VISHNU SANGLI

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Research Interest: Robustness and Generalization, Interpretability of Models, Representation Learning, Reinforcement Learning

EDUCATION

UNIVERSITY OF CALIFORNIA, BERKELEY   Berkeley, CA
B.A. in Computer Science, Physics   Expected May 2024
Cumulative GPA: 3.71/4.0; CS GPA: 3.85/4.0

Relevant Coursework:

Deep Reinforcement Learning, Decision Making, and Control
Designing, Visualizing and Understanding Deep Neural Networks
Introduction to Machine Learning

Efficient Algorithms and Intractable Problems
Operating Systems and System Programming
Introduction to Digital Design and Integrated Circuits

Electromagnetism and Optics
Quantum Mechanics
Instrumentation Laboratory
Particle Physics
Introduction to Statistical and Thermal Physics
Analytic Mechanics

RESEARCH EXPERIENCE

HYBRID ROBOTICS LAB, UC BERKELEY   Berkeley, CA
Student Researcher   September 2022 – Present
Principal Investigator: Dr. Koushil Sreenath (Also Dr. Sergey Levine)
- Developing a framework for generalized locomotion unifying bipeds, quadrupeds, and other legged robots through a single morphology-agnostic controller.
- Achieved morphology-specific policies on A1-like quadrupeds and Cassie-like bipeds with robust morphology generalization.
- Investigating a joint-level transformer policy for modular control of arbitrary legged morphologies.

LAWRENCE BERKELEY NATIONAL LABORATORY   Berkeley, CA
(1) Undergraduate Research Apprentice, Nachman Group   February 2023 – Present
Principal Investigator: Dr. Benjamin Nachman
- Developing a GAN generative model to replace the hadronization[1] pipeline in High Energy Physics particle collision event simulators.
- Creating an ensemble of latent representations for elementary particles through contrastive loss objectives that leverage inter-particle relationships.

(2) Undergraduate Research Apprentice, ATLAS Group   September 2021 – August 2022
Advisor: Dr. Karol Krizka
- Investigated vision, graph, and algorithmic discrimination techniques for a tagger that identifies H(bb) decay events[2].
- Developed GNN-based jet taggers to reject QCD background jets, statistically comparing performance and checking model bias, that surpassed the current ATLAS Xbb tagger

DR. SRINIVAS' LAB (VISION SCIENCES), INDIANA UNIVERSITY   Bloomington, IN

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[1] Event in High Energy Physics where elementary particles combine to form hadrons like protons and neutrons
[2] Identifying Hbb Higgs decay events in High Energy Physics to better study the Higgs Boson

Research Assistant   June 2022 – August 2023
Principal Investigator: Dr. S.P. Srinivas
- Implemented vision-based segmentation and clustering algorithms for eye blink analysis, enhancing the understanding of blink patterns and characteristics.
- Developed user-friendly web applications to streamline the analysis of blink observations, contributing to efficient data processing for lab-wide use.
- Contributed to the design and implementation of general-use data analysis tools to facilitate advanced analysis and interpretation of blink data.

CENTRE FOR FUNDAMENTAL RESEARCH AND CREATIVE EDUCATION   Bangalore, India
(1) Student Researcher, "A new approach towards Habitability on Exoplanets"   August 2018 – March 2020
Advisor: Dr. B.S. Ramachandra
- Analyzed the confluence of obliquity with the other 1-dimensional habitability factors with Vplanet simulations of Earth-like exoplanets.
- Simulated Earth-like planetary atmospheres in ROCKE-3D to determine idealized obliquities for Kepler and Trappist candidates.
- Utilized planetary simulation models to create an optimistic evolutionary timeline for life on Venus.

PUBLICATIONS

Jay Chan, Xiangyang Ju, Adam Kania, Benjamin Nachman, **Vishnu Sangli** & Andrzej Siódmok , *Fitting a Deep Generative Hadronization Model*, JHEP 2023 (**https://doi.org/10.1007/JHEP09(2023)084**)

(In Progress) Vishnu Sangli, Jay Chan, Xiangyang Ju, Adam Kania, Benjamin Nachman & Andrzej Siódmok, *Exploring hadron latent space schemes for fitting hadronization characteristics*

(In Progress) Jay Chan, Xiangyang Ju, Adam Kania, Benjamin Nachman, **Vishnu Sangli** & Andrzej Siódmok, *Integrating Particle Flavor into Deep Learning Models for Hadronization*

PRESENTATIONS

Vishnu Sangli, Sirisha Tadepalli, Chetana Krishnan, V. Thenmozhi, PF. Hadiya, K. Shivaram, A. Anand, Sudhir, RR, Surekha Paneerselvam, SP. Srinivas, *Precision and fast sampling electrooculogram for recording blinking kinematics*
Talk at AOPT 2023 (Conference on Ocular Pharmacology and Therapeutics), Indianapolis, IN

Sagarika Valluri, **Vishnu Sangli**, *A new approach to Habitability using obliquity and compartmentalised Habitable Zones on planetary surfaces through Vplanet and ROCKE 3D modelling*
Poster at AGU Fall Meeting 2019 (Geophysics and Atmospheric Science Conference), San Francisco, CA

Vishnu Sangli, *Habitability Timeline of Venus: Past and Present*
Poster at AbSciCon 2019 (Astrobiology Conference), Bellevue, WA

FUNDING & AWARDS

AOPT Travel Award   August 2022
Travel Award for the AOPT 2023 Conference

PROFESSIONAL EXPERIENCE

UDI UDI - DATING APP   San Jose, CA
Machine Learning Intern   June 2022 – August 2022
- Developed NLP sentiment analysis models with varying sensitivity levels to maintain a positive user experience.
- Engineered an ML recommender system that leverages user characteristics and preferences to facilitate accurate and personalized user matching.

- Implemented a robust backend for user registration with seamless integration to the Flutter app, ensuring efficient user onboarding and data synchronization.

INDIAN SPACE RESEARCH ORGANISATION (ISRO)   Bangalore, India
Project Intern   May 2019 – September 2019
- Analyzed the NASA GOES satellite's 2011 solar maximum X-ray observations for characterization and identification of solar flares in preparation for the Aditya L-1 satellite.
- Implemented a module to detect single and compound solar flares to modified Gaussian profiles.

PROJECTS

PINN MPC PLANNER FOR A MULTI-LINK MANIPULATOR (COURSE PROJECT)   March 2023 – May 2023
- Investigate the effectiveness of Physics-Inspired loss objectives in Behavioral Cloning (BC) and exploration tasks.
- Found PINNs to have more stable training and robustness to high domain randomization.

SCORING REDDIT SUBREDDITS WITH NLP   June 2022 – July 2022
- Developed expletive word-oriented NLP Aspect-Based Sentiment Analysis models and applied them in selected Reddit subreddits.
- Analyzed contextual usage of keywords and generated Knowledge Graphs to rate toxicity of subreddits regardless of expletive usage.

LIDAR SELF-DRIVING RL AGENT   March 2021 – May 2021
- Developed a 2D car racetrack environment using Python and Pyglet, incorporating tire physics, custom math dependencies, and collision detection algorithms.
- Successfully trained DQN and SAC driving agents and evaluated drifting versus regular steering techniques at high speeds.