Anil Palepu

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EDUCATION

Harvard-MIT Health Sciences and Technology, Cambridge, MA — Sep 2020 – Anticipated May 2025
PhD Student: Medical Engineering & Medical Physics
Topic: Self-supervised learning for medical images & text
Coursework: Statistics, NLP, Medicine (Pathology, Neuroscience, Cardiology, Genetics)

Johns Hopkins University, Baltimore, MD — Sep 2019 – May 2020
M.S.E: Biomedical Engineering (Biomedical Data Science focus), GPA: 4.0
Topic: Early prognosis of neurological trauma patients in the ICU
Coursework: Machine Learning, Computer Vision, Genomics

Johns Hopkins University, Baltimore, MD — Sep 2016 – May 2020
B.S: Biomedical Engineering (Computer Science minor), GPA: 3.81
Coursework: Signal Processing, Biomedical Data Science, Data Structures, Optimization

RESEARCH EXPERIENCE

Beam Lab, Boston, MA — Mar 2021 – Present
Self-supervised learning for medical images and text
PhD Student under Dr. Andrew Beam, Harvard T.H Chan School of Public Health, Epidemiology

- Developed a regularized contrastive image-text architecture and zero-shot classification procedure that exceeds performance of a comparable fully-supervised CNN on common chest x-ray diagnoses
- Demonstrated various capabilities of these self-supervised models, including robustness to spurious correlations, capacity for conformal prediction, and zero-shot classification of novel diseases like covid19

MonitOR, Baltimore, MD — Apr 2018 – Sep 2020
AI and Computer Vision-based tracking of surgical instruments in the operating room
Research Lead under Dr. Jerry Prince, Johns Hopkins University, Electrical and Computer Engineering

- Collaborated with Johns Hopkins Hospital to reduce costly inefficiencies and "hospital never-events" by developing a CNN-based system for identifying surgical instruments in the operating room
- Designed various critical modules including optical flow-based video compression, temporal prediction post-processing, and event processing to provide instrument usage statistics to hospital administrators

Precision Care Medicine, Baltimore, MD — Sep 2019 – May 2020
Early prognosis of neurological trauma patients in the ICU
Team Lead under Dr. Robert Stevens, Johns Hopkins Medicine, Anesthesiology and Critical Care Medicine

- Leveraged first-day physiology and lab data to predict end-of-stay mortality and neurological function for ICU patients presenting with traumatic brain injury, exceeding performance of the standard-of-care model

Neuromedical Control Systems Lab, Baltimore, MD — May 2017 – May 2020
Automating EEG analysis for medically refractory focal-onset epilepsy
Student Researcher under Dr. Sridevi Sarma, Johns Hopkins University, Biomedical Engineering

- Developed a signal-processing algorithm for automated spike detection in electroencephalography (EEG)
- Demonstrated that concordance between non-invasive scalp EEG and invasive electrode placement is predictive of surgical success, suggesting potential for non-invasive epilepsy localization

EmboQuant, Baltimore, MD — Dec 2016 – May 2019
Establishing a quantitative endpoint for transarterial embolization
Co-founder and Team member under Dr. Clifford Weiss, Johns Hopkins Medicine, Interventional Radiology

- Designed and validated a pressure-sensing catheter for transarterial embolization cancer treatments
- Demonstrated that occluded vessel pressure served as a targetable embolization endpoint and used computer vision to characterize off-target embolization as a function of injection and vessel pressures

TEACHING AND WORK EXPERIENCE

Inspirit AI, *Instructor* Sep 2021 – Present
- Taught project-based courses introducing AI to high school students

Medtronic, *Data Science Intern* Jun 2019 – Aug 2019
- Built models to predict capacity fade of pacemaker batteries after manufacturing

Johns Hopkins University, *Teaching Assistant* Sep 2018 – May 2020
- Delivered weekly recitation lectures as TA for Systems & Controls *Spring 2020*
- Developed course materials as head-TA for Gateway Computing course *Fall 2018 & Fall 2019*
- Provided homework and project help as TA for Data Structures *Fall 2018*

ACTIVITIES

Conference on Health, Inference, and Learning (CHIL), *Communications co-chair* Sep 2022 – Present
- Organizing call for papers and advertising efforts for 2023 conference

MIT Graduate Student Council, *Representative* Sep 2020 – Present
- Representing the health sciences & technology (HST) department at meetings

HST Joint-Student Council, *Representative* Sep 2020 – Present
- Co-led MAAP, an application-assistance program for underrepresented minorities

AWARDS

- Recipient, NIH Neuroimaging Training Program (NTP) Grant Sep 2020 – Aug 2022
- Inducted into Johns Hopkins HKN and AEMB Honor Societies May 2019 & Nov 2019
- Finalist, Johns Hopkins Business Plan Competition (MonitOR) Apr 2019
- 1st Place, Carnegie Mellon McGinnis Venture Competition (EmboQuant) Mar 2018
- Johns Hopkins University Dean's List Dec 2016 – May 2020

PUBLICATIONS & CONFERENCES

Nov 2022 *Kumar et al. "*Towards Reliable Zero Shot Classification in Self-Supervised Models with Conformal…"
Conference Presentation (Poster), Self-Supervised Learning: Theory and Practice Workshop, NIPS

July 2022 *Palepu et al. "*Self-Supervision on Images and Text Reduces Reliance on Visual Shortcut Features"
Conference Presentation (Oral), Workshop on Spurious Correlations, Invariance, and Instability, ICML

May 2022 *Kompa et al. "*Artificial intelligence based on machine learning in pharmacovigilance: a scoping review*"*
Journal Publication, Drug Safety Vol 45 Issue 5 p. 477-491

Oct 2021 *Palepu et al.* "Digital signatures for early traumatic brain injury outcome prediction in the intensive…"
Journal Publication, Scientific Reports, Vol 11, Issue 1 p. 1-9.

June 2021 *Gowda et al.* "Establishing a Quantitative Endpoint for Transarterial Embolization from Real-Time…"
Journal Publication, Journal of Medical Devices, Vol 15, Issue 2

July 2019 *Palepu et al. "*Evaluating Invasive EEG Implantations with Structural Imaging Data and Functional…"
Conference Presentation (Oral), IEEE Engineering in Medicine & Biology

July 2017 *Palepu et al. "*Automating interictal spike detection: Revisiting a simple threshold rule"
Conference Presentation (Poster), IEEE Engineering in Medicine & Biology

SKILLS

Technical Programming (Python, R, MATLAB), Deep Learning, Computer Vision, NLP, Signal Processing
Interests Vegetarian Cooking, Tennis, Video Games, Fantasy Books & TV