

Balaji Vasan Srinivasan

Research Statement

My primary research interests are in the computational aspects of machine learning. My research focuses on accelerating existing learning algorithms using scientific computing and parallelization using graphics processor with applications in vision, speech and weather modeling.

Education

UNIVERSITY OF MARYLAND, COLLEGE PARK, MD

JAN 2009 – CURRENT

PhD COMPUTER SCIENCE

- GPA – 4.0/4.0

UNIVERSITY OF MARYLAND, COLLEGE PARK, MD

AUG 2006 – DEC 2008

M.S ELECTRICAL ENGINEERING

- GPA – 3.75/4.0

THESIS: Gaussian process regression of model learning

ANNA UNIVERSITY, CHENNAI, INDIA

JUL 2002 – JUL 2006

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

- GPA – 9.25/10.0

THESIS: Positive output super-lift converters

Publications

Srinivasan BV, Duraiswami R, “Speeding up kernel methods via graphical processors”, *Siam International Conference on Data Mining*, 2010. (submitted)

Srinivasan BV, Duraiswami R, Zotkin DN, “Kernelized Renyi distance for speaker recognition”, *IEEE International Conference on Acoustic, Speech and Signal Processing (ICASSP)*, 2010. (submitted)

Srinivasan BV, Duraiswami R, Mutugudde R, “Efficient Kriging for real-time spatio temporal interpolation”, *20th Conference on Probability and Statistics in Atmospheric Sciences*, American Meteorological Society, 2010. (accepted)

Srinivasan BV, Duraiswami R, “Efficient Subset selection via the kernelized Rényi distance”, in *Proc. of 12th IEEE International Conference on Computer Vision (ICCV)*, 2009.

Morariu VI, **Srinivasan BV**, Raykar VC, Duraiswami R, and Davis L, “Automatic online tuning for fast Gaussian summation.” in *Proc. of 22nd Annual Conference in Neural Information Processing Systems (NIPS)*, D. Koller et al., Eds., MIT Press, 2008

Antani S, Demner-Fushman D, Li J, **Srinivasan BV**, Thoma GR. “Exploring use of images in clinical articles for decision support in Evidence-Based Medicine” in *Proc. of SPIE Electronic Imaging*, 2008.

Srinivasan BV, Antani S, Demner-Fushman S, Thoma GR; "Identification and Segmentation of Multi-Panel Images in Biomedical Journal Articles", *National Institute of Health Research Festival*, 2007

BALAJI VASAN SRINIVASAN**Research Experience**

**Institute for Advanced Computer Studies,
Maryland, College Park, MD****University of**

JAN 2007 – CURRENT

*Graduate Research Assistant***Speaker recognition:**

- Exploring efficient dimensionality reduction techniques to be used in large dimensional speech vectors.
- Developing efficient techniques to perform speaker verification and identification; extending from my work in KRD.

Efficient spatio-temporal kriging:

- Exploring various techniques for developing an efficient approach for spatio-temporal kriging
- Developing efficient models to compare kriged trends in atmospheric contaminant concentration with those in meteorological factors, to enable health related predictions from historic data

GPU Acceleration of kernel machine learning algorithms

- Accelerated kernel algorithms like kernel density estimation, Gaussian process regression, mean shift clustering and ranking using Graphics processor.
- Implemented efficient methods for host-device interaction for improving the performance
- Developed a generalized extendable approach for speeding up multiple kernels
- Extended the GPU based approach to matrix decompositions like LU, QR for kernel matrices.

Non-parametric estimation of Rényi Entropy

- Developed a distance measure based on Rényi entropy for $\alpha = 2$, kernelized Rényi distance (KRD) and extended the idea to develop a divergence measure and a mutual information measure
- Accelerated the resulting entropic distance computation using FIGTREE and graphical processing units (GPUs).
- Developed a KRD-based subset selection approach for Gaussian process regression and object recognition
- Extended the KRD measure for evaluating similarity scores to speaker recognition.

Dual Estimation using Local Ensemble Kalman Filter

- Exploring the methods to efficiently solve non-linear differential equations using a Gaussian Process prior
- Developed an EM based dual estimator with Kalman Filter for model and state estimation.
- The model estimation used Gaussian process regression, data compressed with Informative Vector Machine

**Communication Engineering Branch, National Library of Medicine,
National Institute of Health, Bethesda, MD**

May 2007 – Aug 2007

Summer Intern

- Developed an algorithm to automatically identify and separate multi-panel images
- Improved search retrieval in PubMed by enhancing current image annotation methods.
- Performed shape indexing spinal bones using kd-trees for better database retrieval

Relevant Coursework

Scientific Computing on GPUs
Fast Multipole Methods
Advanced Numeric OptimizationAdvance numeric analysis
Machine Learning
Statistical Pattern RecognitionAuditory Scene Analysis
Randomized algorithms
Multimedia Signal Processing**Awards and Honors**

- Received PAMI Student Support at the International Conference on Computer Vision, September 2009
- Received CS-UMD travel award from the Dept. of Computer Science, University of Maryland, College Park in September 2009
- Received Gannon Research Award from the Dept. of Computer Science, University of Maryland, College Park in April 2009
- Received Goldhaber Travel Award from the Graduate School, University of Maryland, College Park in December 2008
- Awarded the 1953 Endowment Award from Anna University for securing the maximum GPA in 2003-2004