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RESEARCH EXPERIENCE

Current
Dec 2018

Exploring Generalization Properties of DNNs
BCI & ML Lab, HUST
- Study the influence of different optimization techniques (e.g., Batch Normalization, Dropout,...) on the linear regions of DNNs.
- Explore generalization and memorization of DNNs from the perspective of geometric analysis on the prediction landscape.
- Monitor test behaviors without any validation set.

Dec 2019
Sep 2018

Security in Brain-Computer Interfaces
BCI & ML Lab, HUST
- Construct adversarial noise for some popular CNN classifiers in EEG-based BCIs, and analyze its influence on the learned features.
- Construct adversarial noise for traditional approaches (e.g., Riemann-based pipeline, CCA, ...) used in EEG-based BCI spellers (e.g., P300 speller, SSVEP speller,...).
- Consider the causality of constructing adversarial noise for time series.

EDUCATION

Jun 2021
Sep 2018

M.Eng. - School of Artificial Intelligence & Automation, HUST
GPA: 90.3/100, **Rank**: 12/188
Supervisor: Prof. Dongrui Wu

Jun 2018
Sep 2014

B.Eng. - School of Optical & Electronic Information, HUST
GPA: 3.91/4.0, **Rank**: 5/318
Supervisor: Prof. Danhua Cao

PUBLICATIONS

DEEP LEARNING

- **X. Zhang**, D. Wu, H. Xiong and B. Dai, "Optimization Variance: Exploring Generalization Properties of DNNs," work in progress, 2021.
- **X. Zhang**, D. Wu and H. Xiong, "Rethink the Connections among Generalization, Memorization and the Spectral Bias of DNNs," in Proc. Int'l Joint Conf. on Artificial Intelligence (IJCAI), Montreal, Canada, August 2021.
- **X. Zhang** and D. Wu, "Empirical Studies on the Properties of Linear Regions in Deep Neural Networks," in Proc. Int'l Conf. on Learning Representations (ICLR), Addis Ababa, Ethiopia, April 2020. (Poster)

BCI & SECURITY

- **X. Zhang**, D. Wu, L. Ding, H. Luo, C-T Lin, T-P Jung and R. Chavarriaga, "Tiny Noise, Big Mistakes: Adversarial Perturbations Induce Errors in Brain-Computer Interface Spellers," National Science Review, vol. 8, no. 4, nwaa233, 2021. (IF=16.69)

- Z. Liu*, **X. Zhang***, D. Wu, "Universal Adversarial Perturbations for CNN Classifiers in EEG-Based BCIs ," IEEE Trans. on Neural Systems and Rehabilitation Engineering, 2020, *submitted*. (IF=3.34)

- **X. Zhang** and D. Wu, "On the Vulnerability of CNN Classifiers in EEG-Based BCIs," IEEE Trans. on Neural Systems and Rehabilitation Engineering, vol. 27, no. 5, pp. 814-825, 2019. (IF=3.34)

HONORS

2020 National Scholarship for Postgraduates

2020 Goodix Scholarship for Technology

2019 National Scholarship for Postgraduates

2019 1st Place - China Brain-Computer Interface Competition

2018 "Outstanding Graduate" of HUST

2018 "Honor College Student" of Qiming College of HUST

2015 2nd Place - The 7th Mathematics Competition of Chinese College Students

2015 National Encouragement Scholarship