Vansh Kapoor

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in vansh28kapoor

Education

Carnegie Mellon University (CMU) Pittsburgh, PA
Master of Science in Machine Learning | *GPA:* ***4.33/4*** Dec'25

- **Key Courses:** Deep Reinforcement Learning, Intermediate Statistics, Advanced ML

Indian Institute of Technology Bombay (IITB) Mumbai, India
Bachelor of Technology in Electrical Engineering with Honors May'24
GPA: ***9.76/10*** *(Department Rank* $\mathbf{6^{th}}$ *amongst 200+ students)* *Honors GPA:* ***10/10***

- Received *Undergraduate Research Award* for outstanding research conducted in *Partially Observable MDPs*
- Awarded AP Grade (*Course Topper* amongst 200+ students) in *Advanced Deep Learning*, *Online Algorithms*, Advanced ML (*Probabilistic Graphical Models*), Intro to ML, Image Processing, EM Waves, Biology
- Created and graded assignments/quizzes for Error-Correcting Codes as a *Graduate TA* for 40+ students

Professional & Research Experience

Google Research | *Collaborator* | Bangalore, India Jun'23 - Aug'24

- Developed the Look-Ahead algorithm utilizing **crowd-signals** with performance guarantees for **rumor detection**
- Adapted algorithm for large-scale networks to **nullify coordinated bot attacks** spreading rumors on social platforms

IIT Bombay | *Research Assistant (AAAI'25 Submission)* | Mumbai, India Jan'23 - Aug'24

- Formulated theorems and designed heuristics to compute **optimal policies** for **MDPs with state sensing costs**
- Derived computable **bounds on suboptimality** associated with optimal policies corresponding to truncated MDPs

Google | *Silicon Engineering Intern* | Bangalore, India May'23 - Jul'23

- Optimized **design verification** process by **15%** with toggle coverage analysis using Python-based automation
- Developed **automated checkers** for data retention flops in low-power mode applications, streamlining verification

AI & ML Projects

Indian Institute of Technology Bombay Mumbai, India

Text-to-Image Diffusion Models with Enhanced Semantic Understanding Jan'24 - May'24

- Devised SUR (Semantic Understanding & Reasoning) architecture utilizing **LLAMA-based prompt enrichment**
- Boosted **multi-modal** visual question answering accuracy (counting/color/action) by **20%** over baseline CLIP

Deep Recurrent Q-Learning for Partially Observable MDPs Aug'23 - Dec'23

- Implemented **RL-LSTM-Q network**, integrating **Transfer Learning** & LSTM for playing flickering Atari games

RL in Billiards and Football Half-field Offense Jul'23 - Dec'23

- Implemented **Monte-Carlo Tree Search (MCTS)** for potting balls in minimal attempts (< 10) for noisy billiards
- Executed MDP Planning to devise an optimal half-field football offense strategy using value and policy iteration

Generative AI & Stock Trading System Jul'23 - Dec'23

- Enhanced the **CGAN** model to generate diverse images of a given individual by utilizing a **Siamese Discriminator**
- Set up an **LSTM-based** high-frequency stock trading system (**MSE Loss: 0.3%**) using multi-stock inputs

Real-Time Rapid Multi-Face Detection Jan'23 - May'23

- Facilitated multi-face detection using **Haar features-based AdaBoost** Cascade Classifier integrated with a webcam

Biomedical Image Segmentation Aug'22 - Dec'22

- Coded **U-Net** and applied **watershed segmentation** for nuclei semantic segmentation, achieving MSE Loss of 8%

Skills

Programming Languages:	Python (Proficient), MATLAB, C++, Java, HTML, Embedded C
Libraries:	PyTorch, TensorFlow, Keras, PyTorch-Geometric, HuggingFace, OpenCV, NLTK, Scikit-Learn, SciPy, Pandas, Gymnasium, SymPy