Asim Iqbal

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EDUCATION

Ph.D. Computational Neuroscience 2016 - 2019
Neuroscience Center Zurich (ZNZ), UZH/ETH Zurich, CH
Thesis title: Exploring the principles of brain development through deep learning

Master of Science. Neural Systems and Computation 2013 - 2015
INI, Department of IT and Electrical Engineering (D-ITET), ETH Zurich, CH
Thesis title: Enhancing scale-invariance in a deep neural network

Bachelor of Science (Engg.). Electrical Engineering 2006 - 2010
University of the Punjab, Lahore, PK

TECHNOLOGY SKILLS

Research Areas: Machine Learning, Neuroscience, Reinforcement Learning
Programming Languages: Python, C++, MATLAB, R, Lua, Verilog and Java
Operating Systems: Linux, Unix and Microsoft Windows
Tools: TensorFlow, Keras, Google Colab, Torch, Caffe, MS Visual Studio and LaTeX

EXPERIENCE

Machine Learning Researcher August 2019 - Present
Google[x], Mountain View, CA

- Working as an AI (Artificial Intelligence) Resident on an early stage health related Neuro Moonshot at X - The Moonshot Factory. Responsible for deploying deep neural networks to decode unique features in scalable datasets.

Graduate Research and Teaching Assistant 2016 - 2019
HiFo (Brain Research Institute), Neuroscience Center Zurich (ZNZ), UZH/ETH Zurich

- Worked as a Doctoral researcher in Neural Circuit Assembly Lab (Prof. Dr. Theofanis Karayannis) to explore the computational principles in the developing mouse brain through deep neural networks. The project resulted in high-throughput deep learning-based techniques for brain-wide analysis.
- Worked as a teaching assistant in Bio-Progamming (Fall 2018) and Computational Neuroscience (Fall 2017 and Spring 2019) courses at UZH/ETH Zurich
- Supervised 2 Master thesis and 5 rotation student projects

Summer Researcher August 2018 - September 2018
Allen Institute for Brain Sciences and Computational Neuroscience program at University of Washington, Seattle, WA.

- Worked on a short research project in Summer Workshop on the Dynamic Brain to decode neural responses in mouse visual cortex through deep learning.

Research Intern May 2016 - August 2016
Artificial Intelligence and Brain-Inspired Computing, IBM Research - Almaden, CA

- Worked on real-time classification of hand gestures by developing an efficient framework on TrueNorth neuromorphic hardware to process the spiking data from retina chip through a deep neural network.

Researcher August 2015 - March 2016
DiCarlo Lab, Massachusetts Institute of Technology (MIT), Cambridge, MA.

- Worked on implementation of performance optimized deep neural network to explain neural responses (large-scaled two-photon imaging data) in area V1 of monkey visual cortex by presenting natural image and shape stimuli.

Graduate Research Assistant May 2013 - September 2014
Brain Research Institute (HiFo), UZH/ETH Zurich

- Worked in Laboratory of Neural Circuit Dynamics with Prof. Fritjof Helmchen and Prof. Jerry Chen to develop a virtual reality-based mouse whisker tracker to correlate neural activity with the whisker movements.

Embedded Software Engineer November 2012 - February 2013
Technical Operations, R&D Department, Star Technologies, Lahore.

- Worked as a team lead in development of RTOS (Real-time operating system) on embedded mobile board to implement Firmware-over-the-air technology.

Research Engineer March 2011 - July 2012
Department of Physics and EE, Lahore University of Management Sciences, Lahore

- Worked with Prof. Mumtaz Sheikh and Prof. Abubakr Muhammad on design and implementation of 3D terrain mapping system using agile optics technology.

AWARDS

Tech Competitions 2007 - Present

- Best Project Award in Summer Workshop on the Dynamic Brain, Allen Institute for Brain Sciences and Computational Neuroscience program at University of Washington, Seattle, WA. August 2018
- Best Project Award in Summer Intern program at IBM Research, Almaden, CA. August 2016
- Gold Medal (Best Paper Award) in 24th IEEEP, Multi-topic International Symposium, Bahria University, Karachi. April 2009
- Silver Medal (Best Paper Award) in IET Technical Paper Competition at GIKI, Peshawar. November 2008
- 1st position in MIC (Microprocessor Programming Competition) in SOFTEC09 at National University of Computer and Emerging Sciences (NUCES-FAST), Lahore. April 2009
- 1st position in MIC (Microprocessor Programming Competition) in All Pakistan Engineering Exhibition (APEX09) at University of Engineering and Technology (UET), Lahore. April 2009
- 1st position in (Circuit Design Competition) in (2nd All Pakistan Electrical Engineering Conference), APE2C07 at GIKI, Peshawar. November 2007
- 2nd position in MIC (Microprocessor Programming Competition) in SOFTEC08 at National University of Computer and Emerging Sciences (NUCES-FAST), Lahore. August 2008
- 2nd position in (Circuit Design Competition) in All Pakistan Engineering Exhibition at University of Engineering and Technology, Lahore. April 2009
- 2nd position in (Young Entrepreneur Competition, Idea: Tech-air, inspired by MIT Project Oxygen) in All Pakistan Engineering Exhibition (APEX09) at University of Engineering and Technology (UET), Lahore. April 2009
- 3rd position in Engineering Problem Solving Competition in NASCON09 at National University of Computer and Emerging Sciences (NUCES-FAST), Islamabad. April 2009
- 3rd position in Technological Insight Competition in NASCON09 at National University of Computer and Emerging Sciences (NUCES-FAST), Islamabad. April 2009

PUBLICATIONS

- **Iqbal, Asim**, et al. "Developing a brain atlas through deep learning." ***Nature Machine Intelligence*** 1.6 (2019): 277. [Cover of **Nature Mach. Intell.**] In Brief: Vogt, N. "A deeply learned brain atlas." **Nature Methods** (2019): 680.
- **Iqbal, Asim**, et al. "DeNeRD: high-throughput detection of neurons for brain-wide analysis with deep learning" ***Nature Scientific Reports*** 9.1 (2019): 1-13
- **Iqbal, Asim**, et al. "Decoding neural responses in mouse visual cortex through a deep neural network". ***IJCNN, IEEE***, Budapest, Hungary, 2019, pp. 1-7.
- A Ozgur Argunsah and **Iqbal, Asim**, et al. "DeepSpine: Segmenting spines in microscopy images through deep learning". *In Submission,* ***Nature Methods***
- *A van der Bourg, *R Kaestli, *R Vighagen, A Ozgur Argunsah, **Iqbal, Asim**, F Voigt, D Kirschenbaum, A Aguzzi, F Helmchen, and T Karayannis. "Development of Sensory-driven Cortical Inhibition in Mouse Barrel Cortex" *In Review,* ***Nature Communications***
- **Iqbal, Asim**, et al. "Exploring brain-wide development of inhibition through deep learning." arXiv preprint arXiv:1807.03238. 2018
- **Iqbal, Asim**, et al. A self-teaching image processing and voice-recognition based, intelligent and interactive system to educate visually impaired children **ICDIP, SPIE**. 2010
- U Farooq, M Amar, K.M. Hasan, M. Khalil, M Usman, **Iqbal, Asim** "A low cost microcontroller implementation of neural network based hurdle avoidance controller for a car-like robot", **ICCAE, IEEE**. 2010
- **Iqbal, Asim**, et al. "A Low Cost Artificial Vision System for Visually Impaired People". **ICCEE, IEEE**. 2009

PRESENTATIONS

- Decoding neural responses in mouse visual cortex through a deep neural network, Deep Learning session, International Joint Conference on Neural Networks (IJCNN), Budapest, Hungary. July 16, 2019 (Talk)
- Decoding anatomical and computation principles in the mammalian brain through deep learning, Neuroscience meets Deep Learning symposium, EPFL, Lausanne. July 8-9, 2019 (Poster)
- Artificial Intelligence-based tools to Map Neurobiological Systems, Swiss Light-sheet Microscopy Workshop, UZH/ETH Zurich. April 25, 2019 (Poster)
- Neuromachine Intelligence, Whole Organ Imaging meeting, UZH/ETH Zurich. March 28, 2019 (Talk)
- Exploring Animal Intelligence through Machine Intelligence, Guest Lecture in Bio-Programming Course at UZH/ETH Zurich. Dec 4, 2018 (Talk)
- Segmenting Macro/Micro Regions in Brain through Deep Learning, Single Cell Dynamics Mini Symposium, UZH/ETH Zurich. Oct 18, 2018 (Talk)
- Exploring Brain Intelligence through Machine Intelligence, INI-HiFo Symposium, UZH/ETH Zurich. July 26, 2018 (Talk)
- Exploring brain-wide development of neuronal population through deep learning, FENS Meeting, Berlin, Germany. June 10, 2018 (Poster)
- Exploring brain-wide developmental alterations of GABAergic neurons and their relation with the emergence of different functional modalities through deep learning, GABA Meeting, Schaffhausen, CH. June 7, 2018 (Poster)
- Deep Computational Brain Automaton, Wyss Center Lightsheet Microscopy workshop, Campus Biotech, Geneva, CH. March 19, 2018 (Poster)
- Exploring brain-wide development of inhibition through deep learning, SSN (Swiss Society for Neuroscience) meeting, UZH, CH. Feb 9, 2018 (Poster)

- Exploring brain-wide development of inhibition through deep learning, Evaluation Seminar, Brain Research Institute, UZH, CH. Jan 31, 2018 (Poster)
- To understand human-level concept learning: Bayesian Network or Deep Learning?, Auditory Informatics Seminar, Institute of Neuroinformatics, UZH/ETH Zurich. October 26, 2016 (Talk)
- Computation in Neural Systems: From Biophysics to Deep Learning, Neuromorphic Engineering and beyond, SSE, LUMS, Lahore. Dec 20, 2016 (Talk)
- Classification of hand gestures through implementation of convolutional neural network on TrueNorth chip, IBM Brain-inspired Computing Seminar, CA [goo.gl/16UTGY]. August 3, 2016 (Poster)

REFEREES Available on request