KIARASH FARIVAR

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Linkedin Profile

EDUCATION

École Polytechnique Fédérale de Lausanne (EPFL), Switzerland   *September 2018- July 2022*
Master of data science   GPA: 5.27/6

Shahid Beheshti University (SBU), Tehran, Iran   *September 2013 - August 2018*
Bachelor of science in computer science   GPA: 18.84/20

WORK EXPERIENCE (RESEARCH)

Adversarial examples and loss task alignment   September 2021 – July 2022
Master's Thesis, Laboratory for Information and Inference Systems(LIONS), EPFL
Professor:Volkan Cevher, Assistant: Igor Krawczuk

· The loss function is supposed to be a proxy for the accuracy measure used to analyse a model. But this proxy is not always perfect.
· I explored how the definition of the loss function, the specific method of learning used (self-supervised or supervised) and the dataset affects the robustness of a model to adversarial examples.
· For my thesis and code see here.

Disentangling Adversarial examples   February 2021 – June 2021
Semester project, Laboratory for Information and Inference Systems(LIONS), EPFL   grade: 5.75/6
Professor:Volkan Cevher, Assistant: Igor Krawczuk

· Different factors that can contribute to the phenomena of adversarial examples were explored.
· I examined robust training, the saliency maps of the robust model, methods for estimating the smoothness of the decision boundary (like CLEVER score), and estimating the concentration of the dataset.
· A library was created to automate the process of evaluating the above phenomena.
· For report and code see here.

3D Human body reconstruction   September 2020 – February 2021
Internship, Logitech
Supervisor: Remy Zimmermann

· I investigated possible solutions to reconstruct 3D bodies using multiple RGB-depth Kinect cameras.
· These included methods such as IF-net and IP-net from the Max Planck Institute.

Instance Segmentation of 3D Point Clouds using deep learning   February 2020 – June 2020
Semester project, Computer vision lab (CVLab), EPFL   grade: 5.5/6
Supervisor:Dr.Mathieu Salzmann

· I used Pointnet++ to classify points and detect different instances of pipes in a 3D point cloud.
· Due to a lack of data a good performance was not achievable.
· For report and code see here.

Predicting right or left hand movements' imagination from EEG signals April 2017 – August2018
Bachelor capstone, Institute for Cognitive and Brain Sciences, SBU   grade: 19/20
Supervisors: Dr. Reza Khosrowabadi and Dr. Jamal Amani Rad

- An accuracy of %67 was achieved using a CSP filter and a LDA classifier using Openvibe.
- I worked with the EMOTIV EPOC+ EEG sensor and used OpenViBE to process the signals.
- My project was presented orally in the 4th Iranian Human Brain Mapping Congress IHBM 2017.

RELEVANT COURSE PROJECTS

1. Using reinforcement learning trained a network to play Pong, winning %80 of the games. (python)

2. Implemented a distributed movie recommendation algorithm using KNN and cosine similarity on the MovieLens dataset. (Spark)

3. Predicted number of nights spent by tourists in European countries with MRSE %10 of values using SARIMA model. (python)

4. Predicted subject's emotion in response to patterns in architecture with MRSE %10 of values using PCA and regression. (python)

5. Predicted 4 types of neurons using in-vivo recording data achieved accuracy of %90 using heuristic features and SVMs. (matlab)

6. Used Hopfield networks to model the human memory and saved simplified versions of digits, found out the maximum capacity of different networks. (python)

RESEARCH INTERESTS

Deep learning, Adversarial examples, Self-Supervise Learning, Feature Learning, Computational neuroscience.

AWARDS

1. Ranked 1st/40 B.Sc. Students in computer science, department of mathematics, SBU. (according to my cumulative GPA)

2. My oral presentation at the IHBM 2017 conference was chosen as one of the best presentations by the conference's scientific committee.

3. Received a Master's in CS offer from Johns Hopkins University and University of Southern California (2018).

4. Received a direct PhD offer from Aalto University Finland (2018).

RELEVANT COURSES

- Machine learning
- Artificial neural networks (Deep and Reinforcement learning)
- Statistics for data science
- Systems for data science
- Stochastic processes

- Learning Theory (PAC learning and Tensors)
- Applied data analysis
- Optimization for machine learning
- Markov chains and algorithmic applications
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LANGUAGES AND LIBRARIES

- Languages: Python, Scala, Java, SQL, C.
- Big data: Spark.

- Machine/Deep learning: Pytorch, Scikit-learn, Matlab, Keras.
- Viz: Plotly, Matplotlib.

MISCELLANEOUS

Teaching Experience:
Engineering Mathematics, January 2017 – May 2017
Teaching assistant, Prof. Yaser Shekofteh

GRE: (327/340)
quantitative: 168/170   verbal: 159/170   analytical writing: 4/6

TOEFL:(112/120)
reading: 29   listening: 30   speaking: 28   writing: 25