Dwaraknath Gnaneshwar

Curriculum Vitae

Department of ICT
Manipal Institute of Technology
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My Webpage
Github *Linkedin* *Skype*

Experience

University of Oxford

Dec, 2020 – present
Research Intern.
- Fast uncertainty estimation and reducing training time in Deep Neural Networks with the OATML group.
- Implemented weight, activation similarity visualization using centered kernel alignment in TensorFlow and PyTorch and reduced memory footprint of networks by over 8x

Advisor : **Dr. Yarin Gal**, *Associate Professor, Department of Computer Science & Engineering*, University of Oxford (*Personal Web-page*)

Aixplain

Jan, 2021 – present
Machine Learning Engineer Intern.
- Train large neural networks using distributed training strategies, specifically, large scale language models
- Deploy ML models on AWS. Worked with AWS Lambda, EC2, S3, Elasticache to build efficient inference pipelines.
- Implemented a smart caching system to save application context to reduce inference time by 25%.

German Research Centre for Artificial Intelligence, Bremen

Sept 2020 – Dec 2020
Fast uncertainty estimation in neural networks.
- Modified Monte Carlo DropConnect, Dropout to reduce compute required to estimate uncertainty by 4x
- Improved out-of-distribution detection in neural networks and studied the trade-off between performance and compute requirement (FLOPS).

Advisor : **Dr. Matias Valdenegro-Toro**, *Researcher, Interactive Machine Learning Group*, DFKI, Bremen, Germany (*Personal Web-page*)

IBM Research

May 2020 – July 2020
Summer Intern.
- Built a scalable framework to analyse data augmentation methods for unstructured text data. Worked with large scale language models like BERT, ROBERTA, GPT etc.
- Designed metrics to quantify the readability, consistency, statistical properties of industry scale datasets.
- Implemented algorithms to quantify the distribution shift caused due to payload data in online learning settings.(*Cert*)

Google Summer of Code, DBpedia

May 2019 – Aug 2019
Software Engineer.
- Implemented a multilingual natural language generation framework to verbalise RDF triples, i.e, take in RDF triples represented as graphs and output text describing information they contain.
- Significantly improved BLEU scores (previous SOTA): Eng -66.21 (55.9), Ger - 53.08 (NA), Rus - 46.86 (NA). Multilingual - 56.04 (NA)
- Used Encoder-Decoder architecture training with Graph Attention Networks, Transformers, LSTM. (*Code*)

Publications

In Conference Proceedings | *: Equal Contribution

2020 **Dwaraknath Gnaneshwar***, Diego Moussallem*, Thiago Castro Ferreira, and Axel-Cyrille Ngonga Ngomo. Nabu–multilingual graph-based neural rdf verbalizer. In *International Semantic Web Conference*, pages 420–437. Springer, 2020.

2020 Akshatha Kamath*, **Dwaraknath Gnaneshwar***, and Matias Valdenegro-Toro. Know where to drop your weights: Towards faster uncertainty estimation. In *"I Can't Believe It's Not Better!" NeurIPS 2020 workshop*, 2020.

2020 Amit Jindal, **Dwaraknath Gnaneshwar**, Ramit Sawhney, and Rajiv Ratn Shah. Leveraging bert with mixup for sentence classification (student abstract). In *AAAI*, pages 13829–13830, 2020.

Projects

Adversarial defense research project.
- Research on adversarial defense using Targeted Dropout
- Implemented ResNet 18, 32, 50 and Targeted Dropout (*Code*)

PyFL: Simulation of Systems Design for Federated Machine Learning in PyTorch.
- Simulation of Federated Learning to train distributed neural networks, designed a message passing system from scratch using PyTorch multi-processing API. Working on extending it to actual distributed training using sockets for communication. (*Code*)

Sparsify - A simple pruning toolkit for PyTorch.
- Simple, easy-to-use API to convert pytorch models into models with custom layers to facilitate weight masking, pruning, analysis etc.
- Implemented weight, unit, structured, unstructured and single-shot pruning methods. (*Code*)

Reverse Boltzmann Transport Equation simulator for radiation flux calculation.
- Designed geometric approximation methods to visualize the radiation sources using OpenGL
- Wrote simulator for the reverse Boltzmann Transport Equation to calculate radiation flux in 3D space given dosage value. (*Code*)

Education

2017–2021 : **B.Tech, Information Technology**, *Manipal Institute of Technology*, Manipal.
Minor in *Computational Mathematics* | CGPA - 7.68/10

2014–2016 : **Higher Secondary Examination**, *Velammal Vidhyashram*, Chennai.
Mathematics, Physics, Chemistry, English, Computer Science | Percentage - 76%

2014 : **Secondary Examination**, *Velammal Vidhyashram*, Chennai.
Mathematics, Physical Science, Life Science, Geography, History, English, Hindi | CGPA - 9.8/10

Achievements

2018 **Runner up** in ***Microsoft's Code.Fun.Do++***, Manipal, India.

2018 **All India Rank 4** in ***All India Research Championship***, IIT Kanpur, India.

2018 **Runner up** in ***Smart India Hackathon***, Dept of Atomic Energy, India.

Skills

Programming Languages	C++, Python, R
Frameworks	CUDA, TensorFlow, PyTorch, Keras
Technologies	Docker, Kubernetes, TerraForm, GIT
Languages	English, Tamil, Telugu, Hindi

Position of Responsibility

2017-2018 **Executive member of IEEE Student Branch**, MIT Manipal.