Dhruv Srikanth

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Who Am I?...

- CS graduate student at the University of Chicago, Research Assistant at the UChicago Booth Center for Applied Artificial Intelligence.
- Areas of interest: Deep Learning, High Performance Computing, Game Theory, Computational Learning Theory. Specifically, generative frameworks (e.g. GAN, VAE, DDPMs), energy-based models (EBMs) and self-supervised learning (SSL).
- Recent personal projects: **PyNN** (Deep Learning Framework) [code], **GAN Experimentation Packages** [code], **Neural style transfer CLI tool** [code], **Tweet-driven LSTM forecasting framework for Tesla's stock price** [code], **Distributed GPU based Monte Carlo Ray Tracing Simulation** [code].
- What excites me about machine learning is its infancy and novelty. What drives me is the potential to create impactful solutions through data-centric algorithms and a little fun with math.

Education

University of Chicago — *Chicago, USA*

Master of Science in Computer Science, Specializing in High Performance Computing - GPA: 3.57 — *Sept 2021 – Apr 2023*

PES University — *Bangalore, India*

Bachelor of Technology in Electronics and Communication Engineering, Specializing in Signals & Systems - GPA: 8.87 (First Class Distinction) — Aug 2017 – June 2021

Technical Coursework Deep Learning · Machine Learning · Neural Networks · Computational Learning Theory · Algorithms · High Performance Computing · Parallel Programming · Applied Data Analysis · Databases · Digital Signal Processing · Advanced Image Processing · Linear Algebra

Languages Python · C · C++ · Go · CUDA · MPI (Distributed Memory Parallelism) · OpenMP (Shared Memory Parallelism) · MATLAB · Haskell · Java · SQL · JavaScript · CSS · HTML

Frameworks PyTorch · TensorFlow · Keras · Pandas · Scikit-learn · NumPy · SciPy · NLTK · Simulink · LabVIEW · Dash (Flask) · NodeJS · Azure · Unix

Experience

UChicago Booth Center for Applied Artificial Intelligence — *Chicago, USA*

Researcher (Full-Time Internship), Research Assistant (Part-Time) — *Apr 2022 – Present*

- **Empirically proved presence of inductive biases** (inherent correlations between covariates – race, gender) in pretrained (ImageNet) weights and ubiquitous CNN model architectures (AlexNet, VGG, ResNet, DenseNet).
- **Developing an expert coding language and API** that models user information as a dynamic knowledge graph for information generation based on a contextual understanding of the user. Used in creating Wikipedia-like pages with automatic content generation based on user's knowledge base.
- Developed PyTorch templates for end-to-end computer vision training pipeline.

Myelin Foundry — *Bangalore, India*

Machine Learning Intern — *Jan 2021 – July 2021*

- **Created real-time AI framework (dashboard)** towards shaping policymaking utilizing sentiment analysis and topic modeling - Latent Dirichlet Allocation.
- **Developed real-time competitor analysis tool** creating new revenue streams by extrapolating writing style and engagement on articles using Beautiful Soup. **Developed and deployed full-stack for both tools** using Python, MySQL, HTML, CSS, JavaScript and shell scripts on Azure VMs.
- Obtained **87% out of sample accuracy** on constructed pseudo-YOLOv5 model for object detection.

Outdu Mediatech — *Bangalore, India*

Deep Learning Intern — *June 2020 – Aug 2020*

- Implemented **real-time depth map generation with threshold accuracy of 98%** through monocular depth estimation using transfer learning on U-Net style CNN and DenseNet169.
- Designed a novel quantitative method to estimate depth values as a distance measure.
- Formulated model for depth map synthesis and depth-to-distance conversion **deployed in spatial positioning and thresholding applications** (ensuring social distancing). Facilitated using TensorFlow 2.0.

General Electric Healthcare — *Bangalore, India*

GE Healthcare Intern — *July 2019 - Aug 2019*

- Determined factors causing defects in X-ray manufacturing process through exploratory data analysis on Acero and Perenna X-ray insert models utilizing Pandas and sklearn.
- Developed defective X-ray identification model utilizing Random Forest regression and Naïve Bayes classification via sklearn.
- Models **deployed for quality assurance tests and root cause analysis** achieving **out of sample accuracy of 84%.**

PUBLICATION AND RESEARCH

Suraj Bidnur, Dhruv Srikanth, Sanjeev Gurugopinath, "**Resource-Conscious High-Performance Models for 2D-to-3D Single View Reconstruction**", in IEEE Region 10 Conference, 2021. [paper] [code]

Machine Learning Based 2D-3D Reconstruction — *Bangalore, India*

Faculty Advisor: Dr. Sanjeev Gurugopinath — *May 2020 – Sept 2021*

- **Increased performance of 2D-to-3D single-view reconstruction by 29%** compared to state-of-the-art models via survey of evolving 2D-to-3D reconstruction techniques, existing image/signal processing methods, machine learning, and deep learning architectures.
- Implemented 3D CNN autoencoder models (with and without gated RNN units) as baselines for single and multi-view 3D voxel reconstruction.
- **Optimized performance and resource utilization tradeoff** between dense and skip connections in an asymmetric autoencoder.
- Empirically determined optimal loss functions (Binary Cross-Entropy) and architectures (autoencoder, VAE and GAN) for efficient 3D reconstruction.