ALI ZINDARI

zindari.ali@gmail.com

Website ◇ Scholar ◇ Linkedin ◇ Github

RESEARCH INTERESTS

Machine Learning: Feature Learning
Mathematics: Optimization, Theory of Deep Learning

EDUCATION

M.Sc. in Mathematics & Computer Science *2023 - Present*
Saarland University Saarbrücken, Germany

B.Sc. in Computer Engineering *2017 - 2022*
Isfahan University of Technology, GPA 17.4/20 Isfahan, Iran
Thesis: Segmentation of Lungs COVID Infected Regions by Attention Mechanism and Synthetic Data.

Diploma in Mathematics and Physics *2013 - 2017*
National Organization for Development of Exceptional Talents (Ejei 2) Isfahan, Iran

PUBLICATIONS

Decoupled SGDA for Games with Intermittent Strategy Communication
A.Zindari, P.Yazdkhasti*, A.Rodomanov, T.Chavdarova, S.Stich* **[Submitted to ICLR 2025]**

The Limits and Potentials of Local SGD for Distributed Heterogeneous Learning with Intermittent Communication
K.K.Patel, M.Glasgow, A.Zindari, L.Wang, S.Stich, Z.Cheng, N.Joshi, N.Srebro **[COLT 2024]**
[Link]

On the Convergence of Local SGD Under Third-Order Smoothness and Hessian Similarity
A.Zindari, R.Luo, S.Stich **[Opt4ML @ NeurIPS 2023]**
[Link]

Segmentation of Lungs COVID Infected Regions by Attention Mechanism and Synthetic Generated Data
A.Zindari, P.Yazdkhasti*, Z.Nabizadeh, P.Khadivi, N.Karimi, S.Samavi* **[Arxiv 2021]**
[Link]

Bifurcated Autoencoder for Segmentation of COVID-19 Infected Regions in CT Image
P.Yazdkhasti, A.Zindari*, Z.Nabizadeh, R.Roshandel, P.Khadivi, N.Karimi, S.Samavi* **[ICPR 2021 Workshops]**
[Link]

* Equal Contribution

RESEARCH EXPERIENCES

CISPA Helmholtz Center for Information Security - MLO Lab Oct. 2022 - Present
***Supervisors**: Prof. Sebastian U. Stich - Prof. Tatjana Chavdarova* *Saarbrücken, Germany*

- Proposed a new method for solving minimax games in a distributed fashion, capable of achieving communication acceleration in low-interaction games.
- Developed the first convergence guarantee for *Local SGD* in heterogeneous settings, based on third-order smoothness and Hessian similarity.
- Analyzed the fixed point of *Local SGD* for quadratic objectives and proposed a rate of convergence to this point. Additionally, provided a closed-form formula for the distance between the fixed point and the global optimum of *Local SGD*.

École polytechnique fédérale de Lausanne (EPFL) - LIONS Lab Jun. 2022 - Oct. 2022
***Supervisors**: Prof. Ali Ramezani-Kebrya - Prof. Reza Shokri (NUS)* *Lausanne, Switzerland*

- Worked on the adversarial robustness of self-supervised models.

École polytechnique fédérale de Lausanne (EPFL) - VITA Lab Jul. 2021 - Oct. 2021
***Supervisors**: Prof. Alexandre Alahi - Yuejiang Liu - Mohammadhossein Bahari* *Lausanne, Switzerland*

- Worked on the Motion Forecasting problem for self-driving cars.
- Developed a contrastive representation learning method to improve the latent space, which enabled the network to avoid forecasting future vehicle positions in off-road areas.
- Reduced the percentage of off-road predicted points by approximately 12%.

Isfahan University of Technology - Biomedical Imaging Lab Jun. 2020 - Feb. 2021
***Supervisors**: Prof. Shadrokh Samavi - Prof. Nader Karimi* *Isfahan, Iran*

- Proposed a bifurcated neural network for segmentation of COVID-19 infected regions in CT images.
- Leveraged a conditional generative adversarial network (cGAN) based on the pix2pix architecture to generate new synthetic COVID-19 infected regions. The cGAN was used to convert a binary mask into a new infected region, increasing the amount of training data.
- Employed and modified channel and spatial attention mechanisms to emphasize the infected regions.

WORK EXPERIENCES

Dorsa Company Mar. - Jun. 2021
Computer Vision Engineer *Isfahan, Iran*

- Developed an algorithm for scanning the cross-section of metallic products and made a 3D visualization of them.

Isfahan University of Technology Jun. - Aug. 2019
Computer Networks Engineer intern at IT center *Isfahan, Iran*

- Worked on a cloud computing platform called "Open Stack" to deploy it at the information center of university.

Sitco Company Jun. - Aug. 2018
Software Engineer intern *Isfahan, Iran*

- Worked as a software engineer at Sitco company to develop an accounting software.

NOTABLE GRADUATE COURSES

Optimization for Machine Learning (1.3/1) Games in Machine Learning (1.7/1)

*German Scale: 1 (Max), 5 (Min)

NOTABLE UNDERGRADUATE COURSES

Applied Linear Algebra (20/20)
Fundamentals of Computer Vision (17.1/20)
Engineering Mathematics (19.5/20)
Algorithm Design (17.1/20)
Differential Equations (20/20)
Artificial Intelligence (20/20)
Bayesian Statistics (16/20)
Data Structures (19.5/20)
General Math 2 (19.5/20)
Fundamentals of Computational Intelligence (18.8/20)
Game Theory (18.2/20)
Engineering Statistics and Probability (17.5/20)
Multimedia Systems (17/20)

TEACHING

- Data Structures (Teaching Assistant) *Fall 2019*
- Computer Organization and Architecture (Teaching Assistant) *Fall 2019*
- Fundamentals of Computer Programming (Teaching Assistant) *Fall 2018*

COMPUTER SKILLS

- Programming Languages: Python, C/C++, C-sharp, Matlab, Verilog, LaTeX
- AI Related Libraries: PyTorch, TensorFlow, Keras, Scikit-learn, Numpy, Pandas
- Image Processing Library: OpenCV
- Operating System: Linux (Ubuntu, CentOS), Windows

SELECTED PROJECTS

- **Bifurcated Auto-Encoder for Segmentation of Covid Infected Regions in Lungs** [Code]
  Implementation of the Neural Network, Channel and Spatial Attention mechanism, Pix2Pix GAN

- **High Resolution Image Embedding Using Graph Attention Networks** [Code]
  A method for summarizing an image into a vector

- **Deep Reinforcement Learning for Games** [Code]
  This is a framework for model-free RL that can be used for solving different games using pixels as input

- **Reinforcement Learning** [Code]
  Implementation of some famous RL algorithms from scratch based on Prof. Sutton's text book

- **Statistical Machine Learning** [Code]
  Implementation of some famous ML algorithms from scratch: Bayesian Linear Regression, Gaussian Mixture Models, Gaussian Processes

- **Fuzzy Controller** [Code]
  This code uses a fuzzy approach to park a car at a specific location