Anuj Nagpal

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Education

- **Stanford University** — California, U.S.A.
  Masters in Computational and Mathematical Engineering; GPA: 4.16/4.00 — *Sep 2021 - Ongoing*
- **Indian Institute of Technology Kanpur** — Uttar Pradesh, India
  Bachelors in Computer Science and Engineering; GPA: 9.3/10.0 — *July 2014 - May 2018*

Work Experience

- **Facebook** — Menlo Park, California
  Machine Learning Engineer — Marketplace Product Intelligence — *June 2022 - September 2022*
  - **Product Intelligence**: Worked on a **multimodal framework (MMF)** for extracting product attributes from images and text in marketplace listings for use in search, ranking, and recommendation.
  - **Machine Learning Pipeline**: Designed the complete **machine learning workflow** that automated every step of pipeline, from first process of training data preparation to final step of model evaluation.
  - **End-to-End Training**: Achieved **90%+ accuracy** with a hierarchical vision transformer based image encoder trained end-to-end with a multi-head product attribute and category classification network.
- **Goldman Sachs** — Bengaluru, India
  Associate — Fixed Income Currencies and Commodities — *June 2018 - July 2021*
  - **Systematic Market Making**: Worked as an **algorithmic market making developer** with area of focus in electronic and automated trading of fixed income products.
  - **Automated Trading**: Developed and supported applications that **stream algorithmic prices** to electronic trading platforms as well as **automatically quote** a subset of the incoming trade inquiries using live market data, product attributes, and manual trader inputs.
  - **Scalable Architecture**: Built robust and scalable systems that can handle **heavy inquiry load and rapid market movements** for trading desks based in New York, London and Hong Kong.
  - **E-Trading Expansion**: Enabled **electronic trading support** for new fixed income securities including custom credit default swaps and money market products. Also expanded **e-trading communication streams** with new exchanges and clients that led to direct increase in revenue.

Academic Projects

- **Natural Language Generation with Inverse Q-Learning**: Project Link
  Designed and built an **adversarial-free imitation learning approach** for natural language generation that gives lower text perplexity than maximum likelihood based models. Won the best project award.
- **Knowledge Graph Completion with Graph Neural Networks**: Project Link
  Implemented **graph neural network (GNNs)** models including **TransE, ComplEx and RotatE** for triple prediction in knowledge graphs and evaluated them on Hits@K, Mean Rank (MR) and Mean Reciprocal Rank (MRR) metrics.
- **Instance-Specific Augmenter with Representation Matching**: Project Link
  Designed an end-to-end learnable **instance-specific augmentation module** based on representation matching that can improve meta-learning task performance in a few-shot setting.
- **Diffusion Modeling with Multi Sample Denoiser**: Project Link
  Developed a **denoising autoencoder** based approach for **score value estimation** that can be scaled to multiple noisy samples for faster training and better image generation quality in diffusion models.
- **Neural Models for Granger Causality Detection**: Project Link
  Implemented a class of neural network based **non-linear models for Granger causality detection** which are capable of capturing long term dependencies between various time series.

Teaching Experience

- **CS224N**: Natural Language Processing with Deep Learning, Stanford University, Winter 2023
- **CME100**: Vector Calculus for Engineers, Stanford University, Fall 2022
- **CME323**: Distributed Algorithms and Optimization, Stanford University, Spring 2022
- **CS236G**: Generative Adversarial Networks, Stanford University, Winter 2022
- **ESC101**: Fundamentals of Computing, IIT Kanpur, Winter 2018

Technical Skills

- **Languages**: Python, C++, Java, R, Scala, JavaScript, SQL, Bash, HTML/CSS
- **Libraries**: PyTorch, TensorFlow, Keras, PyG, JAX, CVXPY, PySpark, Numpy