

Najeeb Khan

University of Saskatchewan,
Department of Computer Science,
Room 176, Thorvaldson Building,
Saskatoon, Saskatchewan, S7N 5C9

najeeb.khan@usask.ca
www.najeebk.com
github.com/najeebkhan

RESEARCH INTERESTS

Machine Learning, Neuromechanics, Nonlinear Control, Speech Synthesis, Optimization

EDUCATION

Ph.D. Student in Computer Science, Sept 2015 – Aug 2019.
University of Saskatchewan, Canada.

- Research Area: *Machine Learning for Human Robotics*
- Advisor: Ian Stavness, Ph.D.
- Grade: 89.24/100

M.S. Computer Engineering, March 2013 – Aug 2015.
University of Ulsan, South Korea.

- Thesis: *Singing Voice Synthesis Using Hidden Markov Model Based Text To Speech Synthesis System*
- Advisor: Jung Lee, Ph.D.
- GPA: 4.31/4.50

B.S. Electronic Engineering, Sept 2008 – June 2012.
International Islamic University, Pakistan.

- Thesis: *Implementation of Adaptive Filters on TMS320C6713 DSK*
- Advisor: Jawad Shah, Ph.D.
- GPA: 3.67/4.00

PEER REVIEWED PUBLICATIONS

1. N. Khan, J. Shah and I. Stavness, "Bridgeout: stochastic bridge regularization of deep neural networks." *Under review* (2018).
2. F. R-Despres, N. Khan and I. Stavness, "Towards finite-element simulation using deep learning." *CMBBE Symposium* (2018).
3. N. Khan and I. Stavness, "Prediction of muscle activations for reaching movements using deep neural networks." *American Society of Biomechanics* (2017).
4. N. Khan and J. Lee, "Optimal state duration assignment in hidden Markov model-based text-to-speech synthesis system." *Electronics Letters* (2015).
5. N. Khan and J. Lee, "HMM based duration control for Singing TTS." *Lecture Notes in Electrical Engineering* (2015).
6. N. Khan and J. Lee, "Singing Voice Synthesis using HMM based TTS and MusicXML." *Journal of the Korean Society of Computer and Information* (2015).
7. N. Khan and J. Lee, "Development of a Music Score Editor based on MusicXML." *Journal of the Korean Society of Computer and Information* (2014).

EXPERIENCE

- **Software Developer at SED Systems, Canada** Feb 2018 – present
My main responsibilities include the design, development and testing of Inmarsat Satellite Spectrum Monitoring System.
- **Teaching Assistant at University of Saskatchewan** Jan 2016 – May 2018
I created and delivered weekly tutorial lectures for the following courses:
 - CMPT 270 - Developing Object-Oriented Systems Fall 2017
 - CMPT 260 - Mathematical Logic and Computing Summer 2017
 - CMPT 820 - Machine Learning Fall 2016I marked weekly assignments for the following course:
 - CMPT 280 - Intermediate Data Structures and Algorithms Winter 2016-2018
- **Research Assistant at University of Ulsan, S. Korea** Mar 2013 – Aug 2015
My main responsibilities included writing research software for statistical signal processing and delivering weekly seminars to the speech signal processing lab members.
- **Intern at National Telecom Corporation HQ, Pakistan** Summer 2010
Research: Interpolation filters for packet loss concealment in VoIP networks.
Operation and maintenance of ZTE ZXJ10 Network Management System.

SCHOLARSHIPS

- Department of CS Scholarship 2015 – 2018
Valued US \$21,500/year
For PhD in Computer Science at the University of Saskatchewan, Canada.
- Australian Postgraduate Award Offer declined 2016
Valued US \$205,000
For PhD in Electrical Engineering at the Queensland University of Technology, Australia.
- AF-1 Full Tuition Scholarship 2013 – 2015
Valued US \$45,000
For MS in Computer Engineering at the University of Ulsan, South Korea.
- National ICT Scholarship by Govt. of Pakistan 2008 – 2012
Awarded to top 550 out of 7200 candidates.
For BS in Electronic Engineering at IIUI, Pakistan.

AWARDS

- Outstanding Academic Performance Award as National ICT Scholar.
- Winner of IEEE nation-wide inter-university quizzical 2011.

TALKS

- “Reinforcement Learning,” Young Researchers Conference in Mathematics and Statistics, Canada, June 8, 2017. [goo.gl/WbqSGU]
- “Deep Neural Networks: Introduction, Architectures and Implementations,” Dept. of CS, University of Saskatchewan, Canada, November 29, 2016. [goo.gl/EaygQp]
- “Text-to-Speech Synthesis Systems: An Overview,” Dept. of Electrical Engineering, University of Ulsan, South Korea, December 6, 2013. [goo.gl/iebOnA]

TECHNICAL SKILLS

Computer Programming:

| | |
|------------------------------------|---|
| C# | Developed a music score editor [git.io/vMycc] and a text-to-speech synthesis system [git.io/vMycg] in C#. |
| C | Programmed TI digital signal processors using C language. |
| Matlab | Implemented backpropagation neural-nets with unsupervised pre-training. [git.io/vMyck] |
| Python | Implemented dynamics of a two joint arm. [git.io/vMyCY] |
| TensorFlow | Implemented various regularization techniques for DNNs, namely DropOut, DropConnect, ShakeOut and ShakeConnect (proposed by me). |
| Java | Developed a physics based model of the human tongue using ArtiSynth. |
| L^AT_EX | Developing a tiny library for visualization of ML algorithms. |
| Verilog | Analyzed and tested the implementation of a VeSPA processor. |

Hardware:

| | |
|-------------------------------------|---|
| Circuit Design | Studied extensive coursework in both analog and digital circuit analysis and design. |
| PCB Design & Fabrication | Developed several term projects using custom designed PCBs including amplifiers, an inductance-capacitance meter and boards for microcontrollers. |
| Embedded Design | Designed and implemented embedded systems including a GPS Logger, lighting control system and a line following robot. |

Writing:

| | |
|-------------------|--|
| Reports | (2015) A parallel implementation of CMA-ES [goo.gl/hqFUXf] |
| Blog Posts | The Perplexing Trivia [] Gradient, Jacobian, Hessian, Laplacian and all that [goo.gl/qdmcKN] On differential equations [goo.gl/6WhnQk] |

LANGUAGES

| | |
|-------------------|--|
| Korean | Basic conversation, reading and writing. |
| English | Can read, write, speak and comprehend. |
| Urdu/Hindi | Can read, write, speak and comprehend. |
| Pashto | Native speaker. Can read and write. |

EXTRA-CURRICULAR ACTIVITIES

- Ph.D. Students Representative, Dept. of CS (2017-2018), USask, Canada.
- Volunteer, Graduate Students Association (2016), University of Saskatchewan, Canada.
- Participated in Research Festival (2016), Dept. of CS, USask, Canada. [[goo.gl/CWxWB1](https://github.com/vMycc)]
- Vice-President, Pakistani Students Association (2013), University of Ulsan, Korea.
- Participated in Engineering Problem Solving at NASCON (2012). [[goo.gl/et2KDk](https://github.com/vMycc)]
- Runner-up in Microcontroller Programming and Interfacing at NASCON (2011).

ACADEMIC
PROJECTS

- **Covariance Matrix Adaptation Evolution Strategy** Fall 2015
CMA-ES is a derivative free optimization algorithm. I implemented a parallel version of CMA-ES using Python and integrated it with PythOpt optimization environment.
- **Polar Codes** Fall 2014
Polar codes are error correcting codes that achieve channel capacity with coding complexity of $\mathcal{O}(n \log(n))$. I simulated polar codes in Matlab for a binary erasure channel.
- **Scheduling for the FlexRay Protocol** Spring 2013
A formal investigation of the scheduling problem for the dynamic segment of the FlexRay was conducted.
- **Signal Processing for Muzzle Velocity Radar** Fall 2012
I replaced FFT based Doppler shift measurement with the Chirp Transform Algorithm in order to increase the accuracy given the brief Doppler signal.
- **Negative Index Metamaterials** Fall 2012
Developed the simulation of a transmission line based on negative index metamaterial in Advanced Design System simulator.
- **Firmware for AVR and SD card interfacing** Spring 2010
I developed drivers for interfacing secure digital cards with AVR microcontrollers through Serial Peripheral Interface.