

## RESEARCH INTERESTS

- Deep Learning
- Machine Learning
- Computer Vision
- Data Mining

## EDUCATION

- Master of Science in Electrical and Electronic Engineering** (Ongoing) April 2017 - May 2019(Expected)  
Bangladesh University of Engineering and Technology (BUET), Dhaka  
CGPA: 3.75/4.00, Completed: 18 credits
- Bachelor of Science in Electrical and Electronic Engineering** April 2012 - February 2017  
Bangladesh University of Engineering and Technology (BUET), Dhaka  
CGPA: 3.78/4.00, 157.5 credits

## WORK EXPERIENCE

- Machine Learning Researcher**, Semion Ltd., Dhaka March, 2017 - present
- Providing Deep Learning solutions to potential clients
  - Reproducing state of the art results from the literatures and applying them to proprietary datasets
  - Design and development of necessary software infrastructures, Android app, Alexa skill
- Intern**, Semion Ltd., Dhaka August, 2016 - December, 2016

## ONGOING RESEARCHWORKS

- **Deep learning based Sepsis screening system from EHR data**  
Detection and prediction (4 hours before the onset) of 3 categories of sepsis by novel deep learning algorithm that uses only six widely available vital measurements; feature ranking and affect of variable number of vital signs
- **Classify subcellular protein patterns in human cells** 🔄  
Multi label classification of mixed protein patterns from 4-channel (RGBY) confocal microscopy images, explore the effects of adaptive learning rate and different image processing techniques

## RESEARCH ARTICLES ( [R<sup>6</sup>](#) )

- [1] **A. Mitra**, K. Ashraf. "Sepsis Prediction and Vital Signs Ranking in Intensive Care Unit Patients", *arXiv preprint arXiv:1812.06686*, 2018 📄
- [2] R. Ahsan, **A. Mitra**, S. Omar, M. Z. R. Khan, M. A. Basith. "Sol-gel synthesis of DyCrO<sub>3</sub> and 10% Fe-doped DyCrO<sub>3</sub> nanoparticles with enhanced photocatalytic hydrogen production abilities", *RSC Advances*, 2018 📄
- [3] **A. Mitra**, T. Mostafiz, R. Ur Rashid. "Photoplay: An Android Application to Stimulate Children's Cognitive Development", *IEEE Region 10 Humanitarian Technology Conference (R10-HTC)*, 2017 📄 🔄

## UNDERGRADUATE THESIS

- Sol-gel synthesis of DyCrO<sub>3</sub> and 10% Fe-doped DyCrO<sub>3</sub> nanoparticles and characterization of their structural, optical, magnetic properties for enhanced photocatalytic activities**  
DyCrO<sub>3</sub> and 10% Fe-doped DyCrO<sub>3</sub> nanoparticles, synthesized by sol-gel method, were characterized using XRD, SEM and UV-visible spectrophotometry. The doped nanoparticles show a reduced band gap (2.45 eV) compared to the undoped ones (2.8 eV). Photocatalytic degradation test shows 17% improved photocatalytic ability for the doped nanoparticles.  
**Supervisor:** Md. Ziaur Rahman Khan, PhD, Department of Electrical and Electronic Engineering(EEE), BUET

## SELECTED PROFESSIONAL PROJECTS

- **SemSepsis**, a sepsis detection GUI (Python, PyQt4) 2018
- **SemRad**, a Teleradiology Solution (Java, JavaFX, SQLite, MySQL) 2018
- **Faulty semiconductor wafer detection** from machine logs (Python, Tensorflow) 2018
- **Finding hotspots** in semiconductor wafer logs using LRP algorithm (C++, Python) 2018
- **HealthGeek**, an Android app and **Differential Diagnoses**, an amazon Alexa skill (Java, Node.js, Flask) 2017
- **Risk factors detection** for heart diseases in diabetic patients using bi-LSTM and CRF (Python, Theano) 2017
- Symptoms to disease, organ/body part and specialist **mapping** (Python, R) 2017

## SELECTED OTHER PROJECTS

- Retinal Vessel segmentation via ANN, SVM and CNN Self 2018
- Implementation of GTA and ADDA for VisDA-2018 challenge on Syn2Real dataset Self 2018
- End-to-end speech recognition using Baidu's DeepSpeech architecture Self 2018
- Detection of Arrhythmia based on DWT using ANN, SVM and RF Biomedical Signal Processing 2018

• Gate level design, cell layout and simulation of a 3-bit Multiplier	VLSI II Laboratory 2017
• Hangman for GRE, an android app for GRE students	self 2017
• Gate level design and simulation of an 8-bit Microprocessor (Modified SAP)	Microprocessor Laboratory 2016
• Gesture based pong game implementation on a TFT display	Control System Laboratory 2016
• Home security system via push message service	Communication Laboratory 2016
• Gate level design and simulation of a 4-bit Arithmetic Logic Unit	Digital Electronics Laboratory 2015

## RELEVANT COURSES

**Undergrad Level:** Linear Algebra • Probability and Statistics • Calculus I • Calculus II • Ordinary and Partial Differential Equations • Digital Signal Processing I • Continuous Signals and Linear Systems • Digital Logic Design

**Grad Level:** Biomedical Signal Processing

**Self-taught:** Machine Learning (Coursera/Stanford) • Convolutional Neural Networks for Visual Recognition (Stanford)

• Deep Learning Specialization-5 courses (deeplearning.ai/Coursera)

## SKILLS

**Programming Languages:** Python, Java, C, C++, MATLAB, Verilog HDL, R, Assembly language

**Machine Learning Frameworks:** Tensorflow, Keras, Scikit-learn, Pytorch, Theano

**Design Tools:** PSPICE, Cadence Virtuoso, Proteus, Quartus

**IDEs:** Android studio, Visual Studio, PyCharm, IntelliJ IDEA, Brackets, Arduino

**Other Expertise:** Weka, Latex, Git, Microsoft Office

**Os:** Linux, Windows

## ACADEMIC HONORS

<b>Dean's List Award</b>	Awarded for attaining CGPA greater than 3.75
<b>Board Scholarships</b>	At Primary, Junior, Secondary and Higher secondary Levels
<b>Admission Test Scholarship</b>	For securing 83 <sup>rd</sup> position among 9000 applicants in BUET admission

## OTHER ACTIVITIES

<b>449<sup>th</sup> among 2172 teams (Top 21%),</b> Human Protein Atlas Image Classification, Kaggle 🏆	2019
<b>355<sup>th</sup> among 3234 teams (Top 11%),</b> TGS Salt Identification challenge, Kaggle 🏆	2018
<b>12<sup>th</sup> among 57 teams (Top 21%),</b> Bengali Handwritten Digit Recognition, Kaggle 🏆	2018
<b>2<sup>nd</sup> Runner up,</b> Inter University Project Show, BUET	2015
<b>1<sup>st</sup> Runner up,</b> Inter School & College Science Festival, Rajuk College, Dhaka	2010
<b>Volunteer</b> – EEE day 2017 and RAG Program 2017, BUET	2016
<b>Club Affiliations</b> – Satyen Bose Science Club, BUET Robotics Society	

## REFERENCES

**Dr. Mohammad Ariful Haque**  
Professor, Department of EEE  
Bangladesh University of Engineering and Technology  
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**Dr. Khalid Ashraf**  
Founder, Semion Ltd.  
Co-founder, Deepscale Inc.  
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