Don Kurian Dennis

PhD Student, Machine Learning Department
Carnegie Mellon University
*Advisor: **Prof. Virginia Smith***

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Research Interests

Primary: Theoretical and Applied Machine Learning, Optimization, On-device ML
Secondary: Hardware & Systems for ML, Resource Efficient Inference and Training, Statistical Learning

Education

Carnegie Mellon University
PhD, Machine Learning Department — *August '19 -*

Indian Institute of Technology Patna
Bachelor of Technology, Computer Science and Engineering — *July '13 - May '17*

Publications

Heterogeneity For the Win: One-Shot Federated Clustering
Don Dennis, Tian Li, Virginia Smith
International Conference on Machine Learning (ICML), 2021.[Link]

Shallow RNN: Accurate Time-series Classification on Resource Constrained Devices
Don Dennis, Durmus Alp Emre Acar, Venkatesh Saligrama, Prateek Jain
Advances in Neural Information Processing Systems (NeurIPS), 2019.[Link]

Multiple Instance Learning for Sequential Data Classification on Resource Constrained Devices
Don Dennis, Chirag Pabbaraju, Harsha Simhadri, Prateek Jain
Advances in Neural Information Processing Systems (NeurIPS), 2018. [Link]

EdgeML: Edge of Machine Learning - Demonstration of Low resource Keyword Spotting
Don Dennis, Harsha Simhadri, Prateek Jain
Advances in Neural Information Processing Systems (NeurIPS), 2018 (MLPCD2 Workshop).

GesturePod: Programmable Gesture Recognition for Augmenting Assistive Devices
Shishir Patil, Don Dennis, Chirag Pabbaraju, Harsha Simhadri, Manik Varma, Prateek Jain
ACM Symposium on User Interface Software and Technology (UIST), 2019. [Link]

Single Cycle RISC-V Micro Architecture Processor and its FPGA Prototype
Don Dennis, Ayushi Priyam, Sukhpreet Virk, Sajal Agrawal, Tanuj, Arijit Mondal, Kailash Ray
International Symposium on Embedded Computing and System Design (ISED), 2017. [Link]

Work Experience

Microsoft, Redmond
Advisor: Dr. Kazuhito Koishida — ***May '21 - Aug '21, Research Internship***

Worked on reducing compute footprint of noise suppression models using Shallow RNNs. Worked on a new generalized ensembling method to boost expressive power of RNN model classes.

Microsoft Research India
Advisors: Dr. Prateek Jain & Dr. Harsha Simhadri — ***July '17 - July '19, Research Fellowship***

Worked on bringing machine learning to severely resource constrained edge and end-point devices (IoT devices, embedded systems, etc). Research involved designing new and novel theoretical frameworks and algorithmic tools for such settings as well as implementing these algorithms on user-facing real-world systems.

Indian Institute of Technology, Patna
Advisor: Dr. Arijit Mondal — ***July '16 - July '17, Thesis Research***

Developed a RISC-V based micro-architecture processor optimized for low-cost embedded devices, a hardware simulator and an FPGA prototype. Wrote a custom assembler-linker-loader tool chain to run native programs on the prototype.

Center for Smart Systems, SUTD/NUS Singapore
Advisors: Dr. Vishram Mishra & Prof. Lim H Beng ***Summer Internship '16***

Research involved building and analysing various ontologies for a protocol agnostic universal IoT Gateway.

Indraprastha Institute of Information Technology (IIIT), Delhi [GitHub]
Advisor: Prof. Debajyoti Bera ***Summer Internship '15***

Explored a new Breadth First Search algorithm with multi-point initialization for throughput efficiency on the distributed map-reduce framework. Also worked on developing ear-decomposition algorithms on Map-Reduce.

Google Summer of Code '15 [GitHub]
Advisors: David Anders & Tom King, Intel ***Summer Internship '15***

Developed the first complete simulation of the Harwell WITCH, a Dekatron based computer used at the Atomic Energy Research Establishment, Oxfordshire during early 1950s. Simulator was built using extremely scarce schematics inferred from recently declassified documents.

Open Source Contributions

EdgeML: Machine Learning for Edge and End-Point Devices [GitHub]
Open Source ***Microsoft Research***

Core developer of EdgeML, Microsoft Research India's machine learning library for edge and end-point devices. Developed ProtoNN, EMI-RNN and ShaRNN for EdgeML's Tensorflow and pytorch submodule. Previously, maintainer of the python codebase.

Mixxx: Open Source DJ Mixing Software [GitHub]
Open Source

Worked on improving various aspects of the Auto-DJ feature. My improvements were included in the 1.12 release.

References

Virginia Smith
Assistant Professor,
Machine Learning Department, CMU
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Prateek Jain
Sr. Staff Research Scientist
Google AI
prajain@google.com

Harsha Vardhan Simhadri
Principal Researcher
Microsoft Research
harshasi@microsoft.com