

SAGNIK ANUPAM

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Moore School Building, 200 S 33 St, Philadelphia, PA 19104

EDUCATION

University of Pennsylvania PhD in Computer and Information Science	2024-
Massachusetts Institute of Technology B.S. in Computer Science and Engineering (6-3) and Mathematics (18) GPA: 5.0/5.0	2020-24

RESEARCH INTERESTS

I am interested in the intersection of machine learning and programming languages, with a focus on building interpretable neurosymbolic AI models. I currently research methods for training models to learn strategies for code understanding and reinforcement learning, using methods like contextual retrieval and library-learning models.

RESEARCH EXPERIENCE

Interpretable Performance-Improving Code Edits <i>trustML@Penn, University of Pennsylvania</i> <ul style="list-style-type: none">Investigating methods for efficient code retrieval and utilizing LLMs for performance-improving code edits.Applying techniques like contextual retrieval, in-context learning and RAG, working with Osbert Bastani.	2024-
Neurosymbolic Reasoning for Mathematical Domains <i>Computer Aided-Programming Group, MIT CSAIL</i> <ul style="list-style-type: none">Trained neural program synthesis models to learn interpretable mathematical equation-solving strategies.Outperformed previous methods by 5.82%, worked with Armando Solar-Lezama and Omar Costilla-Reyes.	2022-24
Neural Decoding Using Signature Methods <i>Department of Mathematics, Imperial College London</i> <ul style="list-style-type: none">Studied applications of neural rough differential equations in modelling neural signals from mice.Proved properties of signature objects for approximating functions, worked with Cristopher Salvi.	2023
Phonation Event Detection for Feature-Cue-Based Analysis <i>Speech Communication Group, MIT Research Laboratory of Electronics (RLE)</i> <ul style="list-style-type: none">Developed probabilistic models to identify glottal-tier acoustic cues from labeled spectrograms.Improved baseline by 16.87%, worked with Stefanie Shattuck-Hufnagel and Jeung-Yoon (Elizabeth) Choi.	2020-22

SELECTED PUBLICATIONS

2024	Anupam, S. , Bowers, M., Costilla-Reyes, O., & Solar-Lezama, A. (2024). MathDSL: A domain-specific language for concise mathematical solutions via program synthesis. <i>NeurIPS'24 MATH-AI Workshop</i> .
2021	Anupam, S. , Choi, J.-Y., & Shattuck-Hufnagel, S. (2021). Detection of phonation events for feature-cue-based analysis using gaussian mixture models. <i>Proceedings of Meetings on Acoustics</i> , 45(1).

- 2021 **Anupam, S.**, & Kar, A. K. (2021). Phishing website detection using support vector machines and nature-inspired optimization algorithms. *Telecommunication Systems*, 76(1), 17–32.
- 2020 **Anupam, S.**, & Pani, P. (2020). Flood forecasting using a hybrid extreme learning machine-particle swarm optimization algorithm (ELM-PSO) model. *Modeling Earth Systems and Environment*, 6(1), 341–347.

Preprints

- 2023 Ghosh, S*, & **Anupam, S***. (2023). CapText: Large language model-based caption generation from image context and description. *arXiv preprint arXiv:2306.00301*.
- 2023 **Anupam, S.***, Lu, N*, & Sragow, J*. (2023). Algorithms for multiple drone-delivery scheduling problem (MDSP). *arXiv preprint arXiv:2306.10368*.

PRESENTATIONS

- ASA21 Anupam, S., Choi, J.-Y., & Shattuck-Hufnagel, S. (2021). Automated detection of glottal-related acoustic cues for feature-cue-based analysis. *The Journal of the Acoustical Society of America*, 150(4_Supplement), A356–A356.

Presented at the Large-Scale and Remote-Platform Acoustic Analysis poster session of the 181st Meeting of the Acoustical Society of America (ASA) held at Seattle, WA, from 29 November-3 December 2021.

PROFESSIONAL EXPERIENCE

AI/ML Engineering Intern 2024
Everyday Goods

- Developed AI model pipelines to automate the processing of inventory management system records.
- Improved efficiency by 25% and speed of customer onboarding by 75%.

AI/ML Engineering Intern 2022
FindOurView

- Built transformer-based natural language processing models for text classification and generation tasks.
- Reduced manual effort by 70%, sped-up pipeline by 15%, reached model accuracy of > 90% on some tasks.

AWARDS

- 2022-23 MIT EECS Gerstle Undergraduate Research and Innovation Scholar
- 2022 MIT Pokerbots Citadel Prize
- 2022 MIT CMSW Boit Manuscript Prize for Poetry, 1st Prize
- 2022 MIT CMSW Robert A. Boit Prize for Poetry, 3rd Prize
- 2019 Intel International Science and Engineering Fair (ISEF), Third Grand Award
- 2018 International Philosophy Olympiad, Bronze Medal
- 2017 International Linguistics Olympiad, Honorable Mention

* indicates equal contribution.

ORGANIZATIONS

2024- Phi Beta Kappa Honor Society
2023- IEEE-HKN (Eta Kappa Nu) Honor Society
2023-24 AI@MIT AIM Labs (Spring 2023 Cohort Member, 2023-24 Co-President)
2021-22 MIT Undergraduate Practice Opportunities Program (UPOP)

SKILLS

Programming Python, C/C++, OCaml, MATLAB, SQL, JavaScript
Languages English, Hindi, Odia
Machine Learning numpy, pandas, scikit-learn, transformers, nltk, flair, TensorFlow, openai, EvoloPy, PyTorch, Hugging Face