2018 IEEE/ACM Machine Learning in HPC Environments (MLHPC 2018)

Dallas, Texas, USA **12 November 2018**



IEEE Catalog Number: CFP18J40-POD **ISBN:**

978-1-7281-0181-1

Copyright © 2018 by the Institute of Electrical and Electronics Engineers, Inc. All Rights Reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

*** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

IEEE Catalog Number:	CFP18J40-POD
ISBN (Print-On-Demand):	978-1-7281-0181-1
ISBN (Online):	978-1-7281-0180-4

Additional Copies of This Publication Are Available From:

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA Phone: (845) 758-0400 Fax: (845) 758-2633 E-mail: curran@proceedings.com Web: www.proceedings.com



2018 IEEE/ACM Machine Learning in HPC Environments (MLHPC) MLHPC 2018

Table of Contents

Workshop Papers

 Aluminum: An Asynchronous, GPU-Aware Communication Library Optimized for Large-Scale Training of Deep Neural Networks on HPC Systems .1
Auto-Tuning TensorFlow Threading Model for CPU Backend .1.4 Niranjan Hasabnis (Intel Corporation)
Automated Labeling of Electron Microscopy Images Using Deep Learning .26 Gunther H. Weber (Lawrence Berkeley National Laboratory), Colin Ophus (Lawrence Berkeley National Laboratory), and Lavanya Ramakrishnan (Lawrence Berkeley National Laboratory)
Automated Parallel Data Processing Engine with Application to Large-Scale Feature Extraction .37
Xin Xing (Georgia Institute of Technology, USA), Bin Dong (Lawrence Berkeley National Laboratory, USA), Jonathan Ajo-Franklin (Lawrence Berkeley National Laboratory, USA), and Kesheng Wu (Lawrence Berkeley National Laboratory, USA)
Communication-Efficient Parallelization Strategy for Deep Convolutional Neural Network Training .47. Sunwoo Lee (Northwestern University), Ankit Agrawal (Northwestern University), Prasanna Balaprakash (Argonne National Laboratory), Alok Choudhary (Northwestern University), and Wei-keng Liao (Northwestern University)
Deep Learning Evolutionary Optimization for Regression of Rotorcraft Vibrational Spectra .57 Daniel Martinez (US Army Engineering Research and Development Center (ERDC)), Wesley Brewer (HPCMP PETTT/Engility Corporation, USA), Gregory Behm (HPCMP PETTT/Engility Corporation), Andrew Strelzoff (US Army Engineering Research and Development Center (ERDC)), Andrew Wilson (U.S. Army Aviation and Missile Research Development and Engineering Center (AMRDEC)), and Daniel Wade (U.S. Army Aviation and Missile Research Development and Engineering Center (AMRDEC))

Large Minibatch Training on Supercomputers with Improved Accuracy and Reduced Time to Train .67.
Valeriu Codreanu (SURFsara), Damian Podareanu (SURFsara), and Vikram Saletore (Intel)
Large-Scale Clustering Using MPI-based Canopy .7.7 Jacek Burys (Imperial College London), Ahsan Javed Awan (Imperial College London), and Thomas Heinis (Imperial College London)
On Adam Trained Models and a Parallel Method to Improve the Generalization Performance .85 Guojing Cong (IBM Research) and Luca Buratti (University of Bologna)
Optimizing Machine Learning on Apache Spark in HPC Environments .95 Zhenyu Li (University of Warwick, UK), James Davis (University of Warwick, UK), and Stephen A. Jarvis (University of Warwick, UK)
Ramifications of Evolving Misbehaving Convolutional Neural Network Kernel and Batch Sizes .106 Mark Coletti (Oak Ridge National Laboratory), Dalton Lunga (Oak Ridge National Laboratory), Anne Berres (Oak Ridge National Laboratory), Jibonananda Sanyal (Oak Ridge National Laboratory), and Amy Rose (Oak Ridge National Laboratory)
Scaling Deep Learning for Cancer with Advanced Workflow Storage Integration <u>114</u> Justin M. Wozniak (Argonne National Laboratory), Philip E. Davis (Rutgers University), Tong Shu (Argonne National Laboratory), Jonathan Ozik (Argonne National Laboratory), Nicholson Collier (Argonne National Laboratory), Manish Parashar (Rutgers University), Ian Foster (Argonne National Laboratory), Thomas Brettin (Argonne National Laboratory), and Rick Stevens (Argonne National Laboratory)
Training Speech Recognition Models on HPC Infrastructure .124 Deepthi Karkada (Intel Corporation, USA) and Vikram A. Saletore (Intel Corporation, USA)

Author Index 133