Bharath K. Sriperumbudur

CONTACT INFORMATION

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CURRENT RESEARCH INTERESTS

Mathematical Statistics & Machine Learning
Theory and applications of reproducing kernel Hilbert spaces (RKHS) in probability and statistics, Concentration of Measure, Empirical process theory, Statistical learning theory, Sparsity in machine learning and statistics.

EDUCATION

University of California, San Diego (UCSD)
Ph.D. Student, Electrical and Computer Engineering. September 2005–August 2010 (expected).
GPA: 3.97/4.0

Indian Institute of Technology, Kanpur (IIT-K), India
Master of Technology, Electrical Engineering. March 2002.
GPA: 10.0/10.0

Sri Venkateswara University College of Engineering (SVUCE), Tirupati, India
Bachelor of Technology, Electronics and communication Engineering. June 1999.
Percentage: 86.4

RESEARCH EXPERIENCE

Visiting Researcher, The Institute of Statistical Mathematics, Tokyo *October–November, '09*

Research Intern, Max Planck Institute for Biological Cybernetics, Tübingen *April–September, '08*

Research Intern, Max Planck Institute for Biological Cybernetics, Tübingen *June–September, '07*

Research Intern, Swartz Center for Computational Neuroscience, UCSD *June–September, '06*

Research Engineer, Imaging Technologies Lab, GE Global Research, India *April '02–August '05*

Graduate Researcher, Speech Processing Lab, IIT-K *August '00–March '02*

TEACHING EXPERIENCE

Tutor, Department of Electrical and Computer Engineering, UCSD *April–June, '10*
Course: Convex Optimization and Applications

Instructor, Edison Engineer Development Program (EEDP), GE Global Research *2004–2005*
Course: Signals and Systems

Teaching Assistant, Department of Electrical Engineering, IIT-K *August '00–December '01*
Courses: Electrical Circuits, Digital Electronics and Microprocessor Technology.

RECENT PUBLICATIONS

Journal Papers (Accepted/Submitted)

B. K. Sriperumbudur, A. Gretton, K. Fukumizu, B. Schölkopf and G. R. G. Lanckriet.
Hilbert Space Embeddings and Metrics on Probability Measures
Journal of Machine Learning Research, 11(Apr): 1297–1322, 2010.

B. K. Sriperumbudur, K. Fukumizu and G. R. G. Lanckriet.
Universality, Characteristic Kernels and RKHS Embedding of Measures
Submitted to Journal of Machine Learning Research.

B. K. Sriperumbudur, K. Fukumizu, A. Gretton, B. Schölkopf and G. R. G. Lanckriet.
On Integral Probability Metrics, ϕ-Divergences and Binary Classification

Submitted to IEEE Transactions on Information Theory.

B. K. Sriperumbudur, D. A. Torres and G. R. G. Lanckriet.
A Majorization-Minimization Approach to the Sparse Generalized Eigenvalue Problem
Submitted to Machine Learning Journal.

B. K. Sriperumbudur and G. R. G. Lanckriet.
Convergence Analysis of the Concave-Convex Procedure
Submitted to Neural Computation.

Conference Papers (Peer-reviewed)

B. K. Sriperumbudur, K. Fukumizu, A. Gretton, B. Schölkopf and G. R. G. Lanckriet.
Non-parametric Estimation of Integral Probability Metrics
International Symposium on Information Theory (ISIT), 2010.

B. K. Sriperumbudur, K. Fukumizu and G. R. G. Lanckriet.
On the Relation Between Universality, Characteristic Kernels and RKHS Embedding of Measures
International Conference on Artificial Intelligence and Statistics (AISTATS), 2010.

B. K. Sriperumbudur, K. Fukumizu, A. Gretton, G. R. G. Lanckriet and B. Schölkopf.
Kernel Choice and Classifiability for RKHS Embeddings of Probability Distributions
Neural Information Processing Systems (NIPS), 2009.
Honorable Mention for the Outstanding Student Paper Award.

B. K. Sriperumbudur and G. R. G. Lanckriet.
On the Convergence of the Concave-Convex Procedure
Neural Information Processing Systems (NIPS), 2009.

A. Gretton, K. Fukumizu, Z. Harchaoui and B. K. Sriperumbudur.
A Fast, Consistent Kernel Two-sample Test
Neural Information Processing Systems (NIPS), 2009.

K. Fukumizu, B. K. Sriperumbudur, A. Gretton and B. Schölkopf.
Characteristic Kernels on Groups and Semigroups
Neural Information Processing Systems (NIPS), 2008.

B. Schölkopf, B. K. Sriperumbudur, A. Gretton and K. Fukumizu.
RKHS representation of measures applied to homogeneity, independence and Fourier optics
Oberwolfach Report 30, Mathematisches Forschungsinstitut, Oberwolfach-Walke, Germany, 2008.

B. K. Sriperumbudur, A. Gretton, K. Fukumizu, G. R. G. Lanckriet and B. Schölkopf.
Injective Hilbert Space Embeddings of Probability Measures
Conference on Learning Theory (COLT), 2008.

B. K. Sriperumbudur, O. Lang and G. R. G. Lanckriet.
Metric Embedding for Kernel Classification Rules
International Conference on Machine Learning (ICML), 2008.

B. K. Sriperumbudur, D. A. Torres and G. R. G. Lanckriet.
Sparse Eigen Methods by D.C. Programming
International Conference on Machine Learning (ICML), 2007.

OTHER PUBLICATIONS

Signal Processing

S. V. Bharath Kumar and S. Umesh.
Non-Uniform Speaker Normalization Using Affine Transformation
Journal of the Acoustic Society of America, 124(3), pp.1727–1738, September 2008.

S. V. Bharath Kumar, S. Umesh and R. Sinha.
Study of Non-Linear Frequency Warping Functions for Speaker Normalization
Proc. of IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2006.

G. Gopalakrishnan, S. V. Bharath Kumar, A. Narayanan and R. Mullick.
A Framework for Parameter Optimization in Mutual Information based Registration Algorithms
Proc. of SPIE Medical Imaging, 2006.

G. Gopalakrishnan, S. V. Bharath Kumar, A. Narayanan and R. Mullick.
A Fast Piece-wise Deformable Method for Multi-Modality Image Registration
Proc. of Applied Imagery and Pattern Recognition, 2005.

V. Nandedkar, S. V. Bharath Kumar and S. Mukhopadhyay.
Lossless Medical Image Compression with Progressive Multi-Planar Reformatting using 3-D DPCM
Proc. of National Conference in Image Processing, 2005. (**Best Paper Award**)

S. V. Bharath Kumar, R. Mullick and U. Patil.
Textural Content in 3T MR: An Image-Based Marker for Alzheimer's Disease
Proc. of SPIE Medical Imaging, 2005.

S. V. Bharath Kumar and S. Umesh.
Non-Uniform Speaker Normalization Using Frequency-Dependent Scaling Function
Proc. of International Conference on Signal Processing and Communications (SPCOM), 2004.

S. V. Bharath Kumar and S. Ramaswamy.
A Texture Analysis Approach for Automatic Flaw Detection in Pipelines
Proc. of International Conference on Signal Processing and Communications, 2004.

S. V. Bharath Kumar, S. Mukhopadhyay and V. Nandedkar.
A Novel Progressive Thick Slab Paradigm for Volumetric Medical Image Compression
Proc. of IEEE International Conference on Image Processing (ICIP), 2004.

S. V. Bharath Kumar, S. Umesh and R. Sinha.
Non-Uniform Speaker Normalization Using Affine Transformation
Proc. of IEEE ICASSP, 2004. **(rated amongst the top in its review category)**

S. Umesh, R. Sinha and S. V. Bharath Kumar.
An Investigation into Front-end Signal Processing for Speaker Normalization
Proc. of IEEE International Conference on Acoustics, Speech and Signal Processing, 2004.

D. Blezek, S. V. Bharath Kumar, S. Adak, Z. Li, J. Schenck and E. Zimmerman.
Spatial Distribution of T_2 values in the Hippocampus of Alzheimer's and Control Subjects
Twelfth ISMRM Scientific Meeting and Exhibition, 2004.

S. V. Bharath Kumar, N.Nagaraj, S. Mukhopadhyay and X. Xu.
Block-Based Conditional Entropy Coding for Medical Image Compression
Proc. of SPIE Medical Imaging, 2003.

S. Mukhopadhyay, S. V. Bharath Kumar, V. Nandedkar and A. Raparia.
3-D Loss-less Multi-resolution Image Compression for Medical Images
RSNA InfoRad presentation, 2003.

S. Umesh, S. V. Bharath Kumar, M. K. Vinay, R. Sharma and R. Sinha.
A Simple Approach to Non-Uniform Vowel Normalization
Proc. of IEEE International Conference on Acoustics, Speech and Signal Processing, 2002.

SELECTED TALKS

Non-parametric Estimation of Integral Probability Metrics, *ISIT 2010.*

On the Relation Between Universality, Characteristic Kernels and RKHS Embedding of Measures, *AISTATS 2010.*

Kernel Choice and Classifiability for RKHS Embeddings of Probability Distributions, *NIPS 2009.*

On the Convergence of the Concave-Convex Procedure, *NIPS Workshop on Optimization for Machine Learning, 2009.*

Hilbert Space Embeddings and Metrics on Probability Measures, *Workshop on Machine Learning Methods in Statistical Science, The Institute of Statistical Mathematics, Tokyo, October 2009.*

The Sparse Eigenvalue Problem, *Dept. of Computer Science and Automation, Indian Institute of Science, Bangalore, India, December 2008.*

Injective Hilbert Space Embeddings of Probability Measures, *COLT 2008.*

Metric Embedding for Kernel Classification Rules, *ICML 2008.*

Sparse Eigen Methods by D.C. Programming, *ICML 2007.*

RELEVANT COURSES

Probability Theory, Real Analysis, Introduction to Stochastic Processes, Mathematical Statistics, Time Series Analysis & Applications, Parameter Estimation, Topics in High Dimensional Data Analysis, Statistical Learning Theory, Convex Optimization, Machine Learning.

PROFESSIONAL ACTIVITIES

Reviewer: Neural Computation, IEEE Transactions on Pattern Analysis and Machine Intelligence, Conference on Learning Theory (COLT 2009), Neural Information Processing Systems (NIPS 2008-2010), International Conference on Machine Learning (ICML 2007), International Conference on Artificial Intelligence and Statistics (AISTATS 2007), Asian Conference on Computer Vision (ACCV 2006), IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2005).

AWARDS & HONORS

Outstanding Student Paper Award (Honorable Mention), NIPS 2009.

Travel Award, NIPS 2009, ICML 2008, ICML 2007, MLSS 2007.

Cal-$(\mathbf{IT})^2$ Fellowship, University of California, San Diego (2005–2006).

Bronze Patent Medal, GE Global Research (2004).

Six Sigma Green Belt Certification, GE Global Research (2002).

General Electric Scholarship awarded by Institute of International Education, NY, USA (2000–2002).

Graduate Research Fellowship, Dept. of EE, Indian Institute of Technology-Kanpur (2000–2002).

98.48 percentile in *Graduate Aptitude Test in Engineering* with **All India Rank 136** out of ∼20,000 students (2000).

Jawaharlal Nehru Center for Advanced Scientific Research (JNCASR) Fellowship (1998).

University 2^{nd} rank in the Department of ECE, Sri Venkateswara University (1995–1999).

REFERENCES

Available on request