Mononito Goswami

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LinkedIn | ResearchGate | Google Scholar | Website

RESEARCH INTERESTS

Foundation Modeling, Weak Supervision, Time-series Analysis, Machine Learning (ML), ML for Healthcare, Education, and Public Policy

EDUCATION

Doctor of Philosophy in Robotics 2020 - 2025 (expected)
Carnegie Mellon University, Pittsburgh PA, USA

- **Advisor:** Prof. Artur Dubrawski
- **Fellowship:** Centre for Machine Learning and Health

Bachelor of Technology in Computer Engineering 2016 - 2020
Delhi Technological University, New Delhi, India

- **Thesis:** Towards Social & Engaging Peer Learning [Paper 1, Paper 2]
- **Advisor**: Prof. Rajni Jindal

RESEARCH EXPERIENCE

Applied Scientist Intern May - August 2023
Amazon Web Services AI Labs, Seattle, USA

- Machine Learning research on **large-scale pre-training for multi-task sample-efficient time-series modeling**, along with Barış Kurt, Andrey Kan, Gauthier Guinet, Jingchao Ni, Jonas Kübler and Laurent Callot.

Applied Scientist Intern May - August 2022
Amazon Web Services AI Labs, Seattle, USA

- Machine Learning research on unsupervised model selection of time-series anomaly detection models, in collaboration with Andrey Kan, Lenon Minorics and Laurent Callot [Paper].

Robotics Institute Summer Scholar June 2019 - August 2020
Auton Lab, Carnegie Mellon University, Pittsburgh, USA

- Machine Learning research on detecting cognitive disequilibrium and flow in children solving math problems, advised by Prof. Lujie (Karen) Chen and Prof. Artur Dubrawski [Paper, Student abstract].

Robotics Institute Summer Scholar June 2018 - September 2020
RoboTutor Project, Carnegie Mellon University, Pittsburgh, USA

- Developed Statistical Probe of Tutoring (SPOT), a tool for iterative data-driven improvement of RoboTutor, an Intelligent Tutoring System (ITS), advised by Prof. Jack Mostow [Paper, Student abstract].

Undergraduate Researcher 2017 - 2020
Delhi Technological University, New Delhi, India

- Analyzing dyadic interactions between young children to identify non-verbal cues that aid effective story-telling, advised by Prof. Rajni Jindal [Paper 1, Paper 2].
- Developed a Multi-task Learning approach for Open Domain Suggestion Mining and a novel language model-based text over-sampling method, advised by Ms. Minni Jain [Paper, Student abstract].
- Improvised energy-efficient clustering & routing algorithms for Wireless Sensor Networks using modified Binary Particle Swarm Optimization, advised by Prof. Indu S and Prof. Daya Gupta [Paper].
- Designed an Intrusion detection algorithm for critical RBAC administered databases using Pattern Mining and nearest-neighbours Anomaly Detection, advised by Ms. Indu Singh [Paper].
- Investigating applications & modelling of fractional order-differential equations (FODEs) for control of infectious diseases using SVEIR models, advised by Dr. Nilam [Report].
- Distracted driver detection in real-time using a simple CNN-model. Advisors: Dr. Rajiv Ratn Shah, Dr. Yifang Yin and Dr. Roger Zimmermann [Paper].

GUEST LECTURE (at CMU)

- Implicit Communication and Theory of Mind (for 16-467– Human-Robot Interaction)

TEACHING ASSISTANTSHIP (at CMU)

- 16-811 – Math Fundamental for Robotics — Fall 2022
- 16-467 – Human-Robot Interaction — Spring 2022

CONFERENCE ARTICLES

See also my google scholar page. ** indicates equal contribution*

14. **Goswami, Mononito**, Vedant Sanil, Arjun Choudhry, Arvind Srinivasan, Chalisa Udompanyawit, Artur Dubrawski. "*AQuA: A Benchmarking Tool for Label Quality Assessment.*" *Neural Information Processing Systems (NeurIPS 2023) Track on Datasets and Benchmarks.* [PDF, Code] (**Poster**)
13. **Goswami, Mononito**, Cristian Challu, Laurent Callot, Lenon Minorics, and Andrey Kan. "*Unsupervised Model Selection for Time-series Anomaly Detection.*" *International Conference of Learning Representations (ICLR 2022).* [PDF, Code] (**Spotlight**)
12. Gao, Chufan*, **Mononito Goswami***, Jieshi Chen and Artur Dubrawski. "*Classifying Unstructured Clinical Notes via Automatic Weak Supervision.*" *Machine Learning for Healthcare Conference (MLHC 2022).* [PDF, Code]
11. Dey, Arnab, **Mononito Goswami**, Joo Heung Yoon, Gilles Clermont, Michael R. Pinsky, Marilyn Hravnak, Artur Dubrawski. "*Weakly Supervised Classification of Vital Sign Alerts as Real or Artifact.*" In *AMIA Annual Symposium Proceedings.* American Medical Informatics Association. [PDF, Code]
10. Nagpal, Chirag, **Mononito Goswami**, Keith Dufendach, and Artur Dubrawski. "*Counterfactual Phenotyping with Censored Time-to-Events*". (2022) In *ACM Conference on Knowledge Discovery and Data Mining.* [PDF, Code]
9. **Goswami, Mononito**, Benedikt Boecking, and Artur Dubrawski. "*Weak Supervision for Affordable Modeling of ECG Data.*". (2021) In *AMIA Annual Symposium Proceedings.* American Medical Informatics Association. [PDF]

8. McReynolds, Andrew A., Sheba P. Naderzad, **Mononito Goswami**, and Jack Mostow. "*Toward Learning at Scale in Developing Countries: Lessons from the Global Learning XPRIZE Field Study.*" In Proceedings of the Seventh ACM Conference on Learning@ Scale, pp. 175-183. 2020. [PDF]
7. Singh, Indu, Minkush Manuja*, Rishabh Mathur*, and **Mononito Goswami***. "*Detecting intrusive transactions in databases using partially-ordered sequential rule mining and fractional-distance based anomaly detection.*" International Journal of Intelligent Engineering Informatics 8, no. 2 (2020): 138-171. [PDF].
6. Kaushik, Ajay*, **Mononito Goswami***, Minkush Manuja*, Indu S. and Daya Gupta. "*A Binary PSO Approach for Improving the Performance of Wireless Sensor Networks.*" Wireless Personal Communications (2020): 1-35. [PDF]
5. Jindal, Rajni*, Maitree Leekha*, Minkush Manuja*, and **Mononito Goswami***. "*What makes a better companion? towards social & engaging peer learning.*" In ECAI 2020, pp. 482-489. IOS Press, 2020. [PDF]
4. Leekha, Maitree*, **Mononito Goswami*** and Minni Jain "*A Multi-task Approach to Open Domain Suggestion Mining using Language Model for Text Over-sampling*". In: Jose J. et al. (eds) Advances in Information Retrieval. ECIR 2020. Lecture Notes in Computer Science, vol 12036. Springer, Cham [PDF]
3. **Goswami, Mononito***, Lujie Chen* and Artur Dubrawski. "*Discriminating Cognitive Disequilibrium and Flow in Problem Solving: A Semi-supervised Approach Using Involuntary Dynamic Behavioral Signals*". Proceedings of the AAAI Conference on Artificial Intelligence. Vol. 34. 2020. [PDF]
2. Leekha, Maitree*, **Mononito Goswami***, Rajiv Ratn Shah, Yifang Yin and Roger Zimmermann. "*Are You Paying Attention? Detecting Distracted Driving in Real-time*". Proceedings of the IEEE International Conference on Multimedia Big Data (BigMM) [PDF]
1. Mian, Shiven*, **Mononito Goswami***, and Jack Mostow. "*What's Most Broken? Design and Evaluation of a Tool to Guide Improvement of an Intelligent Tutor.*" International Conference on Artificial Intelligence in Education. Springer, Cham, 2019 [PDF]

PEER-REVIEWED WORKSHOP PUBLICATIONS & ABSTRACTS

9. Cai, Yifu, Arvind Srinivasan, Mononito Goswami, Arjun Choudhry, and Artur Dubrawski. "*JoLT: Jointly Learned Representations of Language and Time-Series for Clinical Time-series Interpretation*" Proceedings of the AAAI Conference on Artificial Intelligence (Student Abstract). 2024. *3-min presentation contest finalist*
8. Enouen, Eric, Sebastian Caldas, Mononito Goswami, and Artur Dubrawski. "*PICSR: Prototype-Informed Cross-Silo Router for Federated Learning*" Proceedings of the AAAI Conference on Artificial Intelligence (Student Abstract). 2024.
7. Cai, Yifu, Mononito Goswami, Arjun Choudhry, Arvind Srinivasan and Artur Dubrawski. "*JoLT: Jointly Learned Representations of Language and Time-Series.*" Neural Information Processing Systems Workshop on Deep Generative Models for Health (DGM4H NeurIPS) (2023) (Poster).
6. Caldas, Sebastian, **Mononito Goswami** and Artur Dubrawski. "*Encoding Expert Knowledge into Federated Learning Using Weak Supervision.*" International Conference of Learning Representations Workshop on Machine Learning for IoT (ICLR ML4IoT) (2023).
5. Rooney, Sydney R, Roman Kaufman, **Mononito Goswami**, Michael R Pinsky, J. Kyle Miller, Salah Al-Zaiti, Artur Dubrawski and Gilles Clermont. "*Using Weakly*

Supervised Machine Learning to Label Atrial Fibrillation in Real-World Intensive Care Unit Telemetry Data." Circulation 146.Suppl_1 (2022): A10198-A10198.

4. **Goswami, Mononito***, Lujie Chen*, Chufan Gao and Artur Dubrawski. "*Modeling Involuntary Dynamic Behaviors to Support Intelligent Tutoring (Student Abstract)*". Proceedings of the AAAI Conference on Artificial Intelligence. Vol. 34. 2020. [PDF]
3. Gao, Chufan, Fabian Falck, **Mononito Goswami**, Michael R. Pinsky, Anthony Wertz and Artur Dubrawski. "*Detecting Patterns of Physiological Response to Hemodynamic Stress via Deep Unsupervised Learning*". Machine Learning for Health (ML4H) Workshop at NeurIPS 2019 [PDF]
2. Jain, Minni*, Maitree Leekha*, **Mononito Goswami***. "*A Multi-task Approach to Open Domain Suggestion Mining (Student Abstract)*". Proceedings of the AAAI Conference on Artificial Intelligence. Vol. 34. 2020. [PDF]
1. **Goswami, Mononito***, Shiven Mian*, and Jack Mostow. ''*What's Most Broken? A Tool to Assist Data-Driven Iterative Improvement of an Intelligent Tutoring System.*" Proceedings of the AAAI Conference on Artificial Intelligence (Student Abstract). Vol. 33. 2019. *3-min presentation contest finalist* [PDF]

MENTORSHIP (at CMU)

7. Eric Enouen — 2023 - Present
6. Arjun Chowdhary — 2023 - Present
5. Yifu Cai — 2023 - Present
4. Undergrad AI Mentoring Program — 2021 - 2022
3. Chalisa Udompanyawit, CIT Honors Research Program — 2022 - 2023
2. Arnab Dey, Robotics Institute Summer Scholar Program — 2021 - 2022
1. Graduate Application Support Program — 2020

COMMITTEE MEMBERSHIP (at CMU)

2. Xinyu (Rachel) Li, Ph.D. RI
1. Ambareesh Revanur, Masters RI

WORK EXPERIENCE

Equity Research Intern — December 2017
Phillip Capital, Mumbai, India

- Carried out a study on disruptive technology like Blockchain & edge-computing that can potentially transform the *FinTech* sector. [Report]

Intern — June - July 2017
Goods & Services Tax Network (GSTN), New Delhi, India

- Designed the Analytics & Risk Management framework along with consultants from PwC, Infosys and State Tax departments. Co-developed a simplified tool for tax submissions for the pan-India GST roll out. [Report][Letter of Commendation]

Intern — December 2016
Centre for Development in Advanced Computing (CDAC), Noida, India

- Developed a Grade-1 Unified English Braille (UEB) Conversion utility in C++. This work helped would help in implementation of UEB in India. [Report]

ACHIEVEMENTS

- Successfully led a team of scholars to facilitate the publication of the Robotics Institute Summer Scholars Working Papers Journal 2019.
- Successfully completed the *Educational Data Mining track* of the Simon Initiative LearnLab Summer School organised by Carnegie Mellon University, in 2018 and 2019. Mined tutor logs from RoboTutor to analyze *backing-out* from activities.
- Awarded for the best essay on *Goods & Services Tax*, its financial and technological implications, in the 2017 Indian Institute of Public Administration Essay Competition, by the *Vice President of India*.
- Stood **second** among 500 college teams and start-ups from all over India in a Hackathon organized by National Payments Council of India for designing an intrusion detection architecture using Fuzzy Logic & keystroke dynamics.

FELLOWSHIPS

Center for Machine Learning and Health (CMLH) 2021 - 2022

SCHOLARSHIPS

- NeurIPS 2023 Scholar Award
- Microsoft Research Travel Grant to attend AAAI-20
- AAAI-20 Student Scholarship
- National Science Foundation Student Travel Grant to attend AIED 2019

PROFESSIONAL SERVICE

Organization

- Co-organizer of the AAAI 2024 Spring Symposium on Clinical Foundation Models [website]

Reviewer

- NeurIPS-2023, 2022, 2021
- ICLR-2024, 2023, 2022
- AAAI-2020
- ICML-2023, 2021 ML4data workshop
- American Medical Informatics Association (AMIA) 2021 Annual Symposium
- Journal of Electrocardiology

Admissions Committee

- Robotics Institute Summer Scholar (RISS) - 2020, 2021, 2022

SOCIAL OUTREACH

- As a member of the Robotics Institute Climate Committee, identified challenges in the experiences of various groups within RI and made policy recommendations to the Director to address them. 2021 - Present
- Mentored two undergraduate students of an underrepresented groups interested in pursuing AI research, under the CMU AI Mentoring Program. 2020 - Present
- Exposed our research on RoboTutor to primary stakeholders, some 8-10 year olds from Pittsburgh schools and obtained interesting feedback for comparative cognitive processes, as a part of the Gelfand Outreach program. July 2018

PROGRAMMING	Python, C/C++, MySQL, HTML, LaTeX
HOBBIES	Chess, Photography, Cooking