Md Mohaiminul Islam

mmiemon@cs.unc.edu

Personal website Google Scholar GitHub LinkedIn

ABOUT ME

I am a second-year PhD student working with professor Gedas Bertasius. My research interest lies in computer vision, machine learning, and multi-modal deep learning. Currently, I am working on developing efficient deep learning architectures for long-range video modeling. Before joining UNC-Chapel Hill, I worked at Samsung Research, Bangladesh.

EDUCATION

PhD in Computer Science 2021 - Present
University of North Carolina at Chapel Hill

Courses taken:
Deep learning, Colin Raffel
Advanced Topics in Video Understanding, Gedas Bertasius
Visual Recognition with Transformers, Gedas Bertasius
Connecting Language to Vision and Robotics, Mohit Bansal

Bsc. in Computer Science and Engineering 2014 - 2018
Bangladesh University of Engineering and Technology, Dhaka, Bangladesh

CGPA 3.86/4.00 (3.93 last four terms)

EXPERIENCE

Comcast AI May 2022 - August 2022

Machine Learning Intern, Computer Vision and Video Understanding.

University of Asia Pacific April 2019 - December 2020

Lecturer, Department of Computer Science and Engineering

Samsung Research, Bangladesh November 2018 - March 2019

I worked on the project "Samsung Galaxy Watch Designer".

REVE Systems January 2018 - September 2018

I worked in the project "Bengali Speech to Text Transcription".

RESEARCH AND PUBLICATIONS

Long Movie Clip Classification with State-Space Video Models 2022
European Conference on Computer Vision, ECCV 2022, (arXiv), (code)

We propose ViS4mer, an efficient long-range video recognition model that combines the strengths of standard transformer and the recently introduced state-space models. We achieve state-of-the-art result in several long-range video understanding datasets such as Longform Video Understanding, Breakfast, and COIN. Moreover, ViS4mer is 2.63× faster and requires 8× less GPU memory than the equivalent transformer architecture.

Object State Change Classification in Egocentric Videos using Divided Space-Time Attention Mechanism 2022
Ego4D Workshop, CVPR 2022, (arXiv), (code)

Using a transformer-based model and leveraging the Divided Space-Time Attention mechanism, won second place in the Ego4D: Object State Change Classification Challenge.

COVID-DenseNet: A Deep Learning Architecture to Detect COVID-19 from Chest Radiology Images 2022

International Conference on Data Science and Applications, ICDSA 2022 (preprint) (code)

A novel deep learning architecture to detect COVID-19 from chest radiology images. We also propose a GRAD-CAM-based highlighting strategy to localize critical regions of COVID-19 positive images.

Internal Abnormalities' Detection of Human Body Analyzing Skin Images Using Convolutional Neural Network 2020

International Joint Conference on Computational Intelligence, IJCCI 2020, (link)

A novel CNN architecture to detect abnormalities on the skin from images which may not be visible to human eyes.

Protein Secondary Structure Prediction 2018

Undergrad thesis(thesis book)

We Used machine learning to predict the three-dimensional structure of a protein from its amino acid sequence. We used a CNN-LSTM model as our architecture. To handle the long-range dependency in the protein sequence, we utilized the attention mechanism.

eMED-DNA: An *in silico* operating system for clinical medical data storage within the human genome 2018

Undergrad thesis(bioRxiv)(thesis book)

We presented a proof-of-concept for efficient management of Electronic Health Records(EHRs) of a person inside his DNA sequence.

Patent Application:UK Patent Application No. 1901754.0, filed February 2019, Patent Pending.

SELECTED PROJECTS

GitHub Links are provided.

Bengali Handwritten Digit Recognition

Utilizing proper preprocessing, data augmentation, and transfer learning, I developed a CNN based model to correctly identify Bengali digits from NumtaDB(a large dataset of 85,000+ Bengali Digits).

Automated Room Cleaner

Using ATmega32 and necessary sensors and actuators, I developed an automated room cleaning robot.

Smart Bed

Using Arduino, Pressure Sensor, Temperature Sensor, and other sensors, I built a prototype of Smart Bed, which can ensure sound sleep. It particularly helps patients with sleeping problems.

Police Control Box

An interactive server-client system developed using Java Swing, JavaFX, Scene Builder, MySql, and Socket Programming to efficiently manage various services provided by police.

UniShare (Education Material Sharing Tool)

I used PHP, CodeIgniter framework, MySql, JavaScript, HTML, CSS, and XAMPP server to create this academic resource sharing platform among various Universities.

Online Exam Management

Using SQL, JSP, Servlets, and HTML I created this online exam management system where teachers can create, edit exams, and students participate in them.

Railway Management System

We proposed a use-case diagram, context diagram, collaboration diagram, sequence diagram, and a class diagram for our problem to solve some problems regarding the Railway system in Bangladesh. We used a factory design pattern for our prototypical solution.

Frog Game(Crossy Road)

I used OpenGL to implement this game.

C compiler

Using Flex and Bison, I created a simple C compiler that can compile and run simplified C codes.

TECHNICAL SKILLS

ML tools	Pytorch, Tensorflow, Keras, Distributed training
Languages	Python, C/C++, Java, 80x86 Assembly, HTML, XML, PHP, JavaScript
Framework	MVC, CSS, OpenGL, Codeigniter
Database	Oracle, Microsoft SQL Server, MySQL, SQLite
Simulators	Nachos, Packet Tracer, Proteus, Matlab
OS	Windows, Android and other Linux distributions
Hardware	AVR Micro-controller, Arduino
Others	Lex, Yacc, Shell Script, LaTeX

AWARDS AND HONOR

Champion Student Poster Award 2017

2017 International Conference on Networking, Systems and Security(4th NSysS 2017)
For the poster "Archiving Medical Records in DNA Sequence."

Deans List Award 2015, 2017

Bangladesh University of Engineering and Technology

University Merit List 2015, 2016

Bangladesh University of Engineering and Technology

University Stipend 2017

Bangladesh University of Engineering and Technology

EXTRA-CURRICULAR ACTIVITIES

Kaggle Competition

I participated in the competition Bengali Handwritten Digit Recognition.

Class Representative 2014-18

BUET