Dhruv Srikanth

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Who Am I?...

- AI Researcher working on computer vision, robotics, and time-series problems for healthcare with 2 years combined experience implementing ML models.
- Areas of interest: Combining methods from deep learning and high performance computing to build intelligent, equitable, and accessible AI systems. Specifically, generative frameworks (e.g. GAN, VAE, DDPMs), meta-learning (learn to learn) and self-supervised learning (SSL).
- Self developed projects: **PyNN** (Deep Learning Framework) [code], **GAN Experimentation Packages** [code], **Neural style transfer CLI tool** [code], **RTConcierge - Road trip recommendations using LLMs, Speech Recognition & Translation** [code], **GoLLUM - A compiler for Golite, a mix between C++ and Go** [code].

Education

University of Chicago — *Chicago, USA*

Master of Science in Computer Science, Specializing in High Performance Computing and Machine Learning — *Sept 2021 – Apr 2023*

PES University — *Bangalore, India*

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

Technical Coursework Deep Learning · Machine Learning · Algorithms · High Performance Computing · Parallel Programming · Compilers · Applied Data Analysis · Signal Processing · Advanced Image Processing · Linear Algebra

Languages Python · C/C++ · Go · CUDA · MPI (Distributed Memory) · OpenMP (Shared Memory) · MATLAB · SQL

Frameworks PyTorch · TensorFlow · Keras · Pandas · sklearn · NumPy · Dash (Flask) · NodeJS · Azure · LLVM · Unix · Slurm · Bash

Experience

Auton Lab – Robotics Institute, Carnegie Mellon University — *Pittsburgh, USA*

Research Programmer, Advisor: Dr. Artur Dubrawski — *May 2023 – Present*

- **Trained 20+ models** (VAEs, Anatomical Priors, Autoencoders, Bayes Nets) for semantic segmentation of ultrasound images for robotic arm used in field treatment.
- **Led development** of **AutonFeat** [code][docs], a distributed automatic featurization library used in time series analysis (forecasting and classification).
- **Developing survival analysis models** for renal failure and dialysis toward **improving patient outcomes** with UPMC healthcare researchers and doctors.

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

Researcher, Faculty Advisor: Dr. Sendhil Mullainathan — *Apr 2022 – Mar 2023*

- **Trained 50+ models for experiments on identifying algorithmic and architectural bias in ML models.**
- **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).
- **Developed recommendation engine, expert system and model API** that models user information as a dynamic knowledge graph utilizing the contextual understanding of the user. Used in creating Wikipedia-like pages with automatic content generation based on user's knowledge level.
- **Optimized computer vision training pipeline** by creating plug-and-play PyTorch templates for end-to-end vision training tasks.

Myelin Foundry — *Bangalore, India*

Machine Learning Intern — *Jan 2021 – July 2021*

- **Led development of new product revenue stream creating a real-time competitor analysis tool** that extrapolates writing style and engagement on articles using Beautiful Soup and various NLP techniques (sentiment analysis and topic modeling).
- **Created real-time policy analysis dashboard** toward shaping policymaking **utilizing NLP methods (Latent Dirichlet Allocation) and notions of chaos theory**.
- **Developed and deployed full stack for both tools** using Python, MySQL, HTML, CSS, JavaScript, Flask 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 Research Intern — *June 2020 – Aug 2020*

- **Developed image recognition system** for depth map synthesis and depth-to-distance conversion **deployed in spatial positioning & thresholding applications** (ensuring social distancing).
- 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. Facilitated using TensorFlow 2.0.

General Electric Healthcare — *Bangalore, India*

GE Healthcare Intern — *July 2019 - Aug 2019*

- **Developed defective X-ray identification model** utilizing Random Forest regression and Naïve Bayes classification via sklearn.
- **Isolated and identified 4+ leading causes of defects** across X-ray insert manufacturing process through exploratory data analysis utilizing Pandas.
- Models **deployed for quality assurance tests and root cause analysis** achieving **out of sample accuracy of 84%.**

General Electric Aviation – Multi Modal Manufacturing Facility — *Pune, India*

GE LEAN Intern — *June 2019 - July 2019*

- **Increase efficiency by 15%** on the **Mark VIe product line** by implementing a **LEAN process optimization strategy**.

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. [code]
- 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.