

Arghya PAL

Deep Learning | MRI Images | Generative Models

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Training data is playing an increasingly important role in defining the performance of modern machine learning systems. Our aim is to learn the joint distribution $P(X, y)$: X being the data, and y being the label, to facilitate a supervised learning. However, we encounter few types of circumstances those can be introduced by unaccounted phenomena in the real world in learning $P(X, y)$, and ways to answer those odds. My thesis work spans over two broad research objectives:

- **Learning under limited supervision** to escape the bottleneck of massive sets of hand-labeled training data.
- **Learning a generic vision task without any data** but from a set of related vision (source) tasks.

Happy to share that there are publications in different Computer Vision, Machine Learning, and Deep Learning venues such as CVPR, IROS, ISMRM, MELBA, WACV etc., to support my proposal.

ACADEMIC PREPARATION

2021 - Till Date	PostDoc Student, PI: Dr. Yogesh Rathi, Associate Professor, Harvard Medical School, Harvard University
2020 - 2021	PostDoc Student, PIs: Prof. Raphael WS Phang and Dr. Wong KokSheik School of Information Technology, Monash University Malaysia
2015 - 2020	Doctor of Philosophy, Ph.D., Thesis: "Beyond Full Supervision Alternate Perspectives to Learning with Limited Supervision in Deep Neural Network Models", Advisor: Dr. Vineeth N Balasubramanian, Dept. of Computer Science & Engineering, Indian Institute of Technology Hyderabad, India, Research Excellence Award 2019 , GPA: 8.6/10 (relative grading)
2012 - 2015	Master of Technology, Dept. of Computer Science & Technology, Goa University, Goa, India, University Gold Medalist
2008 - 2012	Bachelor of Technology, Dept. of Computer Science & Engineering, West Bengal University of Technology, GPA: 8.34/10 (non-relative grading)

RECOGNITION & AWARDS

2022	Trainee (Educational) Stipend , \$1000 grant from ISMRM 2022
2021	Doctoral Consortium , selected in WACV 2021
2020	Doctoral Consortium , selected in CVPR 2020
2019	Google Travel Grant to present paper in CVPR 2019
2019	Research Excellence Award awarded by Indian Institute of Technology Hyderabad (IITH)
2018	Microsoft Research India Travel Grant to present paper in CVPR 2018
2016	Selected for SAKURA Science Indo-JAPAN internship program in The University of Tokyo (UTokyo)
2016	Recipient of Intel India Ph.D Fellowship Duration: 5yrs
2015	Recipient of Visvesvaraya Project Fellowship awarded by Govt. of India, India Duration: 1yr (2015-2016 (August))
2015	University Gold Medalist , Goa University, Dept. of CST
2013	Goa Government Merit Scholarship awarded by Govt. of Goa Duration: 2yrs

3.1 Book Chapters

- **Chapter 13** of the book edited by Hemanth Venkateswara and Sethuraman Panchanathan. Introduction to domain adaptation. In *Domain Adaptation in Computer Vision with Deep Learning*, pages 3–21. Springer, 2020, ISBN-13: 978-3030455286, ISBN-10: 3030455289

3.2 Journals

- Arghya Pal, Yogesh Rathi, A review and experimental evaluation of deep learning methods for mri reconstruction. *Machine Learning for Biomedical Imaging*, 1, 2022
- Arghya Pal and Vineeth N Balasubramanian. Generative adversarial data programming. *arXiv preprint arXiv:2005.00364*, 2020 (under communication Pattern Recognition)

3.3 Conferences Under Communication

- Sailaja Rajanala, Arghya Pal, Raphaël C-W Phan, and KokSheik Wong, Guess-It-Generator: Generating in a Lewis Signaling Framework through Logical Reasoning, ACM Multimedia, 2022
- Sailaja Rajanala, Arghya Pal, Manish Singh, Raphaël C-W Phan, and KokSheik Wong, A Self Critique Cooperative Classifier for Legal Text Classification, under communication in Knowledge Discovery and Data Mining KDD
- Arghya Pal, Raphaël C-W Phan, and KokSheik Wong, Variational Inference Distinguishers based on Autoencoders for the Round-Reduced Speck32/64 Cipher, under communication.

3.4 Conferences Accepted

- Sailaja Rajanala, Arghya Pal, Manish Singh, Raphaël C-W Phan, and KokSheik Wong, DeSCoVeR : Debiased Semantic Context Prior for Venue Recommendation, Annual International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR), **A*** Conference.
- Arghya Pal, Yogesh Rathi, A domain-agnostic MR reconstruction framework using a randomly weighted neural network, ISMRM 2022, **ORAL** presentation.
- Arghya Pal, Yogesh Rathi, Understanding and Reducing structural bias in deep learning-based MR recon, ISMRM 2022.
- Arghya Pal, Raphaël C-W Phan, and KokSheik Wong. Synthesize-it-classifier: Learning a generative classifier through recurrent self-analysis. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, pages 5161–5170, 2021, **A*** Conference
- Arghya Pal and Vineeth N Balasubramanian. Zero-shot task transfer. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, pages 2189–2198, 2019, **ORAL** presentation (5% acceptance rate), **A*** Conference
- Arghya Pal and Vineeth N Balasubramanian. Adversarial data programming: Using gans to relax the bottleneck of curated labeled data. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, pages 1556–1565, 2018, **A*** Conference
- KJ Joseph, Arghya Pal, Sailaja Rajanala, and Vineeth N Balasubramanian. C4synth: Cross-caption cycle-consistent text-to-image synthesis. In *2019 IEEE Winter Conference on Applications of Computer Vision (WACV)*, pages 358–366. IEEE, 2019
- Dhaivat Bhatt, Danish Sodhi, Arghya Pal, Vineeth Balasubramanian, and Madhava Krishna. Have i reached the intersection: A deep learning-based approach for intersection detection from monocular cameras. In *2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 4495–4500. IEEE, 2017, **A*** Conference
- Arghya Pal, BK Khonglah, S Mandal, Himakshi Choudhury, SRM Prasanna, HL Rufiner, and Vineeth N Balasubramanian. On-line bengali handwritten numerals recognition using deep autoencoders. In *2016 Twenty Second National Conference on Communication (NCC)*, pages 1–6. IEEE, 2016
- Arghya Pal and JD Pawar. Recognition of online handwritten bangla characters using hierarchical system with denoising autoencoders. In *2015 International Conference on Computation of Power, Energy, Information and Communication (ICCPEIC)*, pages 0047–0051. IEEE, 2015
- A. Pal. Bengali handwritten numeric character recognition using denoising autoencoders. In *2015 IEEE International Conference on Engineering and Technology (ICETECH)*, pages 1–6, 2015

PYTHON SKILL

PyTorch	●	●	●	●	●
Tensorflow	●	●	●	●	○
OpenCV	●	●	●	●	○
Chainer	●	●	●	●	○

OTHER SKILLS

- GPU based server system administrator
- OS: Ubuntu, CentOS 7, Mac, Windows
- MRI basic operator

NIH grant
R01MH116173
2021-till date

Topic: MRI reconstruction with limited or no ground truth, - PIs: SETSOMPOP, RATHI,

Gist of the work:

- correct reconstruction of minute details of pathology and anatomical structures
- risk quantification
- robustness
- running time complexity, generalizations
- **Project outcomes:** MELBA 2021, ISMRM 2022 two papers, JMRM 2022 (under communication)

Keywords:

MRI reconstruction	Representational Learning	Explainability	Robustness
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Monash STaR-
ship Scheme
2020-till date

Topic: Natural Image Generation using Generative Classifiers, - PIs: RAPHAEL PHAN, WONG KOKSHEIK,

Gist of the work:

- Using Classifier as a Generative Model
- Generation of Natural Images
- **Project outcomes:** CVPR 2021, KDD 2022 (submitted), SIGIR 2022 (submitted)

Keywords:

Image Generation using a Classifier	Generative Model	Natural Image Synthesis
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Intel India PhD
Fellowship
2015-2020

Topic: Beyond Full Supervision: Some Alternate Perspectives of Supervision in Computer Vision , - PI: VINEETH N BALASUBRAMANIAN,

Research Questions:

- What if we do not have access to vast amounts of labeled data?
- How easy is to collect/build curated labeled data?
- What is the effect on the performance of deep supervised learning algorithms if we are unable to provide curated labeled data in a large amount?
- Can we provide alternatives without losing performance?
- **Project outcomes:** IROS 2017, CVPR 2018, CVPR 2019, WACV 2019

Keywords:

Meta Learning	Representational Learning	Explainability in Meta Space
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WordNet
Konkani
2013-2015

Topic: Machine Translation from Konkani to any other Indian Languages, - PI: PROF. JYOTI D PAWAR,

Research Questions:

- How easy is to translate a natural language paragraph to another natural language paragraph with limited or no human supervision?
- **Project outcomes:** NCC 2015, ICETECH 2015

Keywords:

Natural Language Processing	Machine Translation	Deep Learning
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TRANSACTION IN PAMI REVIEWER2021

NEURIPS REVIEWER, CONFERENCE LINK2019-2022

CVPR REVIEWER, CONFERENCE LINK2019-2022

IJCAI REVIEWER, CONFERENCE LINK2020-2022

ICCV REVIEWER2018-2022

SYSTEM ADMIN, ML GROUP SERVERS HARVARD UNIVERSITY, PI: YOGESH RATHI 2021 - TILL DATE

DEPARTMENT REPRESENTATIVE, DEPT OF CSE, IIT HYDERABAD 2016 - 2017

WEBMASTER, RESEARCH SCHOLAR PORTAL, IIT HYDERABAD 2016

SYSTEM ADMIN, ML GROUP SERVERS, PI: VINEETH N BALASUBRAMANIAN 2015 - 2020

“ INTERSHIPS

INTEL INDIA, @ INNOVATION LAB, MENTOR: OMER OM J, 2020

TATA CONSULTANCY SERVICES, @ INNOVATION LAB, ADVISER: DR. JAY GUBBI, 2020

AIST JAPAN, @ AIRC LAB, ADVISER: DR. HIRODIKO SAKANASHI, 2019

ADOBE NOIDA, @ RESEARCH LAB, 2018

THE UNIVERSITY OF TOKYO, JAPAN, @ MACHINE INTELLIGENCE LAB, ADVISER: PROF. TATSUYA HARADA, 2016

INDIAN INSTITUTE OF TECHNOLOGY MADRAS, @ RISE LAB, ADVISERS: PROF. BALARAM RAVINDRAN & DR. KAUSHIK MITRA, 2016

INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI, @ SIGNAL INFORMATICS LAB, ADVISERS: PROF. SRM PRASANNA, 2014-2015

“ REFERENCES

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