Curriculum Vitae

Personal Information

Name	K M Arefeen Sultan	Date of Birth	*Jan 9th, 1997*
		Email	krsultan069@gmail.com

Research Interests

- Machine Learning
- Deep Learning

Education

2015 – 2019   **Ahsanullah University of Science and Technology** *Dhaka, Bangladesh*
B.Sc in Computer Science and Engineering (CSE)
CGPA: 3.685/4.00

Work Experience

Jan 2020 – Present   **Northern University Bangladesh** – Full-time Lecturer

- Conducting competitive programming classes on data structures, algorithms and graph theory.
- Undertaken courses on "Computer Graphics", "Software Engineering", "Data Communication", "Object Oriented Programming", and "Numerical Method".

Skills & Background Knowledge

Technical skills

Languages	Python, Java, JavaScript, C, C++, C#, SQL, Git, MySQL, MATLAB, PHP, HTML5, CSS, 80x86 Assembly, Prolog
Frameworks	PyTorch, TensorFlow, Keras, OpenCV, NumPy, Pandas, Matplotlib, WebGL
Operating System	Windows, AWS SageMaker, Android & Linux
Others	LaTeX

Academic Projects

Apr 2019   **Character Recognition:** Project on recognizing characters from images using image processing and machine learning algorithms.

- Experimented with median blur, and histogram equalization, for image pre-processing technique.
- Achieved an accuracy of 92.2% and 59% by implementing Support Vector Machine, and K-Nearest Neighbor for machine learning approach.
- Github: `https://github.com/arf111/Character-recognition.git`

Feb 2018   **SuperShop Mania:** A C# and MySQL based project on Super-Shop.

- Transaction between customer and local store is implemented. Customers can also be approved for membership. Also they can browse product for information and reliability.
- Warehouse has product inventory and can distribute products to local store. There is monthly, weekly and daily sales report.
- Customer can search in different stores for product availability and can browse the top selling products of specific category.
- Github: `https://github.com/arf111/SuperShop_Mania.git`

Dec 2017   **Tic-Tac-Toe:** An Arduino implementation of Tic-Tac-Toe game.

- Both players can input their name at the start of the game.
- Made the game intelligent in a sense that it can predict if the game will be draw or not before the last 2 moves in the board.

- Github: `https://github.com/arf111/Tic-Tac-Toe.git`

Personal Projects

Nov 2020 **Social Distance Awareness:** Project measuring if people follow the appropriate distance between themselves in order to prevent dispersion of COVID-19 disease.

- Bird eye view is implemented using OpenCV to precisely measure the distance between detected objects. The red lines indicate the violated distance (6 ft).
- For detection, Yolov5 model is used (using PyTorch).
- Github: `https://github.com/arf111/Social-Distance-Awareness.git`

Apr 2020 **COVID-19 Detection from X-ray images:**

- Implemented COVID-Net [Wang et al.] from scratch using PyTorch.
- Focal Loss [Lin et al.] was implemented to handle the imbalance dataset.
- GradCAM [Selvaraju et al.] was implemented to visualize the salient regions on X-ray images for which the neural network predicted COVID-19 or not.
- Github: `https://github.com/arf111/PyTorch_COVID-19_detection.git`

Research Experience

Mar 2018 – July 2019 **toon2real: Translating Cartoon Images to Realistic Images**

- Work was based on transforming cartoon images to real-world images using a variation of Generative Adversarial Networks(GANs), named CycleGAN. As GAN is highly unstable during training, Lipschitz constant of the learning weights was constrained using Spectral Normalization technique which resulted in better training stability and image quality as well. For evaluation, Fréchet Inception Distance was implemented, which is on par with human evaluation.
- The project got accepted in ICIET '18 Conference as a Conference Paper.
- The project secured the 1st runner-up position in national competition – MindSparks '19.
- A full paper was written later that got accepted in ICTAI '20 Conference.

Publication

Nov 2020 **K M Arefeen Sultan**, Mohammad Imrul Jubair, MD. Nahidul Islam, & Sayed Hossain Khan, **"toon2real: Translating Cartoon Images to Realistic Images"**, *International Conference on Tools with Artificial Intelligence (ICTAI), Baltimore, USA* [`https://arxiv.org/abs/2102.01143`]

Dec 2018 **K M Arefeen Sultan**, Labiba Kanij Rupty, MD. Nahidul Islam, Sayed Hossain Khan & Mohammad Imrul Jubair, **"Cartoon-to-real: An Approach to Translate Cartoon to Realistic Images using GAN"**, *International Conference on Innovation in Engineering and Technology (ICIET)*, Dhaka, Bangladesh [`https://arxiv.org/abs/1811.11796`]

Professional Development

May 2020 **Computer Vision Nanodegree:** This Udacity Nanodegree program includes the detailed understanding and implementations on Deep Learning and Computer Vision systems.

- Worked on Facial Keypoint Detection project. This part of the nanodegree program covered detailed understanding of Convolutional Neural Networks, Maxpooling, Batch Normalization, etc.
- Worked on Image Captioning project using the combination of both CNN and RNN. This part of the nanodegree program covered in-depth understanding and implementation of object detection using YOLOv3, Attention model, and Image to Text generation.
- Implemented Landmark Detection and Robot Tracking using SLAM. This part of the nanodegree program covered topics on object motion and tracking, optical flow, robot localization, and graph SLAM.
- Certification Link: `https://confirm.udacity.com/E7FJ79LS`

Oct 2019 **Deep Learning Nanodegree:** This Udacity Nanodegree program included a comprehensive understanding and implementation of Deep Learning domain.

- Worked on a project which predicts bike sharing patterns on a given day. The project covers topics on Neural Network's foundation, mostly it's forward propagation and back-propagation.
- Implemented a Dog Breed Classifier which covers topics on the basic buildings of Convolutional Neural Networks, and transfer learning.
- Implemented a Fake TV script generator program. The project covered topics on text processing, RNN's, and LSTM's
- Built a Face Generating Program based on Deep Convolutional GAN (generative adversarial network). The part of the nanodegree covered on the building foundation of GAN, and CycleGAN.
- Bult a sentiment analysis model, deployed the model on Amazon AWS SageMaker, and created a gateway to access it from a website. The part of this nanodegree program covered topics on Cloud Deployment.
- Certification Link: `https://graduation.udacity.com/confirm/FGGM4QG2`

Honors and Awards

July 2019 Ranked among top 5% in Cumulative GPA among 152 undergraduate students in Department of Computer Science and Engineering, Ahsanullah University of Science and Technology.

Jan 2019 1st runner up in Poster Presentation at National Competition, MindSparks '19.

Dec 2010 Recipient of the Grant of General Scholarship on 8th Grade Dhaka Board Scholarship Exam from the Education Board of Bangladesh.

Co-curricular Activities

July 2018 **Event Organizer**
- CodeWare '18