Joseph K J

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Research Interests

Continual Learning, Deep Learning, Machine Learning.

Education

Indian Institute of Technology (IIT), Hyderabad — 9.24 / 10
M. Tech + PhD Dual Degree in Computer Science and Engineering — *Jan 2017 - present*
Received *Excellence in Research Award* twice (2020 and 2022).
Advisor: Dr. Vineeth N Balasubramanian

Government Engineering College (RIT), Kottayam — 80.43 %
B. Tech. in Computer Science and Engineering — *May 2013*

Loyola School, Trivandrum — 92.93 %
Indian School Certificate (ISC), Class 12 — *March 2009*

Research Experience

- **Student Researcher, Google Research, Bangalore, India**. August 2021 - March 2022
  Research Intern April 2021 - July 2021
  Identifying novel category of instances from unlabeled data, without supervision.
- **Visiting Scholar, MBZ University of AI, Abu Dhabi, UAE**. August 2021 - Present
  Research Intern October 2020 - March 2021
  Defined a novel computer vision problem: Open World Object Detection
- **Research Intern, Inception Institute of AI, Abu Dhabi, UAE**. November 2019 - May 2020
  Worked on adding lifelong learning capability to object detectors using meta-learning.
- **Research Intern, Harada Lab, University of Tokyo, Japan**. June - July 2018
  Explored areas related to multi-modal modeling, specifically on generating images from textual descriptions.

Publications

2022 (until April): Two CVPR conference papers and two CVPR workshop papers.

14. K J. Joseph, S. Khan, F. Khan, R. Anwer, V. Balasubramanian, Energy-based Latent Aligner for Incremental Learning, *IEEE/CVF Intl. Conf. on Computer Vision and Pattern Recognition,* ***CVPR 2022*** [arXiv] [Code].
13. A. Gupta, S Narayan, K J. Joseph, S. Khan, F. Khan, M. Shah, OW-DETR: Open-world Detection Transformer, *IEEE/CVF Intl. Conf. on Computer Vision and Pattern Recognition,* ***CVPR 2022*** [arXiv] [Code].
12. K J. Joseph, S. Paul, G. Aggarwal, S. Biswas, P. Rai, K. Han, V. Balasubramanian, Spacing Loss for Novel Class Discovery, *Continual Learning in Computer Vision Workshop,* ***CVPR-W 2022***.
11. A. Ashok, K J. Joseph, V. Balasubramanian, Class-Incremental Learning with Cross-Space Clustering and Controlled Transfer *Continual Learning in Computer Vision Workshop,* ***CVPR-W 2022***.

2021: TPAMI, CVPR-Oral, NeurIPS workshop.

10. K J. Joseph, J. Rajasegaran, S. Khan, F. Khan, V. Balasubramanian, Incremental Object Detection via Meta-Learning, *IEEE Transactions on Pattern Analysis and Machine Intelligence,* ***TPAMI***. [arXiv] [Code].
9. K J. Joseph, S. Khan, F. Khan, V. Balasubramanian, Towards Open World Object Detection, *IEEE/CVF International Conference on Computer Vision and Pattern Recognition,* ***CVPR 2021*** as an **ORAL** paper. [arXiv] [Code] (777+ stars and 120+ forks to this GitHub repository).

8. S N. Rai, D. Singh, K J. Joseph, R. Saluja, V. Balasubramanian, C. Arora, A. Subramanian, C V. Jawahar, ORDER: Open World Object Detection on Road Scenes. *Machine Learning for Autonomous Driving Workshop,* ***NeurIPS-W 2021****.* [Paper]

2020: NeurIPS, BMVC

7. K J. Joseph, V. Balasubramanian, Meta-Consolidation for Continual Learning, 34^{th} *Conference on Neural Information Processing Systems,* ***NeurIPS 2020****.* [arXiv] [Code]
6. U. Maniyar, K J. Joseph, A. Deshmukh, U. Dogan, V. Balasubramanian, Zero-shot Domain Generalization, 31^{st} *British Machine Vision Conference,* ***BMVC 2020****.* (Also presented at *Visual Learning with Limited Labels Workshop, International Conf on Computer Vision and Pattern Recognition,* ***CVPR-W 2020****.*) [arXiv]

2019: IJCAI, WACV

5. K J. Joseph, V. Teja, K. Singh, V. Balasubramanian, Submodular Batch Selection for Training Deep Neural Networks, 28^{th} *International Joint Conference on Artificial Intelligence,* ***IJCAI 2019****, Macao, China.* (Also presented orally at *Negative Dependence in ML Workshop, International Conference on Machine Learning,* ***ICML-W 2019****, Long Beach, USA*) [arXiv] [Code].
4. K J. Joseph, A. Pal, S. Rajanala, V. Balasubramanian, C4Synth: Cross-Caption Cycle-Consistent Text-to-Image Synthesis *Winter Conf. on Applications of Computer Vision,* ***WACV 2019****, Hawaii.* [Paper] [Code]

2018: ICML-W, ECCV-W

3. K J. Joseph, V. Balasubramanian, MASON: A Model AgnoStic ObjectNess Framework, *International Workshop On Autonomous Navigation in Unconstrained Environments, European Conference on Computer Vision,* ***ECCV-W 2018****, Munich, Germany* [Paper] [Code].
2. Pengfei Zhu, Longyin Wen et al., VisDrone-DET2018: The Vision Meets Drone Object Detection in Image Challenge Results, *European Conference on Computer Vision, Workshop Proceedings,* ***ECCV-W 2018****, Munich, Germany.* [Paper]
1. K J. Joseph, A. Pal, S. Rajanala, V. Balasubramanian, Zero-Shot Image Generation by Distilling Concepts from Multiple Captions, *Towards Learning with Limited Labels Workshop, International Conference on Machine Learning,* ***ICML-W 2018****, Stockholm, Sweden.* [Paper]

Work Experience

- **Senior Software Engineer, Oracle Corporation,** July 2016 - Dec 2016.
  Developer at Oracle PeopleSoft Cloud Manager team. Contributed to design, UX, and coding of the product.
- **Software Engineer, Oracle Corporation,** June 2013 - July 2016.
  As part of Oracle PeopleSoft Platforms team, I handled PeopleTools Push Notification Framework, PeopleTools Automated Configuration Management Framework and PeopleSoft Internet Architecture.

Achievements

- Awarded *Excellence in Research Award 2022* from IIT Hyderabad.
- Awarded *Excellence in Research Award 2020* from IIT Hyderabad. (One of 24 students across 16 departments)
- Awarded TCS Research *PhD Fellowship 2019.*
- *Honorable Mention* for our essay submission at ICVSS 2019, Italy.
- Awarded *Microsoft Research Travel Grant* and *ACM-India/IARCS Grant* to present our work at IJCAI 2019.
- Awarded *Certificate of Appreciation in Research* from IIT Hyderabad in March 2019.
- Won cash prize for being top 20% of attendees at '2017 Summer School on Computer Vision', CVIT, IIIT H.
- Runner up for *Best Student Project Contest 2013* from the Computer Society of India, Trivandrum Chapter.

Service

- Web Chair for ACML 2022.
- Program Committee Member of IJCAI '21, '20.
- Reviewer: (Journals) IEEE Trans on Multimedia, Elsevier Pattern Recognition, Springer Machine Learning.
  (Conferences) CVPR '22, CVPR '21, AAAI '21, ACML '20, ICVGIP '18, NCVPRIPG '19.
- Subreviewer: NeurIPS ('20, '21), ICLR '20, IJCAI ('18, '19), ACML '20, ECCV '20, CVPR '19, ICCV '17, WACV ('18, '19, '20), SDM '21.

Research Forums Attended

- Conferences: CVPR 2021, NeurIPS 2020, IJCAI 2019, WACV 2019, ECCV 2018, ICVGIP 2018
- International Computer Vision Summer School - ICVSS 2019, Sicily, Italy.
- Microsoft Academic Research Summit: 2019, 2018
- Amazon Research Days 2019

Invited Talks

- Vision India Summit at ICVGIP, Dec 2021 [Link].
- 8^{th} TCS Research Virtual ReCafe, Sep 2021.
- Robotics and Multi-Perception Lab, Hong Kong University of Science and Technology, May 2021.
- ACM IIT-H Chapter Machine Intelligence Talk Series, Feb 2021 [Link].
- Computer Vision Talks, 12^{th} edition, Oct 2020 [Video].

Teaching / Mentoring

- Head Teaching Assistant: Foundations of ML (Fall 2021), Deep Learning (Spring 2021).
- TA: Deep Learning (Fall 2020 - NPTEL Course, Spring 2020, Fall 2019), Applied ML (Spring 2019).
- Research mentorship for undergraduate students at IIT-H:
  - Vamshi Teja: our submodular mini-batch selection method was presented at IJCAI 2019.
  - Udit Maniyar : we introduced Zero-shot Domain Generalization setting in BMVC 2020.
  - Dishank Jain: working towards a NeurIPS 22 submission, based on a meta-consolidation idea.

Skills

- Languages: Python, Java, C, JavaScript
- Libraries and Tools: PyTorch, TensorFlow, Caffe, Numpy, Scipy, scikit-learn, OpenCV
- Miscellaneous: Shell Scripting, Dockers, Node.js, Hybrid Mobile App development, Git, ClearCase

Relevant Courses

- CS6510 Applied Machine Learning
- CS5370 Deep Learning for Vision
- CS6230 Optimization Methods in ML
- CS5350 Bayesian Data Analysis
- CS6440 Special Topics in Machine Learning
- CS6010 Advanced Data Structures and Algorithms

Positions / Responsibilities

- Founding member of ACM Student Chapter, IIT Hyderabad.
- Founding Secretary of IEEE Computer Society, RIT Chapter.
- Chief Editor of Click!, the half yearly publication of IEEE Computer Society, RIT Chapter.
- Facilitator at Fun@Work, an Oracle Volunteer initiative.

References

- Vineeth N Balasubramanian, Associate Professor in CSE, IIT Hyderabad, India. E-mail: vineethnb@iith.ac.in
- Gaurav Aggarwal, Research Scientist, Google Research, India. E-mail: gauravaggarwal@google.com
- Salman Khan, Associate Professor, MBZUAI, Abu Dhabi, UAE. E-mail: salman.khan@mbzuai.ac.ae