Hemant Tyagi

CONTACT INFORMATION

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RESEARCH INTERESTS

High dimensional data with intrinsic low dimensional models, Approximation Theory, Online Optimization, Learning Theory, Compressed Sensing.

EDUCATION

ETH Zürich, Switzerland

Ph.D, Theoretical Computer Science, June, 2016.

- Dissertation Topic: "On low-dimensional models for functions in high dimensions".
- Advisor: Bernd Gärtner.

Ecole Polytechnique Federale de Lausanne (EPFL), Lausanne, Switzerland

M.S., Communication Systems, July, 2011.

- Thesis Topic: "Local sampling analysis for quadratic embeddings of Riemannian manifolds".
- Advisor: Pascal Frossard.

CGPA: 5.62/6.

National Institute of Technology, Surathkal (NITK), Karnataka, India

B.E., Electrical and Electronics Engineering, June, 2006.
GPA: 4/4.

HONORS AND AWARDS

Received a *Gold Medal* for securing 1^{st} Rank in B.E Electrical & Electronics Engineering, in the Final Degree Examinations held in 2006.

Received the *M.R Shenoy Memorial Prize* for best student of the final year in B.E Electrical & Electronics Engineering, during the year 2005-2006.

Received a *Certificate of Merit* from the Institution of Engineers (Students Chapter), NITK Surathkal for securing 1^{st} Rank in the years 2003-04, 2004-05 in B.E Electrical & Electronics Engineering.

Awarded the *Keerthy Trophy Gold Medal* for Best Student in Electrical & Electronics Engineering, during the year 2005-06, for having secured the highest percentage of marks in I to VII Semester B.E Examinations.

Awarded the *Incident 1981 Committee Prize* for Best Student in Electrical & Electronics Engineering, during the year 2005-06, for having secured the highest percentage of marks in I to VII Semester B.E Examinations.

Selected for the *Summer Fellowship Programme* in the Indian Institute of Technology, Madras (June - August, 2005).

ACADEMIC EXPERIENCE

Teaching assistance in the following courses taught at ETH Zürich.

- Informatik II – Spring 2013.
- Informatik für Mathematiker und Physiker – Fall 15.
- Machine Learning – Fall 2013.
- Data Mining for Large Data Sets – Spring 2014.
- Geometry: Combinatorics & Algorithms – Fall 2014, 2015.
- Modelling and Simulation – Spring 2015.

Reviewer for Neural Information Processing Systems (NIPS): 2014, 2015.

Conference Publications

Hemant Tyagi, Rajesh M Hegde, Hema A. Murthy, and Anil Prabhakar, Automatic identification of bird calls using spectral ensemble average voice prints, 13^{th} European Signal Processing Conference (EUSIPCO), 2006, 1-5.

Hemant Tyagi and Volkan Cevher, Learning ridge functions with randomized sampling in high dimensions, 37^{th} International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2012, 2025-2028.

Hemant Tyagi and Volkan Cevher, Active Learning of Multi-Index Function Models, Advances in Neural Information Processing Systems (NIPS), 2012, 1475-1483.

Hemant Tyagi, Elif Vural and Pascal Frossard, Tangent space estimation bounds for smooth manifolds, 10^{th} International Conference on Sampling Theory and Applications (SAMPTA), 2013, 452-455.

Hemant Tyagi and Bernd Gärtner, Continuum armed bandit problem of few variables in high dimensions, Proc. 11^{th} Workshop on Approximation and Online Algorithms (WAOA), 2014, LNCS 8447, 108-119.

Hemant Tyagi, Andreas Krause and Bernd Gärtner, Efficient Sampling for Learning Sparse Additive Models in High Dimensions, Advances in Neural Information Processing Systems (NIPS), 2014, 514-522.

Hemant Tyagi, Anastasios Kyrillidis, Bernd Gärtner and Andreas Krause, Learning Sparse Additive Models with Interactions in High Dimensions, 19^{th} International Conference on Artificial Intelligence and Statistics (AISTATS), 2016, 111-120 (**oral presentation**).

Journal Publications

Hemant Tyagi, Elif Vural and Pascal Frossard, Tangent space estimation for smooth embeddings of Riemmanian manifolds, Information and Inference, 2013, 2:1, 69-114. (**Second prize at the Information and Inference best paper prize meeting**)

Hemant Tyagi and Volkan Cevher, Learning non-parametric basis independent models from point queries via low-rank methods, Applied and Computational Harmonic Analysis (ACHA), 2014, 37:3, 389-412.

Hemant Tyagi, Sebastian Stich and Bernd Gärtner, On two continuum armed bandit problems in high dimensions, Theory of Computing Systems (TOCS), 2014, 58:1, 191-222.

Preprints

Hemant Tyagi, Anastasios Kyrillidis, Bernd Gärtner and Andreas Krause, Algorithms for learning SPAMs with interactions in high dimensions, 2016.

Talks

Learning multi ridge functions in high dimensions via low rank matrix recovery. Mittagsseminar, ETH Zürich, April, 2012.

Tangent space estimation for smooth embeddings of manifolds. Mittagsseminar, ETH Zürich, January, 2013.

Continuum armed bandit problem of few variables in high dimensions. Mittagsseminar, ETH Zürich, July, 2013.

Continuum armed bandit problem of few variables in high dimensions. 11th Workshop on Approximation and Online Algorithms (WAOA), September, 2013.

The adversarial multi-armed bandit problem. Mittagsseminar, ETH Zürich, December, 2013.

Interpolation with cubic splines. Mittagsseminar, ETH Zürich, May, 2014.

Efficient sampling for learning SPAMs in high dimensions. Mittagsseminar, ETH Zürich, October, 2014.

Tangent space estimation for smooth embeddings of manifolds. Information and Inference best paper

prize meeting, University of Oxford, UK, August, 2015.

Learning SPAMs with pairwise interaction terms. Mittagsseminar, ETH Zürich, November, 2015.

Professional Experience

Senior Engineer, **ITTIAM Systems**, Bangalore, India. **July, 2006 - July, 2008**

Worked in the Video Technology Solutions Team. Involved in the development of ITTIAMs MPEG-2 Video Decoder and the MPEG-2 and MPEG-4 Video Encoder.

Other Positions

Intern, Laboratory of Information and Inference Systems, EPFL, Switzerland. **August, 2011 - February, 2012**

Intern, Signal Processing Laboratory, LTS4, EPFL, Switzerland. **April, 2012 - May, 2012**

References

Available on request.