-Y. CHUNG

Talk

- Summary: The number of information-theoretic DoFs had been argued to be bounded relatively to the size of antenna arrays. On contrary, we show that this is not true, and the number of DoFs is unbounded if electromagnetic power consumption is carefully considered.

Research Projects

Development of explainable human-level deep machine learning inference framework

THE INSTITUTE FOR INFORMATION COMMUNICATION TECHNOLOGY PLANNING AND EVALUATION (IITP)

Sep. 2017 - Dec. 2018

Machine learning for flash memory and SSD framework

SAMSUNG ELECTRONICS

Jul. 2016 - Aug. 2017

Development of reinforcement learning scheme and system for IoT environment

GLOBAL FRONTIER R&D PROGRAM BY THE NATIONAL RESEARCH FOUNDATION OF S. KOREA

Mar. 2016 - Aug. 2017

Development of next-generation wireless communication scheme for 5G communication

LG ELECTRONICS

Aug. 2012 - Aug. 2015

Development of adaptive beam multiple access technology without interference based on antenna node grouping

MINISTRY OF SCIENCE, ICT AND FUTURE PLANNING

Aug. 2012 - Aug. 2015

Reviewer Activities

- Conference** NeurIPS (2019, 2020), AAAI (2019, 2021), ICLR (2020, 2021), ACML (2019, 2020), ICML (2021), IROS (2021)
Journal IEEE Antennas and Wireless Propagation Letters

Open Source Activities

Ray/RLlib Multi-Agent Deterministic Deep Policy Gradient (MA-DDPG)

Talks

SK-T Brain A Bayesian Approach to Generative Adversarial Imitation Learning (Mar. 2019)

Awards

Qualcomm-KAIST Innovation Award Superdirectivity in Wireless Channels (Jul. 2015) [QCI Award-2015-07]

Skills

Programming Python, MATLAB, C++ (used for AAAI 2020 publication)

DL libraries PyTorch, TensorFlow 1&2, Keras

RL libraries Ray/RLlib (a contributor), Rlpyt, OpenAI Baselines

Languages Korean, English