Kirshanthan Sundararajah

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Education

PhD, Purdue University, West Lafayette, IN. Dec 2020
Advised by Milind Kulkarni
Major: Electrical and Computer Engineering
GPA - 3.93/4.00

B.Sc.Eng.(Hons), University of Moratuwa, Katubedda, Sri Lanka. Mar 2014
Major: Electronic and Telecommunication Engineering
GPA - 4.02/4.20 [First Class Honours]

Research Interests

Programming Languages, Compilers, Systems and High Performance Computing

Optimizing irregular programs through code transformations.

Publications

K Sundararajah and M Kulkarni "Composable, Sound Transformations of Nested Recursion and Loops" in *Programming Languages, Design and Implementation*, PLDI 2019, Phoenix, USA. [To appear]

L Sakka, **K Sundararajah**, R R Newton and M Kulkarni "Sound, Fine-Grained Traversal Fusion for Heterogeneous Trees" in *Programming Languages, Design and Implementation*, PLDI 2019, Phoenix, USA. [To appear]

L Sakka, **K Sundararajah** and M Kulkarni "TreeFuser: A Framework for Analyzing and Fusing General Recursive Tree Traversals" in *Object-Oriented Programming, Systems, Languages, and Applications*, OOPSLA 2017, Vancouver, Canada. [ACM DL]

N Hegde, J Liu, **K Sundararajah** and M Kulkarni "Treelogy: A Benchmark Suite for Tree Traversals" in *IEEE International Symposium on Performance Analysis of Systems and Software*, ISPASS 2017, San Francisco, USA. [IEEE Xplore]

K Sundararajah, L Sakka and M Kulkarni "Locality Transformations for Nested Recursive Iteration Spaces" in *Architectural Support for Programming Languages and Operating Systems*, ASPLOS 2017, Xi'an, China. [ACM DL]

K Sundararajah and S Jayasena, "Model-based Input-adaptive Vectorization" in *Moratuwa Engineering Research Conference*, MERCon 2016, Moratuwa, Sri Lanka. [IEEE Xplore]

S Kirshanthan, L Lajanugen, PND Panagoda, LP Wijesinghe, DVSX De Silva and AA Pasqual, "Layered Depth Image Based HEVC Multi-view Codec" in *Advances in Visual Computing: Proceedings of the International Symposium on Visual Computing*, ISVC 2014, Las Vegas, Nevada. [Springer]

Skills

Programming Languages: C/C++, Python, Bash

Operating Systems: Unix/Linux

Frameworks: Clang/LLVM, Intel Pin, Flex, Bison, Valgrind, OpenMP, MPI, Tensorflow

Professional Experience

Microsoft Research (June 2018 - Sep 2018)
Parasail: *SymSGD* for *Word2Vec*.

Parallelizing Word2Vec: Parallelizing and scaling word2vec machine learning problem on many cores.

Zone24x7 (Pvt.) Ltd. (May 2012 - Oct 2012)
Signs24x7: A sophisticated electronic signage alternative to a paper-based system.

Image Compression Algorithm
Implementation of memory efficient image compression algorithm, supposed to perform decompression on an *STM32 microcontroller* based system.

Clock Synchronization Algorithm
Implementation of real-time clock synchronization algorithm, deployed on an *ARM microprocessor* runs *embedded Linux*.

Hardware Abstraction Layer
Implementation of *Hardware Abstraction Layer (HAL)* for radio communication protocol stack of *Electronic Paper Display(EPD)*, driven by an *STM32 microcontroller*.

Research Experience

Descriptor Selection for Parsing Rare Categories Undergraduate Research Project (Mar 2013 - Jan 2014)
Improving the *Non-parametric Scene Parsing Framework* utilizes *Label Transfer* technique.
Replacing the feature descriptor with a suitable one to recognize rare categories.

Sync Word Selection to Reduce False Wake Up Alarm Internship Research Project (Jul 2012 - Oct 2012)
Finding a pool of *Sync Words* to selectively wake up *Wireless Sensor Network (WSN)* nodes from sleep.
Constructing the pool to be resilient to false triggers for extended battery life.

Achievements

Awards and Grants

ACM Travel Grant to Attend *SPLASH 2018*.

ACM Travel Grant to Attend *ASPLOS 2017*.

ACM Travel Grant to Attend *PLDI 2016*.

Electrical and Computer Engineering Fellowship 2015, Purdue University.

ACM Travel Grant to Attend *CGO 2015*.

V.K.Samaranayake Grant 2014 for Research Assistantship.

Mahapola Merit Scholarship 2009 for Undergraduate Studies.

Competitions

Silver Medal in ACM Student Research Competition at *SPLASH 2018*.

Placed 25^{th}, 34^{th}, 29^{th} and 45^{th} correspondingly in *IEEExtreme 7.0, 6.0, 5.0 and 4.0*.

Placed 4^{th} in *Sri Lanka Robot Competition (SLRC) 2012*.

Champions of *Inter-University Statistics Quiz Competition 2010*, University of Colombo, Sri Lanka.

Represented Sri Lanka at *International Mathematics Olympiad Competition(IMO) 2009*, Bremen, Germany