

# RAHEEB HASSAN

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## RESEARCH INTERESTS

Computer Vision, Reinforcement Learning and Multi-agent systems

## EDUCATION

2018 - 2023      **University of Dhaka**      *BSc. (Hons) in Computer Science and Engineering*  
Department of Computer Science and Engineering  
CGPA: 3.75 (2nd highest among 54 students)  
*Thesis Topic: Safe Multi-Agent Reinforcement Learning*  
*Supervisor: Dr. Md. Mosaddek Khan*

## RESEARCH EXPERIENCE

2021 –      **Research Assistant**      *Cognitive Agents and Interaction Lab (CAIL), University of Dhaka*

- Studied and benchmarked several **reinforcement learning** algorithms
- Researched **safety** in reinforcement learning and **multi-agent systems**
- Developed a novel decentralized safe multi-agent reinforcement learning algorithm
- Worked with applying **graph neural networks** and reinforcement learning for solving combinatorial optimization problems

## PROFESSIONAL EXPERIENCE

2/2023 –      **Machine Learning Engineer**      *Therap (BD) LTD, Dhaka, Bangladesh*  
*(Therap Services LLC, Connecticut, USA)*

- Worked with **computer vision, face recognition, multi-object tracking, activity recognition**
- Designed a system integrating real-time monitoring data from cameras and sensors to generate long-term statistical models of individual behavior.
- Optimized ML pipelines to work on resource constrained environments using **NVIDIA Deepstream**
- Worked on scaling distributed ML video processing systems in the cloud (**AWS, Oracle Cloud**)

2020 – 2021      **Full Stack Developer**      *CranTech LLC, New York, USA*  
*Remote*

- Worked on several web development projects like **Shoshikkha, Amplify**, etc.
- Worked with **ReactJS** (frontend), **ExpressJS** (backend) and **React Native** (Mobile)

## PUBLICATIONS

Published      **DePAint: A Decentralized Safe Multi-Agent Reinforcement Learning Algorithm considering Peak and Average Constraints**      *Springer Applied Intelligence Journal*  
Authors: **Raheeb Hassan**, K.M. Shadman Wadith, Md. Mamun or Rashid, Md. Mosaddek Khan  
Keywords: *Decentralized Learning, Reinforcement Learning (RL), Mutli Agent RL, Safe RL, Peak Constraint, Average Constraint*  
DOI: 10.1007/s10489-024-05433-x  
Preprint: <https://arxiv.org/abs/2310.14348>

Published      **Reinforcement Learning Based Formulations with Hamiltonian-Inspired Loss Functions for Combinatorial Optimization over Graphs**      *IEEE Access Journal*  
Author: Redwan Ahmed Rizvee, **Raheeb Hassan**, Md. Mosaddek Khan  
Keywords: *Hamiltonian Function, Deep Reinforcement Learning, Graph Neural Network, Monte Carlo Tree Search*  
DOI: 10.1109/access.2024.3497955  
Preprint: <https://arxiv.org/abs/2311.16277>

## AWARDS AND ACHIEVEMENTS

<b>Awards</b>	<b>Best Undergraduate Final Project (Thesis) Award</b> Department of Computer Science and Engineering, University of Dhaka
	<b>Scholarship Recipient for Academic Excellence in Undergraduate Examinations</b> University of Dhaka
<b>Competitions</b>	<b>Hackathons</b> <ul style="list-style-type: none"><li>• Code Samurai: Inter-University Hackathon 2022 (<b>Champion</b>)</li></ul>
	<b>Programming Competitions</b> <ul style="list-style-type: none"><li>• International Collegiate Programming Contest Asia Dhaka Regional 2021 (<b>16<sup>th</sup> place</b>)</li><li>• MIST Inter University Programming Contest 2019 (<b>20<sup>th</sup> place</b>)</li><li>• SUB Inter University Programming Contest 2019 (<b>28<sup>th</sup> place</b>)</li></ul>
	<b>Cybersecurity Competitions</b> <ul style="list-style-type: none"><li>• SUST Technovent 2023 Capture the Flag (<b>11<sup>th</sup> place</b>)</li></ul>
<b>Miscellaneous</b>	<b>Online Judge</b> Codeforces (expert) ( <b>top 20%</b> ) , Codechef (blue), LightOJ (90+ problems)

## PROJECTS

Python	<b>kamlabot</b> AI-powered helper chatbot for fetching various useful info (like class routine, syllabus, etc.) Uses NLP to parse message intent and fetch data from Firebase Database	<a href="https://github.com/hoenchioma/kamlabot">github.com/hoenchioma/kamlabot</a>
Unity, C#, Python	<b>Trojan Capture The Flag</b> A capture-the-flag game with AI-powered agents who can deceive you Trained agents using multi agent reinforcement learning (MA-POCA)	
Android, Java, C/C++	<b>hotkey</b> A cross-platform solution for controlling your PC from a mobile device	<a href="https://github.com/hoenchioma/hotkey">github.com/hoenchioma/hotkey</a>
Python	<b>vlawyer</b> An unofficial vjudge statistics API	<a href="https://github.com/hoenchioma/vlawyer">github.com/hoenchioma/vlawyer</a>
SFML, OpenGL, C/C++	<b>Depths of CSEDU</b> Top-down horror/adventure RPG	<a href="https://github.com/hoenchioma/Depths-of-CSEDU">github.com/hoenchioma/Depths-of-CSEDU</a>
ReactJS, NodeJS, Strapi	<b>Corona Factcheck</b> A website for fact-checking Corona-related information	<a href="https://github.com/Viper4717/corona-factcheck-frontend">github.com/Viper4717/corona-factcheck-frontend</a>

## STANDARDIZED TESTS

<b>GRE</b>	Quantitative Reasoning:	161	<b>TOEFL</b>	Total:	113
	Verbal Reasoning:	162		Reading:	30
	Analytical Writing:	4.0		Listening:	29
				Speaking:	27
				Writing:	27

## SKILLS

<b>Languages:</b>	Python, C++, C, Java, Javascript, Typescript, C# (Unity3D), Dart (Flutter).
<b>Machine Learning:</b>	PyTorch, TorchVision, Pytorch Geometric, NVIDIA DeepStream, Scikit-Learn, Optuna.
<b>Data Science:</b>	Pandas, Numpy, Sympy, Matplotlib, Seaborn, Scrappy.
<b>Web:</b>	ReactJS, NodeJS, FastAPI, Flask.
<b>Miscellaneous:</b>	Git, Docker, Linux (Debian, Arch), AWS Cloud, Oracle Cloud.