Md. Mushfiqur Rahman

Career Interests: **Computer Vision**, **Machine Learning** and **AI** Research
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SCORES

GRE (Date Taken: 4th November 2020) 327/340
QR: 167 VR: 160 AWA: -

TOEFL (Date Taken: 17th October 2020) 105/120
Reading: 29/30 Listening: 30/30 Speaking: 23/30 Writing: 23/30

EDUCATION AND ACADEMIC HIGHLIGHTS

Islamic University of Technology (IUT) 2017 – Mar 2021
BSc in Computer Science and Engineering CGPA 3.77/4.00 (after 6 semesters)
Medium of instruction: English
Expected date of graduation: **Mar 2021**

- Obtained OIC scholarship
- Worked at IUT Computer Vision Lab (supervisor: Dr. Md. Hasanul Kabir)
- Runner-up of *Inter University App Development Contest*, 2019 ICT Fest
- Champion of *ICT4D at 4th AUW ICT Fest 2018*

Notre Dame College 2014 – 2016
Medium of instruction: English
Higher-Secondary School Certificate, Science GPA 5.00/5.00

- Medalist in *Bangladesh Mathematical Olympiad* (2016)

St. Joseph Higher Secondary School 2006–2014
Medium of instruction: English
Secondary School Certificate, Science GPA 5.00/5.00

- 2 times National Topper and Gold Medalist in *International Assessment for Schools (Maths)* organized by UNSW
- 4 National Medals in *Bangladesh Mathematical Olympiad* (2009, 2012, 2013, 2014). 2 times National Math Camper
- 2 Divisional Medals in *Bangladesh Physics Olympiad* (Dhaka) (2013, 2014)

RESEARCH PUBLICATION (Peer-reviewed)

Md. Mushfiqur Rahman, S. B. Noor, F. H. Siddiqui,
Automated Large-scale Class Scheduling in MiniZinc, Accepted at *2020 2nd International Conference on Sustainable Technologies for Industry 4.0 (STI)*
Funded by the University Grant Commission (UGC), Bangladesh
(Indexed by IEEE Xplore Digital Library) In this paper, we propose an automated system to generate class schedules in reasonable time (less than 1 minute for a typical setting). The paper considers the class-scheduling as a constraint satisfaction problem. The use of MiniZinc (a constraint modeling language) and Chuffed (off-the-shelf solver used in the implementation) makes the system robust.

Md. Mushfiqur Rahman, N. M. Zahin, K. R. Mahmud, A. B. Ansar,
Automated Intersection Management with MiniZinc, Accepted at *2020 2nd International Conference on Sustainable Technologies for Industry 4.0 (STI)*
(Indexed by IEEE Xplore Digital Library) In this paper, we propose a heuristic based solution to the grid-lock problem at traffic intersections. With the efficient use of MiniZinc, our model minimizes the overall time delay at intersections by regulating traffic signals.

ON-GOING RESEARCH PROJECTS

Md. Mushfiqur Rahman, T. Abedin, K. S. S. Prottoy, A. Moshruba, F. H. Siddiqui. **Semantically Sensible Video Captioning (SSVC)**, *Submitted to a peer-reviewed journal. Pre-print is available.*
In this paper, we propose a lightweight solution to video captioning by the introduction of two novel concepts – "Stacked Attention" and "Spatial Hard-Pull". Our model efficiently captures the higher level features of videos along with lower level features. We also propose a novel scoring method for video captioning models.

Image Restoration with GAN
Academic Thesis, Supervised by Dr. Md. Hasanul Kabir
In this research, our goal was to restore and reconstruct old broken images. Our proposed method can handle several kinds of noises simultaneously and have performance comparable to state-of-the-art methods. Our primary contribution is the use of 'structure loss' in restoration tasks that helps maintaining overall consistency of the images. Our model also uses coherent semantic attention to ensure proper inpainting.

Artificial Abstraction and Reasoning Generation
On-going research

WORK EXPERIENCE

Dhaka University of Engineering and Technology, Gazipur
Research Assistant Feb 2020 – Jul 2020

- Worked with Dr. Fazlul Hasan Siddiqui (head of CSE deptartment, DUET)
- Built an automated university scheduler using heuristic approach and authored a research paper
- Used MiniZinc and Python for implementation

Samsung R&D Institute Bangladesh, Dhaka
Intern Nov 2019 – Jan 2020

- Worked on a research project that aimed at generating realistic equirectangular images from 3D models using GAN
- Implemented the conditional GAN architecture adjusted for spherical images

M-World, Bangladesh
Game Development Team Lead Jul 2019 – Sept 2019

- Developed 2 android games using Unity and C# for a nutrition awareness project (funded by GAIN and BSMMU)
- The two games – *Pothe pothe* and *Radhuni Ami* are available in play-store.

Harriken, Dhaka
Intern Nov 2017 – Dec 2017

- Harriken was a tech start-up where I worked as an intern for 2 months
- My primary duty was to coordinate with the clients and convey their needs to the developers

Bangladesh Mathematical Olympiad
Academy Team Member (Voluntary) Dec 2016 - Oct 2017

- Our main responsibility was to prepare questions for the olympiads and to analyze interesting and innovative solutions
- We had to travel across the country to all exam spots where olympiads were held

OTHER RELEVANT ACTIVITIES

Other Notable Accolades

- Silver medal in a Kaggle competition, titled, "Bengali.AI Handwritten Grapheme Classification"
- Top 10 finish in "Dhaka-AI Traffic Detection Challenge 2020"

Other Notable Projects

- Parameter reduction of image classifier: Finding lowest parameter model while achieving 80% top-1 accuracy. The research project was conducted using **Pytorch in Python**
- Real-time Object Detection for Autonomous Vehicles using YOLOv5 in **Pytorch in Python**
- Bengali Hand-written Digit Recognition with **Tensorflow in Python**
- A simple Bengali OCR application for **Android** (available at play-store). The machine learning model was developed with **Tensorflow and Keras**
- A cricket scoring desktop application written in **C++ (Qt platform)**
- A travel manager desktop application with network-socketing written in **Java**. JDBC was used to maintain back-end database

Additional Courses and Certifications

- Completed the Deep Learning Specialization (offered by DeepLearning.ai) on Coursera including all the 5 courses in it
- Completed the Machine Learning Course (offered by Stanford University) on Coursera
- Introduction to Psychology (offered by University of Toronto) on Coursera