

Abrar Fahim

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About Me

Motivated and fast-learner looking to enter Machine Learning research in the fields of Computer Vision and NLP. 1-year experience with ML basics and developing novel learning algorithms.

Research Interests

- Computer Vision
 - Scene reconstruction by estimating 3D object and light positions and relative depths of objects of interest, and more to advance computational photography and robotics
 - Improving “understanding” of multimedia sources by combining NLP and vision concepts
- Natural Language Processing
 - Creating abstractive summaries of multiple sources of text and multimedia
 - Improving speech comprehension to make human-computer interactions more natural

Research Experience

Mar 2021 - Present

B.Sc. Thesis - Supervised by [Prof. Mohammed Eunus Ali](#)

- Learned indexes for **Approximate Similarity Search in High Dimensional Datasets**
- Created custom, fully vectorized optimization function in PyTorch and made loss function memory-compatible using complex tensor operations to run under 4GB GPU memory for ~ 1000 dimensional datasets with millions of points, learning high-quality partitions in under 10 minutes
- Improved on baseline approach (that uses supervised learning) by designing an algorithm to learn partitions of the dataset without using labels from existing indexes in an unsupervised setting using model-boosting (improving Nearest Neighbors accuracy by at least 5-10% using an ensemble of 2 models)

Education

Feb 2017 - Present

Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh - B.Sc. in Computer Science and Engineering

- Current CGPA: **3.71**, Major CGPA: **3.91** | Expected Completion Date: **Apr 2022** (Currently in final semester)
- Ongoing Courses: ‘Machine Learning’, ‘Simulation and Modeling’, ‘Sociology for Science and Technology’, ‘Financial, Cost, and Managerial Accounting’, and ‘Industrial Management’.

Sept 2014 - Jun 2016

Merryland International School, Abu Dhabi, UAE – Cambridge International AS and A level

Awarded Outstanding Cambridge Learner's Award for scoring the highest marks in the country in Physics, Chemistry, Math, and Biology. Also recognized by Abu Dhabi Education Council for the same achievements

Work Experience

Dec 2020 - Jul 2021

Free Pixel Games Ltd, Dhaka, Bangladesh – Junior Software Engineer

- Created in-house infrastructure to process and serve data to analysts. Built a web app and wrote complex SQL queries to generate charts and reports from the company game database based on input parameters
- Reduced response times of company database (millions of records) access from minutes to seconds by pingping the database and maintaining client response states in the backend, and by caching third-party API data
- Improved visuals of 3 games by working with graphics team and experimenting with custom shaders

Technical Skills

- **Languages:** C, C++, Java, Javascript (ES6), Python
- **Machine Learning:** PyTorch, NumPy, Scikit-learn
- **Development and Database:** React Native, React.JS, Angular 2, Node.JS, MySQL, PostgreSQL, MongoDB, Git
- **Hardware:** ATMega32, Arduino

Selected Projects

Alfred

Messenger chatbot, a personal assistant that caters to the needs of every office employee.

I led a team of three, conducted requirement analysis, designed chat flows for the bot, and documented all features.

Motion Controlled Robotic Arm:

A robotic arm made using ATMega32 microcontrollers that shadows the movements of its controller.

Lines of Action

Game AI using adversarial search (minimax with alpha-beta pruning). Experimented to find the best heuristic

Volunteering and Social Events

- Part of the organizing team of BUET event "Youngest of the Young, Awake to Fight!"
 - Consisted of a series of sessions addressing rape, sexual harassment, sexual discrimination, and feminism in the context of Bangladesh
- Tutored two Cambridge A-level students, improving both their class performances significantly. One of them received the highest grade in all 4 subjects in AS level finals.
- President of the Student Council, Merryland International School
 - Coordinated with teachers and led the student body in organizing major school events