# Savinay Nagendra

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## EDUCATION

- **Pennsylvania State University, University Park (Main) Campus** — State College, PA
  *Ph.D. in Computer Science and Engineering (GPA: 3.6\*/4.0)* — *Aug 2019 – Dec 2024 (Expected)*
  *Master of Science in Electrical and Computer Engineering (GPA: 3.7/4.0)* — *Aug 2017 – May 2019*
- **PES Institute of Technology** — Bangalore, Karnataka, India
  *Bachelor of Engineering in Electrical and Electronics (GPA: 3.91/4.0)* — *Aug 2013 – May 2017*

## SKILLS

- **Languages**: Python (Proficient), C++, C, MATLAB, PHP, HTML5 (Competent), Java, Go, JavaScript, Cuda (Intermediate)
- **Deep Learning Frameworks**: PyTorch, TensorFlow, Keras (Proficient), TensorRT (Novice)
- **Frameworks**: GCP, Azure, AWS, Flask, Docker, PySpark, Jenkins, PostgreSQL, Git, Replit, Kubernetes, ROS
- **Soft Skills**: Cross-functional collaboration, Problem-solving, Self-motivation, Adaptable learning, Mathematical understanding of ML and DL

## PROFESSIONAL EXPERIENCE

- **Center for Machine Learning and Applications - Penn State**, Research Assistant (Dr. Daniel Kifer) — State College, PA
  - **Intelligent Prompting of Large-Scale Vision Models** — *Sep 2023 – Present*
    - Developing a few-shot prompt generator for leveraging Meta AI's Segment Anything Model (SAM)'s zero-shot segmentation capabilities for downstream tasks such as co-saliency detection, semantic, instance, and video segmentation, and tracking.
  - **Segmentation Refinement** (WACV 2024 - paper link) — *May 2021 – Aug 2023*
    - Developed a lightweight post-processing segmentation refinement network that refines the raw logit maps from any base segmentation network, consistently improving the segmentation performance by 2-3%.
  - **Automated Segmentation of Global Landslide Events** (IEEE JSTARS, 2022 - paper link) — *Aug 2019 – May 2021*
    - Developed a SOTA deep continual learning framework in collaboration with Google AI and USGS for automated segmentation of global landslide events from satellite imagery, showing a 14% improvement in performance compared to existing models.
    - Featured and presented our work at the Google AI Summit, 2020, and American Geophysical Union TV.
- **Department of Perception, Sensing and Robotics - Schlumberger Doll Research**, Research Intern (3 internships) — Cambridge, MA
  - **Internship 3** (patent filed) — *May 2023 – Aug 2023*
    - Developed a zero-shot, domain-agnostic, interactive framework for high-quality automated region extraction from satellite imagery, showing SOTA performance when compared to supervised segmentation models.
  - **Internship 2** (EAGE 2022 - paper link) — *Apr 2021 – Aug 2021*
    - Developed a 3D semantic inpainting deep learning framework using MoCoGan to generate high-quality, realistic 3D videos of reservoir sedimentation, conditioned on provided well-log data with 100x improvement in FPS compared to expensive simulators.
  - **Internship 1** (patent filed) — *May 2018 – Aug 2018*
    - Designed a rapid, scalable, and search-efficient deep reinforcement learning framework to learn an optimal policy for valve settings of multi-lateral oil wells to maximize the Net Present Value (NPV).
- **Lab for Perception, Action, and Cognition – Penn State**, Research Assistant (Dr. Robert Collins) — *Apr 2018 – May 2019,* State College, PA
  - Developed an end-to-end deep learning framework to transform kinematics (video of human action) to dynamics (foot pressure heat map) in order to extract the trajectory of the center of pressure for human gait stability analysis. (ECCV 2020 - paper link)
- **Computational Learning and Motor Control Lab - University of Southern California, Research Intern** — *May – Aug 2016,* Los Angeles, CA
  - Designed a framework for jerk-less point-to-point trajectory planning with dynamic obstacle avoidance for humanoid end-effectors.

## TECHNICAL PROJECTS

- **AudioHUD**, *Penn State (Second place, Nittany AI Challenge Prototype Phase 2022)* — *Python, JavaScript, HTML, CSS, PHP*
  AI-based Heads-Up Display designed for the DHH community to enhance situational awareness in virtual and real-world environments by providing visual substitutes to sound cues.
- **Kubernetes Face Recognition API**, Penn State — *Python, OpenCV, Docker, Kubernetes*
  Built a REST service on Kubernetes to scan an image for a face and match it with existing images on a Redis database. Deployment of services was built using Docker, and communication with worker nodes was achieved using RabbitMQ.
- **Behavioral Cloning for Self-Driving Cars**, *Penn State* — *Python, Keras, Tensorflow, OpenCV*
  An end-to-end CNN framework to predict steering angles from the corresponding left, right, and center video frames from Udacity dataset.
- **Emotion Recognition from the perspective of Action Recognition**, *Penn State* — *Python, PyTorch, OpenCV*
  An end-to-end pipeline to detect arousal and valence from videos of facial landmarks, body pose extracted optical flow from video frames.
- **Intent-based Text Classification**, *Penn State* — *Python, Keras, Tensorflow*
  Comparison of Machine Learning and Deep Learning techniques for intent-based text classification on Quora question-pair dataset.

## Selected Publications & Patents

- **Savinay Nagendra**, Chaopeng Shen and Daniel Kifer. PatchRefineNet: Improving Binary Segmentation by Incorporating Signals from Optimal Patch-wise Binarization. *Proceedings of the IEEE/CVF Winter Conference of Computer Vision (WACV)*. *2024*. ([paper link](#))
- **Savinay Nagendra**, Chaopeng Shen and Daniel Kifer. Estimating Uncertainty in Landslide Segmentation Models. *In Proceedings of International Congress on Information and Communication Technology (ICICT). 2024.* ([paper link](#))
- **Savinay Nagendra**, Chaopeng Shen and Daniel Kifer. Constructing a Large-Scale Landslide Database Across Heterogeneous Environments Using Task-Specific Model Updates. *IEEE Journal of Selected Topics in Applied Earth and Observations and Remote Sensing (JSTARS)*, *Vol. 15, 2022, pp. 4349 – 4370*. ([paper link](#))
- **Savinay Nagendra** and Christopher Funk. Learning Dynamics from Kinematics: Estimating 2D Foot Pressure Maps from Video Frames. *Proceedings of the IEEE/CVF European Conference on Computer Vision (ECCV). 2020*. ([paper link](#))
- **Savinay Nagendra** and Te Pei. Cloud-based interactive database management suite integrated with deep learning-based annotation tool for landslide mapping. *American Geophysical Union Fall Meeting. 2020*. ([paper link](#))
- **Savinay Nagendra**, Chaopeng Shen and Daniel Kifer. An efficient deep learning mechanism for cross-region generalization of landslide events. *American Geophysical Union Fall Meeting. 2020*. ([paper link](#))
- **Savinay Nagendra** and Nikhil Podila. Comparison of Reinforcement Learning algorithms applied to the cart-pole problem. *In International Conference on Advances in Computing, Communications, and Informatics (ICACCI). 2017. pp. 26-32*. ([paper link](#))
- **Savinay Nagendra** and Kashif Rashid. Co-inventor and a patent filed by SLB: *Oil Field Asset Optimization using Reinforcement Learning Controllers. 2020*.
- **Savinay Nagendra** and Kashif Rashid. Co-inventor and a patent filed by SLB: "*SmartScan: AI-Powered Interactive Framework for Automated Region Extraction.*" *2023*.

## Achievements

- Second Place in the Prototype Phase of the Nittany AI Challenge, 2022. AudioHUD: AI-based Heads-Up Display designed to enhance situational awareness in the DHH community.
- Served as Reviewer for the IEEE/CVF Winter Conference of Computer Vision (WACV), 2024 and Journal of Water Resources Research, 2023.
- CNR Rao Scholarship for Academic Excellence, 2014, 2015, 2016 and 2017. Issued by the PES Institute of Technology.

## Certifications

- Machine Learning Specialization, Coursera.
- Deep Learning Specialization, Coursera.
- Machine Learning on Google Cloud Specialization, Coursera.
- Self-driving Cars Specialization, Coursera.
- Machine Learning with Python and TensorFlow, Freecodecamp.