Habibur Rahman

Machine Learning Developer · Awele | Former Software Engineer · Samsung R&D

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EXPERIENCE

Machine Learning Developer   Feb 2023 – Present
Awele Technologies Inc.   Edmonton, AB, Canada

- Designed a data collection, analysis and visualization pipeline for cross-border shipping
- Developed a recommendation-based algorithm to predict the best possible shipping routes with the highest customer satisfaction, improving route accuracy by 50% and reducing shipping costs by optimizing cost, service time and carrier ratings.
- Implemented core quotes API in NodeJS to CRUD databases and generated shipping options.
- Worked on the ReactJS frontend for presenting the quotes in a user-friendly format.
- Created the ML API on Django and deployed it on Heroku, ensuring high availability and scalability.
- **Language:** Python, JavaScript **Tool/Tech:** PyTorch, Heroku, Django, ReactJS, NodeJS, Scrum

Graduate Research & Teaching Assistant   Jan 2021 – Sep 2023
University of Alberta   Edmonton, AB, Canada

- Introduced a novel variant of the simulated annealing algorithm for addressing program synthesis tasks that leverage a Graph Neural Network (GNN) for sampling a node from the Abstract Syntax Tree (AST), which is then mutated to generate a new program.
- Led undergrad lab for the *Practical Programming Methodology* course by preparing lab scripts, evaluating submissions, and helping students solve exercise problems.
- **Language:** Python, C, C++, Bash **Tool/Tech:** PyTorch, Linux, GNN

Software Engineer   Jul 2019 – Dec 2020
Samsung R&D Institute Bangladesh   Dhaka, Bangladesh

- Contributed to drawing SDK for Samsung Notes in C++, following Agile methodology throughout the development process.
- Implemented the new tag feature for Samsung Notes V3.X from concept and developed an internal automation tool to convert Android localization strings for the Windows platform, reducing string processing time from 120 minutes to 120 seconds.
- **Language:** C++, C# **Tool/Tech:** UWP, WPF, Scrum

Lecturer & Programming Contest Mentor   Jan 2018 – Jul 2019
University of Information Technology & Sciences   Dhaka, Bangladesh

- Redesigned the courses by including programming problems to improve their problem-solving skills.
- Prepared the university teams to attend national and international level programming contests conducting sessions and hosting programming contests.

EDUCATION

M.Sc. in Computing Science, *GPA: 3.8/4*   Jan 2021 – Sep 2023
University of Alberta   Edmonton, AB, Canada

- **Thesis:** Worked on the heuristic search, machine learning and explainable artificial intelligence algorithms for synthesizing human-readable computer program encoded strategies for solving sequential decision-making problems and synthesizing programs for the drawing domain.
- **Supervisor:** Levi Lelis

B.Sc. in Computer Science & Engineering, *GPA 3.77/4*   Mar 2013 – Dec 2017
Rajshahi University of Engineering & Technology (RUET)   Rajshahi, Bangladesh

- **Thesis:** Introduced a weighted probabilistic approach to solve algebraic word problems, which increased the accuracy by **9%** using semantic parsing and reasoning.
- **Supervisor:** Julia Rahman

Leadership Experience

Finance Department Administrator   Jun 2021 – Present
University of Alberta International Students' Association   Edmonton, AB, Canada
- Assisting the VP of Finance in running the department of **16** directors.
- Acting as a liaison between the President and VP Finance office by information exchange.

Problem Setter and Judge - RUET Codesmash   2017 & 2018
Rajshahi University of Engineering & Technology   Rajshahi, Bangladesh
- Arranged intra-university programming contest for university freshman.
- Set programming problems, provided editorial and testcases.

Bangladesh Scouts - Group Leader   Jan 2007 – Dec 2009
Parulia Schedule-caste High School and College   Lalmonirhat, Bangladesh
- Served flood-affected people for sheltering during floods in Rural areas in Parulia (a Village on the Northern-side of Bangladesh, situated beside the Tista River)
- Attended 3 days health camp for first-aid training

Projects

Synthesizing Libraries of Programs by Optimizing an Auxiliary Function   Dec 2021 – Sep 2023
- Proposed an approach by augmenting the program library and guiding the bottom-up search by optimizing auxiliary functions for string manipulation and reverse drawing to generate high-quality programs.
- **Language:** Python, **Tech:** PyTorch, DNN, BUS

Debiasing Multiclass Demographics in Language Models   Sep 2021 – Dec 2021
- Implemented a new regularizer to debias multiclass demographics in language models like BERT, which reduced the biases for several individual classes within a demographic
- Contributed a word list for four demographics to evaluate the fairness of language models.
- **Language:** Python, **Tech:** BERT, PyTorch, DNN **Repo:** akashsara/debiasing-language-models

Data Augmentation in NMT: A Case-study for English to Portuguese   Jan 2021 – Apr 2021
- Developed a new method for data augmentation in translation tasks by evaluating its performance on Recurrent Neural Network with LSTM and Transformer.
- **Language:** Python, **Tech:** LSTM & BERT, **Repo:** habibrahmanbd/Data-Augmentation-in-NMT

How is Testing Related to Single Statement Bugs?   Jan 2021 – Apr 2021
- Predicted a week to moderate correlation (r-value **0.40**) between test coverage and single statement bugs by evaluating **25** open-source maven based java projects.
- Suggested adding more unit tests and increasing test coverage to mitigate single statement bugs by at least **10%**.
- **Language:** Python, ⍾ **Repo:** habibrahmanbd/SSBandTesting

Awards & Scholarships

- Barakah Scholarship for Excellence in Computer Science, MAX Scholarship Fund, CAD $3000.00   2022
- FGSR Graduate Student Support for Parents, University of Alberta, CAD $1300.00   2022
- RUET CSE Student of the Year   2016
- ACM-ICPC Dhaka Regional - Divisional Champion (Rajshahi)   2016
- Dutch-Bangla Bank Merit Scholarship, CAD $2000.00   2012
- NCC Bank Merit Scholarship, CAD $550   2012
- Dinajpur Board Scholarship (SSC, General Category).   2010
- Dutch-Bangla Bank Merit Scholarship, CAD $550.00   2010
- Rangpur Division Junior School Scholarship (General Category)   2007
- Rangpur Division Primary School Scholarship (Talent-pool Category)   2004

Publications, Posters & Workshops

Habibur Rahman. *"Two Irons in the Fire: Synthesizing Libraries of Programs by Optimizing an Auxiliary Function while Solving Problems"*. MSc Thesis, Computing Science, University of Alberta. Fall 2023. https://doi.org/10.7939/r3-y5s5-rx83 — 2023

Akash Saravanan*, Dhruv Mullick*, **Habibur Rahman***, and Nidhi Hegde. *"FineDeb: A Debiasing Framework for Language Models"*. In: AAAI 2023: The Workshop on Artificial Intelligence for Social Good 2023. arXiv preprint arXiv:2302.02453. Equal contributions are marked with *. — 2023

Habibur Rahman. *"Two Irons in the Fire: Synthesizing Libraries of Programs by Optimizing an Auxiliary Function while Solving Problems"*. Poster Presentation, Upperbound AI Week, Alberta Machine Intelligence Institute (Amii), 23 – 26 May, 2023. — 2023

Habibur Rahman. *"Generating Low Cost Heuristic Functions for Grid Pathfinding using Program Synthesis"*. In: Hidden Methods Conference, 27th April, 2022. https://hiddenmethods.ca. — 2022

Habibur Rahman, Julia Rahman and Asmaul Husna. *"WALGES: Weighted Probability Based Scoring Approach for Solving Algebraic Word Problems using Semantic Parsing"*. In: IEEE International Conference on Electrical, Computer and Communication Engineering (ECCE), 7–9 February, 2019. https://doi.org/10.1109/ECACE.2019.8679393 — 2019

Asmaul Husna, **Habibur Rahman** and Emrana Kabir Hashi. *"Statistical Approach for Classifying Sentiment Reviews by Reducing Dimension using Truncated Singular Value Decomposition"*. In: IEEE International Conference on Advances in Science, Engineering and Robotics Technology (ICASERT-2019). https://doi.org/10.1109/ICASERT.2019.8934507 — 2019

Habibur Rahman. *"Solving Percentage Word Problems by Semantic Parsing and Reasoning"*. In: BSc Thesis Seminar, Department of Computer Science and Engineering, Rajshahi University of Engineering and Technology (RUET), Bangladesh. December, 2017. — 2017

Competition Achievements

4th place among 15 teams at University of Alberta Programming Contest (Advanced)	Mar 2022
6th place among 69 participants at A Perfect Fit: HackerEarth ML Challenge	Sep 2021
1st place among 117 students in the 4th Academic Year at RUET CSE department	2016
1st place among 20 teams from Rajshahi Division at ACM - ICPC Dhaka Regional	Nov 2016
2nd position among 20 teams at IEEE RUET RoboTour and Programming Contest	2015

Licenses & certifications

- **Deep Learning + Reinforcement Learning Summer School 2023** - CIFAR — Jul 2023
  Skills: Deep Learning, Reinforcement Learning
- **Probabilistic Graphical Models 1: Representation** - Stanford Online — Dec 2021
- **Problem Solving (Basic, Intermediate)** - HackerRank — 2021
- **Intermediate Python** - DataCamp — Feb 2023
  Skills: Data Science, Python
- **Intro to Python for Data Science Course** - DataCamp — Mar 2017
  Skills: Data Science, Matplotlib
- **Python (Basic)** - HackerRank — Dec 2021
  Skills: Data Science
- **Introduction to R** - DataCamp — Feb 2023
  Skills: Data Science, R
- **Front-End Web UI Frameworks and Tools: Bootstrap 4** - Coursera — Nov 2020
- **Developing UWP Apps: 5 Bindings, Commands, and Converters** - LinkedIn — Sep 2019

TECHNICAL SKILLS

- **Skills**: Problem Solving, Data Analysis, Algorithm Design & Data Structures, OOP, Agile
- **Languages**: C/C++ (5+ yrs), Python(3+ yrs), C#(1+ yr), Java(1 yr), Matlab, HTML, CSS, PHP, JavaScript
- **Libraries**: Numpy, Scikitlearn, Matplotlib, Pandas, TensorFlow, PyTorch, React.js, Node.js
- **Frameworks**: Universal Windows Platform (UWP), BootStrap, .NET
- **Scripting, Database & Tools**: Bash, Zsh, Python, MySQL, Github, Gitlab, Perforce, CI/CD

OPEN SOURCE CONTRIBUTIONS

Program Synthesis and Explainable Artificial Intelligence in Bangla Language   Dec 2021 – Present
- Contributing by writing open source book in Bangla for Program Synthesis and Explainable Artificial Intelligence.
   Repo: program-synthesis.habibrahman.me Link: https://prosyn.habibrahman.me

Python in Bengali Language   Apr 2017
- Contributed in *"Python in Bangla Language"* project by fixing bugs of several Python programs.
   Repo: howtocode-dev/python.howtocode.dev

TEACHING

- CMPUT201 - Practical Programming Methodology   Winter 2021
- CSE 101 - Introduction to Computer Systems   Spring 2018 – Summer 2019
- CSE 103 - Structured Programming Language   Spring 2018 – Summer 2019
- CSE 105 - Discrete Mathematics   Spring 2018 – Summer 2019
- CSE 203 - Object Oriented Programming Language   Spring 2018 – Summer 2019
- CSE 206 - Web Technology   Spring 2018
- CSE 207 - Data Structures   Spring 2018 – Summer 2019
- CSE 213 - Algorithms   Spring 2018 – Summer 2019
- CSE 401 - Artificial Intelligence   Spring 2018