Bharath K. Sriperumbudur

CONTACT INFORMATION

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Visa Status: F-1 Student

Address:
Department of ECE
University of California, San Diego
9500 Gilman Drive
La Jolla, CA 92093-0407, USA.

RESEARCH INTERESTS

Mathematical Statistics & Machine Learning
Regularization in reproducing kernel Hilbert spaces (RKHS), Empirical process theory, Statistical learning theory, Convex optimization methods in learning, Sparse approximations.

Signal Processing
Speaker normalization and Speech recognition, Statistical Signal Processing, Multi-rate theory and Wavelets, Geometric methods in Image Processing.

EDUCATION

University of California, San Diego (UCSD)
Ph.D. Candidate, Electrical and Computer Engineering. Since September 2005.
GPA: 3.97/4.0
Advisor: Prof. Gert Lanckriet

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

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*
Project: Universality, characteristic kernels and RKHS embedding of measures.

Research Intern, Max Planck Institute for Biological Cybernetics, Tübingen *April–September, '08*
Project: Hilbertian metrics and kernels on probability measures.

Research Intern, Max Planck Institute for Biological Cybernetics, Tübingen *June–September, '07*
Project: Injective Hilbert space embeddings of probability measures.

Research Intern, Swartz Center for Computational Neuroscience, UCSD *June–September, '06*
Project: Context sensitive independent component analysis (ICA) using canonical correlation.

Research Engineer, Imaging Technologies Lab, GE Global Research, India *April '02–August '05*
Active research in the field of Entropy coding and Medical Image Compression, Image Processing and Analysis, Wavelet transforms, Image Registration and Pattern Recognition.

Graduate Researcher, Speech Processing Lab, IIT-K *August '00–March '02*
Project: Non-uniform speaker normalization by affine transformation.

TEACHING EXPERIENCE

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.

PUBLICATIONS

Journal Papers under Submission

Hilbert Space Embeddings and Metrics on Probability Measures
(with A. Gretton, K. Fukumizu, B. Schölkopf and G. R. G. Lanckriet)
`http://arxiv.org/pdf/0907.5309v2`.

On Integral Probability Metrics, ϕ-Divergences and Binary Classification
(with K. Fukumizu, A. Gretton, B. Schölkopf and G. R. G. Lanckriet)
`http://arxiv.org/pdf/0901.2698v4`.

A D.C. Programming Approach to the Sparse Generalized Eigenvalue Problem
(with D. A. Torres and G. R. G. Lanckriet)
`http://arxiv.org/pdf/0901.1504v2`.

Mathematical Statistics & Machine Learning

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.

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.

THESES

S. V. Bharath Kumar
A Model Based Approach to Non-Uniform Vowel Normalization
Masters Thesis, Department of Electrical Engineering, Indian Institute of Technology, Kanpur, 2002.

S. V. Bharath Kumar
Realization of Linear Time-Invariant System Stability Analyzers
Bachelors Thesis, Sri Venkateswara University College of Engineering, Tirupati, 1999.

PATENTS & DISCLOSURES

S. V. Bharath Kumar and S. Ramaswamy.
Method to Automatically Detect Metal-Loss Regions in Magnetic Flux Leakage Data
GE Global Research Disclosure Letter, 2004.

S. V. Bharath Kumar, S. Mukhopadhyay and V.Nandedkar.
Progressive Medical Image Volume Navigation
US patent application, 2003.

S. V. Bharath Kumar, N. Nagaraj and S. Mukhopadhyay.
Block Based Conditional Entropy Coding with Sub-Optimal Scan Order using Wavelet Transform for Medical Image Compression
GE Global Research Disclosure Letter, 2002.

TALKS

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, *Dept. of Electrical Communication Engineering, Indian Institute of Science, Bangalore, India, December 2008.*

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.*

Finding Musically Meaningful Words Using Sparse CCA, *Music, Brain and Cognition Workshop, NIPS 2007*.

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

Non-Uniform Speaker Normalization Using Frequency-Dependent Scaling Function, *SPCOM 2004.*

A Texture Analysis Approach for Automatic Flaw Detection in Pipelines, *SPCOM 2004.*

A Novel Progressive Thick Slab Paradigm for Volumetric Medical Image Compression and Navigation, *ICIP 2004.*

Non-Uniform Speaker Normalization Using Affine Transformation, *ICASSP 2004.*

Shape-Based Markers for Detection of Alzheimer's Disease, *Albany Medical Center, Albany, May 2004.*

RELEVANT COURSES

Graduate (UCSD): Probability Theory [audit], Real Analysis [audit], Introduction to Stochastic Processes, Topics in High Dimensional Data Analysis, Time Series Analysis & Applications, Probabilistic Methods in AI and Machine Learning [audit], Learning Theory, Convex Optimization, Machine Learning, Parameter Estimation, Mathematical Statistics, Statistical Learning.

Graduate (IIT-K): Detection and Estimation Theory, Statistical Signal Processing, Representation and Analysis of Random Signals, Image Processing, Speech Signal Processing, Mathematical Structures of Signals and Systems, Advanced Topics in Digital Filtering, Spectral and Correlation Techniques for Digital Systems.

PROFESSIONAL ACTIVITIES

Reviewer: IEEE Transactions on Pattern Analysis and Machine Intelligence, Conference on Learning Theory (COLT 2009), Neural Information Processing Systems (NIPS 2008, 2009), 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

Honorable Mention for the Outstanding Student Paper, 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).

Hats-off Award, GE Global Research (2002, 2003).

Team Excellence Award, GE Global Research (2002).

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 $\sim$20,000 students (2000).

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

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

Saraswathi Award for academic excellence in all years of undergraduate study at SVUCE, Tirupati, India (1995–1999).

REFERENCES

Available on request.