Vineet Punyamoorty

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Education

Purdue University — West Lafayette, IN
PhD in Electrical and Computer Engineering — *Aug 2022 – present*
Research Areas: **Machine Learning**, **Multimodal Learning**, **Computer Vision**, **Generative Models**

Indian Institute of Technology (IIT) Bombay — Mumbai, India
Bachelor and Master of Technology **Major***:* Electrical Engineering — *Aug 2015 – May 2020*

Selected Publications

[1] Dynamic Obstacle Avoidance through Uncertainty-Based Adaptive Planning with Diffusion
V. Punyamoorty, et al. **IROS 2025** [**ArXiv**]

[2] Contrastive Cross-Modal Learning for Infusing Chest X-ray Knowledge into ECGs
V. Punyamoorty, et al. ***Under Review*** at **IEEE Journal of Biomedical and Health Informatics**.

[3] CarE-X: ECG-based Prediction of Cardiomegaly Metrics through Alignment with X-rays
D. Tamboli, **V. Punyamoorty**, A. Malusare, and V. Aggarwal. ***Under Review*** at **IEEE Journal of Biomedical and Health Informatics**.

[4] Augmenting Generative Models with Biomedical Knowledge Graphs Improves Targeted Drug Discovery
A. Malusare, **V. Punyamoorty**, V. Aggarwal. ***Under Review*** at **IEEE Transactions on Artificial Intelligence**.

[5] Privacy-aware Image Editing and Enhancement Pipeline
D. Tamboli, **V. Punyamoorty**, V. Aggarwal. **U.S. Provisional Patent Application** No. 63/799,484 (**2025**)

Work Experience

Analyst — Oct 2020 – Jul 2022
J.P. Morgan Chase & Co. — *Mumbai, India*

- Developed a financial dashboard in the bank's analytics suite for portfolio reporting of large institutional clients with a **revenue impact** of **$1.6M** per year.
- Developed financial reporting tools offering performance and risk metrics for two large federal pension funds with **$75B** assets under management, generating a revenue impact of **$1.7M** per year.
- Designed and presented a product pitch to leadership by analyzing **five** competitors' ESG reporting platforms, combining key insights and gaps into a differentiated product offering.

Awards and Honors

- **Undergraduate Research Award** in recognition of quality and extent of research in the Master's thesis (**2020**)
- Scholarship from the **Dutch Research Council** (NWO) for pursuing research at TU Delft, The Netherlands (**2018**)

Projects

Multimodal Learning for Cardiac Health Assessment — Dec 2024 – Present

- Designed a novel contrastive learning-based framework for enriching the representation of **ECGs** using chest **X-ray** knowledge during training for improved detection of cardiopulmonary conditions using ECG alone at test time.
- Achieved significant performance gains in the detection of **cardiomegaly**, **edema** and **pulmonary effusion** using **ECG** (up to **78.3**% **AUROC**) through a combination of adaptive penalization and supervised contrast.

Uncertainty-based Diffusion Planning for Collision Avoidance — May 2024 – Sep 2024

- Developed a novel diffusion model-based method for adaptive re-planning using uncertainty estimates from a deep ensemble to avoid collisions in a **dynamically changing** environment.
- Demonstrated a **13.5**% increase in the mean trajectory length and **12.7**% increase in mean reward, indicating a reduction in collision rates and improved ability to navigate the environment safely.

Skills

Languages	Python	C/C++	SQL	Bash Shell	R	MATLAB	Assembly	VHDL
Libraries	PyTorch	JAX	Pandas	MLFlow	Docker	Git	Hydra	