

# SAI VIKAS DESAI

svdesai.github.io ♦ saivikas3@gmail.com

## PROFESSIONAL SUMMARY

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A deep learning engineer with a strong background in applied ML research.

## EDUCATION

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### Indian Institute of Technology (IIT), Hyderabad

*Aug 2017 - July 2020*

Master of Technology

CGPA: 9.52

Department of Computer Science and Engineering

*Supervisor: Vineeth N Balasubramanian*

### Sreenidhi Institute of Science and Technology

*June 2013 - June 2017*

Bachelor of Technology

Overall Percentage: 82.6%

Department of Electronics and Communication Engineering

## WORK EXPERIENCE

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### ML Engineer, Qualcomm

*Aug 2020 - Current*

I'm currently working on automating deep learning quantization and inference pipelines on multiple Qualcomm chipsets for Android phones. Experienced in implementing evaluation metrics for state-of-the-art Vision and NLP models in Python.

### Research Assistant, IIT Hyderabad

*Aug 2017 - Aug 2020*

I worked under the guidance of Dr. Vineeth N Balasubramanian on using active learning to minimize labeled data requirements for object detection. My work focused on using semi supervised learning methods to train object detection models with applications in precision agriculture.

### Research Intern, GeoScience Research Team, AIST Tokyo

*June 2019 - July 2019*

I worked with Dr. Ryosuke Nakamura and Dr. Nevrez Imamoglu on the application of deep learning networks for RGB and LIDAR based tree detection and segmentation from street view images of Tokyo.

### Summer Research Intern, Field Phenomics Lab, University of Tokyo

*May 2018 - June 2018*

I worked with Dr Wei Guo on the application of deep learning in high throughput plant phenotyping, specifically on the estimation of rice heading date from time series crop images.

### Intern, Nuclear Fuel Complex, Hyderabad

*Jan 2017 - Mar 2017*

I worked on interfacing a computer with a high precision mandrel measurement machine and developed a software application to automate the process of mandrel inspection.

## SKILLS

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### Tools & Libraries

PyTorch, Keras, Scikit-learn, Numpy, OpenCV, Matplotlib, Pandas

### Languages

C++, Java, Python, Bash

### Operating Systems

Linux, Windows

### Web Technologies

HTML, CSS, Javascript

### Other Skills

Git, L<sup>A</sup>T<sub>E</sub>X

## RELEVANT COURSES TAKEN

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*Applied Machine Learning, Deep Learning, Statistical Learning Theory, Convex Optimization Theory, Bayesian Data Analysis, Computational Complexity, Advanced Data Structures and Algorithms*

## PROJECTS

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### **Adaptive Supervision for Object Detection**

*Jan 2019 - Apr 2019*

*In collaboration with University of Tokyo*

Developed an adaptive supervision framework for active learning and demonstrate its effectiveness on the task of object detection. A combination of weak and strong supervision is used to obtain 30% savings in annotation cost to attain a target performance level. Accepted to **BMVC 2019**.

### **Rice Heading Stage Estimation using Deep Learning**

*Aug 2017 - Jul 2019*

*In collaboration with University of Tokyo*

Proposed a simple pipeline to detect regions containing flowering panicles from ground level RGB images of paddy rice. Used the flowering panicle region counts to estimate the heading date of the crop with a mean absolute error of less than 1 day. Published in **BMC Plant Methods 2019**.

### **Active Learning with Point Supervision for Cereal Crop Detection**

*Feb 2019 - Jan 2020*

*In collaboration with University of Tokyo*

Proposed a cost-effective point supervision based active learning approach for panicle detection in cereal crops. We show promising results on two publicly available cereal crop datasets - Sorghum and Wheat with 55% reduction in labeling costs. Published in **BMC Plant Methods 2020**.

### **Fine-grained Sampling for Active Learning in Object Detection**

*Oct 2018 - Dec 2019*

Examined a fine-grained sampling based approach for active learning in object detection. Studied the effects of our method on the Feature Pyramid Network and RetinaNet models, and shown significant savings in labeling effort to obtain good detection performance. Accepted to **CVPR 2020 Workshops**.

### **Edge Computing Toolkit for Real-Time Plant Phenotyping**

*Jun 2020 - Aug 2020*

Developed EasyRFP, a software toolkit which can be interfaced with any commercial GPU enabled micro computer (such as NVIDIA Jetson) and a digital camera. This toolkit is used to automatically perform deep learning inference on field images and periodically email the results. Accepted to **ECCV 2020 Workshops**.

## PUBLICATIONS

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1. B. Dittakavi, D. Bavikadi, **S. V. Desai**, S. Chakraborty, N. Reddy, V. Balasubramanian, B. Callepalli, A. Sharma, Pose Tutor: An Explainable System for Pose Correction in the Wild, CVSports, **CVPR 2022 Workshops**.
2. S. Rawat, Akshay L. Chandra, **S. V. Desai**, V. Balasubramanian, S. Ninomiya, W. Guo, How Useful Is Image-Based Active Learning for Plant Organ Segmentation?, **Plant Phenomics, 2022**.
3. Akshay L. Chandra, **S.V. Desai**, C. Devaguptapu, V. Balasubramanian, On Initial Pools for Deep Active Learning. Pre-registration Workshop, **NeurIPS 2020 Workshops**, Online.
4. **S. V. Desai**, Akshay L. Chandra, M. Hirafuji, S. Ninomiya, V. Balasubramanian, W. Guo, EasyRFP: An Easy to Use Edge Computing Toolkit for Real-Time Field Phenotyping, CVPPP, **ECCV 2020 Workshops**, Glasgow, UK.
5. **S. V. Desai**, V. Balasubramanian, Towards Fine-Grained Sampling for Active Learning in Object Detection, Visual Learning with Limited Labels, **CVPR 2020 Workshops**, Seattle, USA.

6. **S. V. Desai**, Akshay L. Chandra, V. Balasubramanian, An Adaptive Supervision Framework for Active Learning in Object Detection, British Machine Vision Conference, **BMVC 2019**, Cardiff, UK.
7. **S. V. Desai**, V. Balasubramanian, T. Fukatsu, S. Ninomiya, W. Guo, Automatic estimation of heading date of paddy rice using deep learning. **Plant Methods 15, 76 (2019)**.
8. Akshay L. Chandra, **S. V. Desai**, V. Balasubramanian, S. Ninomiya, W. Guo, Active learning with point supervision for cost-effective panicle detection in cereal crops. **Plant Methods 16, 34 (2020)**.
9. A. Kumar, **S. V. Desai**, V. Balasubramanian *et al.*, Efficient Maize Tassel-Detection Method using UAV based Remote Sensing, **Remote Sensing Applications: Society and Environment, 23 (2021)**.
10. Akshay L. Chandra, **S. V. Desai**, V. Balasubramanian, W. Guo, Computer Vision with Deep Learning for Plant Phenotyping in Agriculture: A Survey, **ACCS Journal India (March 2020 edition)**.
11. **S. V. Desai**, A. Kumar, M. Taparia, P. Rajalakshmi, V. Balasubramanian, U. B. Desai, W. Guo, AI Based High Throughput Crop Phenotyping in Drone and Static Images, Workshop on AI for Society in Developing Nations (an **AAAI India Chapter Event**), Dec **2018**.

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## SERVICE

- Reviewer for ACML 2022, ICVGIP 2021, CVPPP 2021, CVPPP 2020, VL3 Workshop in CVPR 2020 and ICVGIP 2018. Also reviewed papers in these journals: Frontiers in Plant Science, Pattern Recognition.
- Sub-Reviewer for NeurIPS 2021, ICLR 2020, WACV 2019, WACV 2020, IEEE TKDE and ICCV 2019
- Teaching Assistant (Content Preparation) for NPTEL course on Deep Learning for Computer Vision (Fall 2020).
- Teaching Assistant for CS5500: Reinforcement Learning (Spring 2020)
- Teaching Assistant for CS5370: Deep Learning for Vision (Fall 2019)
- Teaching Assistant for CS6360: Advanced Topics in Machine Learning (Spring 2019)
- Teaching Assistant for CS6510: Applied Machine Learning (Fall 2018)

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## ACHIEVEMENTS

- Received Certificate of Appreciation in Research for the years 2018 and 2020 in IIT-Hyderabad.
- Part of the winning team in "Quest 2k15 Hackathon" in JNTU Hyderabad in 2015.

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## REFERENCES

1. Dr. Vineeth N Balasubramanian, Associate Professor, Department of Computer Science Engineering, IIT Hyderabad, Sangareddy, Telangana - 502285, India. E-mail: vineethnb@iith.ac.in