

MOHAMMAD NUR HOSSAIN KHAN

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Department of ECE
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EDUCATION

Bangladesh University of Engineering and Technology
B. Sc. in Electrical and Electronic Engineering
CGPA: 3.73 on a scale of 4.00

Dhaka, Bangladesh
March, 2016

RESEARCH INTEREST

Artificial Intelligence, Machine Learning, Natural Language Processing.

RESEARCH EXPERIENCE & PROJECTS

Undergraduate Thesis.....

"Basic Hand Movement Classification from Surface EMG Signals Using EMD and Wavelet analysis." - under the supervision of professor Dr. Shaikh Anowarul Fattah.

- Statistical features are extracted from raw EMG data, wavelet coefficients of raw data and Empirical Mode Decomposition (EMD) of raw data which are then used for supervised classification of six class basic hand movement detection by KNN, LDA and SVM classifier.
- Reflection coefficients are extracted from raw data and wavelet coefficients of raw data and these coefficients of different orders are examined to classify six basic hand movements using SVM, KNN and LDA classifier.

Projects.....

- Predicting Bike Sharing Data:** In this project the number of bike shared at a particular time is predicted using neural network from scratch. Code is developed in python. [GitHub project link](#).
- Physiological Signal Analysis using 1D Convolutional Neural Network:** Code is developed in python using keras framework. The goal of this project is to analysis surface EMG signal for hand movement classification and to analysis EEG signal to detect sleep apnea. 1D CNN is used to differentiate apnea from non-apnea frames and the same framework is used to classify six hand movement from surface EMG signal. [GitHub project link](#).
- Dog Breed Classification:** The goal of this project is to create a dog breed identification application using convolutional neural networks. It uses transfer learning and a model from scratch to detect dog breeds. It also utilize openCV for human detection. The resulting algorithm could be used as part of a mobile or web app. The code will accept any user-supplied image as input. If a dog is detected in the image, it will provide an estimate of the dog's breed. If a human is detected, it will provide an estimate of the dog breed that is most resembling. [GitHub project link](#).
- Face Generation:** The goal of this project is to generate fake celebrity face images using GAN. DCGAN is used here to generate faces. Code is developed in python using the PyTorch framework. [GitHub project link](#).
- Sentiment Analysis:** In this project, I have done a sentiment analysis on IMDB movie review dataset. Sentiment analysis is done using SGD classifier and Recurrent neural network from scratch. The RNN model is then deployed using Amazon SageMaker. [GitHub project link](#).
- 2048 game:** The goal of this project is to play 2048 game with minimax algorithm. I have employed minimax algorithm with alpha-beta pruning to play 2048 game. Player is given 0.2s time to play his move. Highest score achieved is 2048. With proper heuristic it is possible to score higher. [GitHub project link](#).
- Bar Code Generator and Decoder using MATLAB:** Code was developed in MATLAB to generate multicolor bar code of different characters and strings and also to decode bar code to different strings of character. [Project details can be found here](#).
- Webcam Based Smart Traffic Control System:** We developed a traffic control system using Arduino and image

processing where image from webcam was processed in MATLAB. This project was selected for ICT Expo 2015 arranged by Government of Bangladesh. **Project details can be found here.**

PUBLICATION

Preprint.....

- **Mohammad Nur Hossain Khan**, Shaikh Anowarul Fattah, "*Basic Hand Movement Detection Using Wavelet Coefficients and Reflection Coefficients*", International Symposium on Circuits and Systems, 2022. (Under Review)

Conference.....

- **Mohammad Nur Hossain Khan**, Shaikh Anowarul Fattah, "*Surface EMG Based Basic Hand Movement Detection using Singular Value Decomposition*", International Conference on Biomedical Engineering, Computer and Information Technology for Health (BECITHCON), IEEE, 28 to 30 November, 2019, Dhaka, Bangladesh.
- Md. Mohsinur rahman Adnan, Zunaid Omair, Raiyan Abdul Baten, Shouvik Musavvir, **Nur Hossain Khan**, Risalat Ahmed, "*Adaptive Traffic Control System Using Dynamic Slot Allocation To Achieve Minimal Congestion In A Stand Alone Road Junction*", International Conference on Engineering Research, Innovation and Education, ICERIE 2017, 13 to 15 January, SUST, Sylhet, Bangladesh.

PERSONAL ACCOMPLISHMENTS

- **MicroMasters in Artificial Intelligence** - Columbia University
 - Learned Artificial Intelligence, Machine Learning with Mathematics, Robotics, Robot Operating System, Animation and CGI Motion.
- **Deep Learning Specialization** - deeplearning.ai
 - Learned Neural Network and Deep Learning, Hyperparameter Tuning, Regularization, Optimization Structuring Machine Learning Projects, Convolutional Neural Network, Sequence Models.
- **Machine Learning** - Stanford University
- Recipient of Bertelsmann Technology Scholarship on Udacity

STANDARDIZATION TEST

- **Graduate Record Examination (GRE)**
Aggregate: **317**; Quantitative: 165 (86th) ; Verbal: 152 (52nd) ; Analytical Writing Ability: 3.0
- **TOEFL**
Aggregate: **108**; Reading: 30; Listening: 29; Speaking: 23; Writing: 26

TECHNICAL SKILLS

- **Programming Languages:** C, C++, Python, Arduino
- **Software Skills:** Matlab, GNU Octave, OrCAD PSpice, Proteus, LaTeX
- **Framework:** TensorFlow, Keras, PyTorch

RELEVANT COURSE WORKS

Random Signals and Processes, Digital Signal Processing I and II, Microprocessor and Interfacing, Computer Programming, Signal and Systems, Probability and Statistics, Numerical Technique, Linear Algebra, Calculus I and II, Ordinary and Partial Differential Equations.

ACADEMIC ACCOMPLISHMENTS

- Deans List at Level 1 and 2
- University Merit Scholarship at Level 1-1, 2-2, 3-1
- **Perfect Attendance Certificate** awarded by Notre Dame College, Dhaka