Akshay L Chandra

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https://akshaychandra.com

Education

- **University of Freiburg** — Freiburg, Germany
  Master of Science in Computer Science (Artificial Intelligence Specialization) — *Oct. 2021 – Present*
- **Indira Gandhi National Open University** — Hyderabad, India
  Post-Graduate Diploma in Applied Statistics, 85%; — *Jul. 2017 – Jun. 2018*
- **Jawaharlal Nehru Technological University** — Hyderabad, India
  Bachelor of Technology in Computer Science & Engineering, 76% (Top 15/300); — *Aug. 2013 – May 2017*

Publications[†]

1. S. Rawat, **Akshay L Chandra**, S.V. Desai, Vineeth N Balasubramanian, S. Ninomiya, Wei Guo. How Useful is Active Learning for Plant Organ Segmentation. Plant Phenomics, vol. 2022.
2. **Akshay L Chandra**, S.V. Desai, C. Devaguptapu, Vineeth N Balasubramanian. On Initial Pools for Deep Active Learning. NeurIPS 2020 Workshop on Pre-registration in Machine Learning. Proceedings of Machine Learning Research 2021 (Volume 148).
3. **Akshay L Chandra**, S.V. Desai, Vineeth N Balasubramanian, S. Ninomiya, Wei Guo. Active Learning with Point Supervision for Cost-Effective Panicle Detection in Cereal Crops. BioMed Central Plant Methods 2020. *[Impact Factor: 4.993]*
4. **Akshay L Chandra**, S.V. Desai, Wei Guo, S. Ninomiya, Vineeth N Balasubramanian. An Adaptive Supervision Framework for Active Learning in Object Detection. British Machine Vision Conference (**BMVC**) 2019.
5. **Akshay L Chandra**, S.V. Desai, Vineeth N Balasubramanian, S. Ninomiya, Wei Guo. EasyRFP: An Easy to Use Edge Computing Toolkit for Real-Time Field Phenotyping. CVPPP Workshop at ECCV 2020.

Research/Work Experience

- **University of Freiburg (Active Research Project)** — Freiburg, Germany
  Student Research Assistant, Robot Learning Lab — *Jul. 2022 - Now*
  - Currently, my work in the lab, supervised by Iman Nematollahi and Dr. Tim Welschehold, is to help robot manipulators learn to sequence, blend and refine skills with Deep Reinforcement Learning while being sample-efficient.
  - More precisely, our goal is to extract and exploit useful priors (geometry-aware skills) available in offline unlabeled robot trajectory datasets and refine them down the line with reinforcement learning.
  - To that end, even my Master Project (expected to finish in November 2023) is in the same direction.
- **Indian Institute Of Technology Hyderabad** — Hyderabad, India
  Research Assistant, Machine Learning and Vision Lab — *Dec. 2018 - Oct. 2021*
  - I spent nearly three years working under the guidance of **Dr. Vineeth N Balasubramanian**, mainly in the intersection of computer vision, deep active learning, object detection, semantic segmentation and plant phenotyping.
  - During my time at IITH, I frequently collaborated with **Dr. Wei Guo** from University of Tokyo. Please see Research Projects section for full details.
- **GGK Technologies (ACS Corp.)** — Hyderabad, India
  Associate Software Engineer, AI/ML (R&D) Team — *June 2017 - Sept. 2018*
  - Optimized business processes for clients in health care, retail, e-commerce by building useful prediction models, capturing customer/patient behavior patterns. Exclusively worked on building an accelerated computer vision application that detects product pickups in a retail store from the CCTV footage.
  - Won **Best Trainee** and **Best Employee** awards during my time at the company.

[†]Not in any specific order. I share joint first authorship with my colleagues in some of these works. Please see my website for clarity.

Previous Research Projects

- **Active Learning for Semantic Segmentation** *July 2021 - Oct. 2021*
  Advisor: Dr. Vineeth N Balasubramanian (IIT Hyderabad)
  - This work studies the effectiveness of existing deep active learning methods on plant segementation datasets, which are intrinsically specialized and differ a great deal from other benchmark datasets.
  - The study was co-supervised by Prof. Wei Guo and is published in Plant Phenomics journal in January 2022.
- **On Initial Pools for Deep Active Learning** *Nov. 2020 - Apr. 2021*
  Advisor: Dr. Vineeth N Balasubramanian (IIT Hyderabad)
  - This work combines self-supervised methods with active learning methods to intelligently select initial pools of data which are often labeled randomly. The importance of good initialization in weight space is well understood by the community. However, there have been no such efforts in understanding the importance of good initialization in data space for AL methods.
  - This paper was accepted at Preregistration Workshop of NeurIPS 2020 and at PMLR 2021 (Volume 148).
- **Edge Computing Toolkit for Field Phenotyping** *June 2020 - Aug. 2020*
  Advisors: Dr. Vineeth N Balasubramanian (IIT Hyderabad) & Dr. Wei Guo (UTokyo)
  - We built a Flask back-end, AngularJS front-end edge computing toolkit for real-time field phenotyping that can work on any GPU based edge devices such as NVIDIA Jetson Xavier.
  - Our lightweight but adaptable toolkit allows field phenotyping researchers to seamlessly deploy and monitor their models' performances on the go.
  - This work was accepted at CVPPP Workshop, ECCV 2020. Code: https://github.com/lab1055/easy-rfp.
- **Deep Active Learning for Object Detection** *Dec. 2018 - Oct. 2019*
  Advisors: Dr. Vineeth N Balasubramanian (IIT Hyderabad) & Dr. Wei Guo (UTokyo)
  - We were able to design a framework that allows the detection model to specifically query for what it needs, either object localization information or object class information or both. This reduced 30% annotation time on PASCAL-VOC dataset
  - Consequently, we were also able to create 3 active learning query metrics for detection with point supervision.
  - These two works were accepted at the BMVC'19 and BMC Plant Methods journal.

Other Applied Projects[†]

- **Evaluating Zeroth and First-Order MPC Methods with a World Model** *Oct. 2022*
  - As part of our Model-Predictive Control and Reinforcement Learning (MPC-RL) course objective, I and two fellow course students evaluated zeroth and first-order MPC methods with a World Model.
  - Report: https://akshaychandra.com/assets/pdf/mpcrl-report.pdf
- **Scaling Worst-Case Soft Actor-Critic (WCSAC) to Saftey-Gym** *Aug. 2022*
  - As part of our Deep Learning Lab course objective, I and two fellow course students successfully implemented and analyzed the limits of WCSAC on OpenAI's Saftey Gym environment.
  - Code: https://github.com/acl21/wcsac
  - Report: https://akshaychandra.com/assets/pdf/wcsac-report.pdf
- **Introducing Exploration and Regularization into DEHB Pipeline** *Aug. 2022*
  - As part of our AutoML course objective, I and two fellow course students attempted to understand how a differential evolution-based hyperparameter tuning method, DEHB worked when exposed to forced exploration and regularization. Our report on the findings is linked below.
  - Report: https://akshaychandra.com/assets/pdf/automl-report.pdf
- **Deep Active Learning Toolkit in PyTorch** *Sept. 2020*
  - This is an end-to-end PyTorch toolkit with 8 popular deep active learning query methods implemented.
  - Code: https://github.com/acl21/deep-active-learning-pytorch
- **Image & Bounding Box Annotation Slicer** *Apr 2019*
  - Slices images and their bounding box annotations into smaller tiles as needed. It can also resize them, both by specific sizes and by a resizing/scaling factor.
  - Code: https://github.com/acl21/image_bbox_slicer

[†]Full list of projects can be found on my GitHub account.

Relevant Skills & Certifications

- **Languages, Libraries & Packages**: Python, PyTorch, TensorFlow, C++, C#, C
- **Certifications**: Deep Learning (IIT Madras; AICTE-FDP approved), Computer Vision Nanodegree (Udacity), Deep Learning Specialization (Coursera), Java SE 6 Programmer (Oracle).

Positions of Responsibility

- Teaching Assistant to Dr. Vineeth N Balasubramanian for the courses: AI2100 & AI5100 - Deep Learning, CS5370 - Deep Learning for Vision, CS6360 - Advanced Topics in Machine Learning in 2020 & 2021, Summer School of AI in 2019 & 2021 (Project Mentor as well)
- Served as a subreviewer at NeurIPS'21, CVPPA'21, NeurIPS'20, ECCV'20, SIAM'20, IEEE TNNLS A/E, CVPPP'20 (reviewer also).
- Teaching Assistant to Dr. Vineeth N Balasubramanian & Project Mentor during the Summer School of AI in 2019 & 2021 held at IIT Hyderabad.
- Student Mentor, Project Reviewer & Peer-to-Peer Auditor at Udacity Inc. since November 2018.
- Volunteered to work as a machine learning instructor for 6 hands-on sessions at EduRidge India in 2018.
- Volunteered to teach Math and Physics at underprivileged high schools as part of Vidyanvahini (Knowledge on Wheels) initiative in 2014.

References

1. **Dr. Vineeth N Balasubramanian**, Head of Department - Department of Artificial Intelligence / Associate Professor - Department of Computer Science and Engineering, Indian Institute of Technology, Hyderabad - India.

2. **Neil Gogte**, Founder, Director and Professor at Keshav Memorial Institute of Technologies / Secretary, Founder at Neil Gogte Inistitute of Technologies, India.

3. **Manas Pant**, Associate Vice President, Data Science at PasarPolis Indonesia. Former Senior Manager at GGK Technologies, India.