

Mohammad Taufeeque

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EDUCATION

Indian Institute of Technology Bombay

2018–2022

B.Tech (with Honors) in Computer Science and Engineering

Mumbai, India

– GPA - **9.24**/10.0

– Bachelor's Thesis - Fianchetto: Speed, Belief, Guile, Caution to Win at Reconnaissance Blind Chess

PUBLICATIONS

- [1*] **M. Taufeeque**, S. Parthasarathy, R. Ragesh, S. Shet, A. Iyer, S. Sarawagi, and S. Rajamani, “SoftCompose: Handling Compliance Violations in Advertisements with Neuro-symbolic Classifiers”, submitted to *The ACM Web Conference (WWW)*, 2023.
- [2] A. Gleave, **M. Taufeeque**, J. Rocamonde, E. Jenner, S. H. Wang, S. Toyer, M. Ernestus, N. Belrose, S. Emmons, and S. Russell, “imitation: Clean Imitation Learning Implementations”, arXiv, 2022. arXiv: 2211.11972 [cs.LG].
- [3*] **M. Taufeeque**, N. Tongia, and S. Kalyanakrishnan, “Fianchetto: Speed, Belief, Guile, Caution to Win at Reconnaissance Blind Chess”, submitted to *The Journal of Artificial Intelligence Research*, 2022.
- [4] G. Perrotta, R. W. Gardner, C. Lowman, **M. Taufeeque**, N. Tongia, S. Kalyanakrishnan, G. Clark, K. Wang, E. Rothberg, B. P. Garrison, P. Dasgupta, C. Canavan, and L. McCabe, “The Second NeurIPS Tournament of Reconnaissance Blind Chess”, in *Proceedings of the NeurIPS 2021 Competitions and Demonstrations Track*, ser. Proceedings of Machine Learning Research, vol. 176, 2022, pp. 53–65.
- [5] **M. Taufeeque**, S. Koita, N. Spicher, and T. M. Deserno, “Multi-camera, multi-person, and real-time fall detection using long short term memory”, in *Medical Imaging 2021: Imaging Informatics for Healthcare, Research, and Applications*, vol. 11601, SPIE, 2021, pp. 35–42.

**submitted*

INDUSTRY & RESEARCH EXPERIENCE

FAR AI - Research Engineer

Berkeley, USA

Supervisor: Dr. Adam Gleave

Aug '22 - Present

- Benchmarked and improved the performance and documentation of the open-source library **imitation**
- Added new algorithmic features to algorithms like Deep RL from Human Feedback, AIRL, and GAIL
- Prepared the pre-print paper to be submitted to **The Journal of Machine Learning Research (JMLR)**

Microsoft Research - Research Intern

Bangalore, India

Guide: Prof. Sunita Sarawagi (IIT Bombay) & Dr. Sriram Rajmani (Microsoft Research)

Dec '21 - Aug '22

- Developed an online algorithm against OOD data to integrate noisy feedback rules to a trained ML text classifier
- Proposed a novel metric to measure the compliance of an algorithm to the feedback rules and the ML classifier
- Deployed the algorithm to **Microsoft's Ads** system & improved the compliance of the system by over **55%**

Goldman Sachs - Summer Analyst

Bangalore, India

Guide: Kesavan Mukunthan

Summer 2021

- Created a webapp module to compute and display performance exposures to different factors for each stock in a portfolio of mutual funds that helps portfolio managers to analyse the drivers of performance of every fund
- Studied **finance theory** on alternative investments, portfolio risk evaluation & management using factor models

- Developed an application that **detects falls in real-time** using human pose keypoints from multiple cameras
- Detected fall events by modeling **temporal dependencies** between frame features using **LSTM Networks**
- Maintainer of the open-source project on GitHub with **128+ stars & 40+ forks**

RESEARCH PROJECTS

AI Agent for Reconnaissance Blind Chess

IIT Bombay

Bachelor's Thesis | Guide: Prof. Shivaram Kalyanakrishnan | Won NeurIPS competition (RBC) Aug '21 - Dec '21

- Developed an AI Agent for RBC, a variant of Chess where only a 3x3 region can be sensed before making a move
- Maintained a set of all possible board states with belief probability from a **Deep Neural Network** tuned with intuitions from tactics in RBC to select sense moves that maximizes information obtained about the state
- Won the **NeurIPS 2021** competition on RBC with **91.3%** win rate & **100 Elo pts** margin from the runner-up

Pretrained Model for Structured Documents

IIT Bombay & Adobe Research, India

Guide: Prof. Ganesh Ramakrishnan

Jan '21 - Aug '21

- Proposed a **BERT**-based architecture to model structured documents using self-supervised learning
- Incorporated document structure based **attention masking** to regularize the model and increase efficiency
- Achieved near **99%** accuracy on self-supervision tasks of masked language modeling and header alignment

Randomized Planning Algorithms for POMDPs

IIT Bombay

Guide: Prof. Shivaram Kalyanakrishnan

Spring 2021

- Designed planning algorithms for **partially observable-MDPs** (POMDPs) by combining multiple policies
- Combined random subsets of nodes from Finite State Controllers of weak policies to obtain a strong policy
- Solver found policies with **20% higher rewards** than state of the art non-randomized planning algorithms

SAFE App Vulnerabilities

IIT Bombay

Guide: Prof. Bhaskaran Raman

Aug '20 - Apr '21

- Found **severe vulnerabilities** in the SAFE App IITB, used by many institutions to conduct remote exams
- Reported **data-leak**, **APK signature verification** and **timing-based** vulnerabilities in the Android app
- Suggested patches and fixes to the SAFE App development team at IITB to circumvent these vulnerabilities

SCHOLASTIC ACHIEVEMENTS

Attended Google Research Week	Selected among 50 undergraduates nationwide	2022
Best AI Agent out of 18 Bots	RBC chess competition in NeurIPS 2021	2021
AP (Advanced Performer) Grade	Best performance in Machine Learning course (GNR 638)	2020
All India Rank 303	JEE Advanced (230,000 aspirants)	2018
All India Rank 330	JEE Mains (1.2 Million aspirants)	2018
Merit-cum-Means (MCM) Scholarship	IIT Bombay	2018
National top 1%	Indian National Physics Olympiad (INPhO)	2017
National top 1%	Indian National Chemistry Olympiad (INChO)	2017
KVPY Science Fellowship	Government of India	2016

TECHNICAL SKILLS

Programming	C++, C, Python, Java, Bash, Racket, Prolog, MIPS, PostgreSQL
ML Libraries	PyTorch, Tensorflow, Transformers (by Huggingface), Keras, Scikit-learn, Pandas
Web Development	HTML5, CSS, Bootstrap, JavaScript, React, jQuery, Django, PHP, AJAX
Softwares	Android Studio, MATLAB, Git, CMake, L ^A T _E X, MakeFiles, RStudio, Wireshark

RELEVANT COURSEWORK

Machine Learning	Foundations of Intelligent Learning Agents, Topics in Learning Algorithms, AI & ML, AGI Safety Fundamentals by EA Cambridge, Formal Methods in ML, Medical Image Computing, ML in Remote Sensing II, Data Analysis & Interpretation
Computer Science	Data Structures and Algorithms, Operating Systems, Computer Architecture, Database & Information Systems, Implementation of Programming Languages, Automata Theory, Design & Analysis of Algorithms, Discrete Structures, Computer Networks, Software Systems Lab, Design and Analysis of Algorithm, Logic for CS
Mathematics	Numerical Analysis, Calculus, Linear Algebra, Differential Equations

POSITIONS OF RESPONSIBILITY

Teaching Assistantships

- Intro to ML Safety (Summer 2022)
- Artificial Intelligence & Machine Learning (Autumn 2021)
- Medical Image Computing (Spring 2022)
- Calculus II (Autumn 2021)

English Language Tutor at ELIT

Autumn 2020

- Discussed, ideated and created an English language curriculum for 50+ students registered for the program
- Held online classes to teach students topics in written English and how to structure their written piece

Member in Developer's Community (DevCom) IIT Bombay

Jan '19 - Aug '20

- Maintained, developed & updated features of **InstiApp**, the institute app with over **10,000+** downloads
- Designed **frontend** of a timetable feature along with API endpoint to generate a universal iCalendar file

Mentor of SoC project - Intrusion Detection System | Github: taufeeque9/IDS

Summer 2020

- Mentored a team of **9 developers** in building a real-time system to monitor networks for malicious activity
- Deployed an ExtraTrees model of **99.7% accuracy** with a raw network **packet sniffer** written in Python

SoS Mentor - Mentored a group of 5 students exploring Artificial Intelligence through Summer of Science

EXTRACURRICULAR ACTIVITIES

- Built Arduino based **Remote-Controlled-Vehicle** in XLR8 conducted by Robotics Club, IITB 2018
- Taught Science & Maths to underprivileged school students under National Service Scheme (NSS) 2018
- Attended a three day **National Science Camp** organised by KVPY held at **IISc Bangalore** 2017
- Attended a two day workshop on **Ethical Hacking** conducted by E-Cell, IITB 2018