Prabhu Teja Sivaprasad

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https://scholar.google.com/citations?user=teCKzqcAAAAJ

Education

Idiap Research Institute, École polytechnique fédérale de Lausanne (EPFL) Switzerland
Doctor of Philosophy (PhD) in (Electrical Engineering) *2023*

International Institute of Information Technology (IIIT-H) Hyderabad, India
Master of Science (MS) (Electronics and Communication Engineering) *2015*

Experience

Applied Scientist Apr 2023 – Present
AWS, Amazon Development Center Germany GmbH *Berlin, Germany*

- Core contributor to Amazon Q Feature Development that ranked top on the SWE-bench leaderbird. Work included large scale experimentation with LLMs, and evaluation pipelines.
- Core contributor to Renate, a PyTorch library for continual learning. Specialized in memory-free approaches for LLM based Continual Learning. Proposed a method for efficient continual learning for transformers with LoRA.

Applied Scientist Intern Sept 2021 – Feb 2022
AWS, Amazon Development Center Germany GmbH *Berlin, Germany*

- Methods for closed-form optimal learning rates for distributed training of large neural networks; specialized on Local SGD techniques. Published results at TMLR 2024.

Research Assistant Nov 2018 – Mar 2023
Idiap Research Institute *Switzerland*

- Method for adapting networks to domain shifts at inference time using augmentation robustness. Presented at NeurIPS 2021 Workshop on Distribution Shifts.
- Method for unsupervised domain adaptation for semantic segmentation. Specifically the case of source data-less domain adaptation using uncertainty quantification. Published CVPR 2021.
- Critical study of the practices of benchmarking of optimizers. Defined the notion of tunability. Large scale experimentation revealed that Adam optimizer is the most tunable of the considered list. Published at ICML 2020.
- Teaching Assistant (TA) for the course EE-559 on Deep Learning ($\sim$ 400 students) taught by Dr François Fleuret at EPFL for the spring semesters of 2020, 2021, 2022. My tasks are to hold tutorial sessions after each lecture, and to design and evaluate course projects.

Research Scientist Apr 2017 – Oct 2018
Amazon Development Center India *Bangalore, India*

- Built NLP models for auto-moderation of advertisements on Amazon site using word embeddings, sentence embeddings, cross-lingual transfer.
- Productionised models for scoring millions of ads with low latency constraints.

Research Engineer Jul 2014 – Feb 2017
Siemens Healthineers *Bangalore, India*

- Segmentation of human vertebra in Computed Tomography images: Active Shape models, Machine Learning (Random Forest) based boundary detection and Laplacian Mesh deformation.
- Non-linear optimization for parameter estimation of Magnetic Resonance Imaging using Levenberg-Marquardt and Nelder-Mead (Simplex) method.
- Deep neural networks for organ detection and segmentation in Computed Tomography images.

Publications

- Wistuba M, Prabhu Teja, Balles L, Zappella G **Choice of PEFT Technique in Continual Learning: Prompt Tuning is Not All You Need** *ArXiV, 2024*[PDF]
- *Balles L*, Prabhu Teja S*, Archambeau C* ***On the Choice of Learning Rate for Local SGD*** Transaction on Machine Learning Research, 2024*[PDF]*
- *Wistuba M, Prabhu Teja, Balles L, Zappella G* **Continual Learning with Low Rank Adaptation** *NeurIPS 2023 Workshop on Distribution Shifts*[PDF]
- *Courdier E*, Prabhu Teja*, Fleuret F* **Paumer: Patch Pausing Transformer for Semantic Segmentation** *33rd British Machine Vision Conference, 2022*[PDF].
- *Prabhu Teja, Fleuret, F* **Test time Adaptation through Perturbation Robustness** *NeurIPS 2021 Workshop on Distribution Shifts*. [PDF]
- *Prabhu Teja, Fleuret, F* **Uncertainty Reduction for Model Adaptation in Semantic Segmentation** *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2021.* Webpage at https://git.io/JthPp.
- *Prabhu Teja*, Mai, F.*, Vogels, T., Jaggi, M. and Fleuret, F* **Optimizer Benchmarking Needs to Account for Hyperparameter Tuning** *In Proceedings of the 37th International Conference on Machine Learning (ICML), 2020.* Webpage at https://git.io/JOqV9.
- *Prabhu Teja, Namboodiri, A* **A Ballistic Stroke Representation of Online Handwriting for Recognition.***International Conference on Document Analysis & Recognition–2013*[PDF].

Select Projects

Machine Learning models for Ad-moderation on Amazon platform

- Designed sentence embeddings based models for advertisements to check for highly objectionable content as defined by policy management. Lead the effort on the integration between the machine learning platform and the software pipelines. Worked on transferring the knowledge base built for English to low-resource marketplaces through transfer learning.

Multi-organ detection and segmentation using deep Convolutional networks

- Designed a CNN that outputs proposal heat-maps of each organ (kidney, liver, spleen). Preliminary results show that volume proposals thus found have a high true positive rate and a low false positive rate.

Segmentation of Vertebra from CT Images

- Deviced a method that uses shape priors, and used Laplacian Mesh Deformation with constraints derived from the image to fit the mesh to the vertebra. Developed a prototype in MevisLab for ready deployment.

Large Scale Random Forests

- Commonly available implementations of Random Forests require all features available in memory. Built a new random forest model implementation that has on the fly feature computation, efficient data structures and storage for the weak-learners and is parallelisable. Testing it on large amounts of data ($\sim$50GB) showed its effectiveness in real-world scenarios.

Programming skills

Languages: Python, C++
Frameworks: PyTorch ecosystem, Scientific Python ecosystem, LangChain, LaTeX, Eigen
Developer Tools: Git, VS Code, PyCharm

Professional Activities

Reviewer for CVPR 2024, ICML 2023, 2024, NeurIPS 2022, ICLR 2022, 2024, IEEE Transactions on Multimedia.