

Avadhanula Vashist
Electrical Engineering
Indian Institute of Technology, Bombay
Specialization: Communication and Signal Processing

08D07022
UG Fourth Year(Dual Degree)
Male
DOB: 20-09-1991

Education

Graduation: 2008 – till date	IIT Bombay – CGPA: 8.38 on a scale of 10
Intermediate/+2: 2008	Board of Intermediate Education, Andhra Pradesh – 95.8 %
Matriculation: 2006	Board of Secondary Education, Andhra Pradesh – 90.1 %

Scholastic achievements

AIS 2010	was the only undergraduate student to be selected for the Advanced Instruction School on Numerical Linear Algebra funded by the National Board of Higher Mathematics organised by the Indian Institute of Technology, Guwahati in December'10
AIR 302 in IITJEE 2008	Secured an All India Rank - 302 out of about 300,000 students in IITJEE 2008, the prestigious entrance examination for undergraduate examination into IITs
NSEP 2008 & NSEA 2008	Was among the top 1% of the candidates selected from all over India for the Indian National Physics Olympiad(2008) and Indian National Astronomy Olympiad(2008 & 2006) conducted by the Tata Institute of Fundamental Research (TIFR) and hence was awarded a certificate of Merit.

Research Summmary

Broad Research Interests

Machine learning, Statistical pattern recognition and Statistical learning theory
Applied probability, Probabilistic graphical models, Probabilistic reasoning and Decision making
Statistical Signal processing, Speech processing, Image processing and Computer vision

Research Projects and Internships

Research Project: Learning Parameters from Subjective Human Annotation

Guide: Prof. Haimonti Dutta,

Center for Computational Learning Systems, University of Columbia

Ongoing

- * Surveyed various *Supervised and Unsupervised* learning algorithms and also looked upon various *boosting* techniques
- * Formulated an objective function to be optimised which incorporates human judgement and perception in a semi-supervised learning algorithm
- * Presently working on various optimization techniques to optimize the above said objective function to obtain a solution for the learning algorithm which can be used to caterogise the articles of the *The New York Public Library*

Summer Internship: Non Realistic Photo Rendering for Artistic Impression

Summer 2011

SONY Corporation, Tokyo

- * Surveyed various *Texture Synthesis and Transfer* algorithms for the purpose of Non Realistic Photo Rendering
- * Implemented a *Texture Transfer* algorithm which emulates the brush filter, to create a artistic painting analog of the original picture
- * The implemented *Texture Tranfer* algorithm is more versatile than the existing brush filtering techniques and can be implemented in a camera

Key Academic Projects

Structured Matrices

Summer 2010

Guide: Prof. Madhu N. Belur, Dept. of EE, IIT Bombay

- * Was part of the *Structured Matrices* Reading group and has performed an extensive literature survey on *unified superfast algorithms* which reduces the complexity of various polynomial operations exploiting the relation between polynomial operations and Structured Matrices
- * We also worked on *Optimal eigen structure assignment by memoryless state feedback*, which aims to find an explicit solution for the optimal assignment problem, for which there was only an iterative algorithm

Reconstruction of Degraded Texts Using Hidden Markov Models

Seminar, Autumn 2010

Guide: Prof. Pushpak Battacharya, Dept. of CSE, IIT Bombay

- * Discussed an idea that first appeared in a paper of AT&T Bell Laboratories on connected and degraded text recognition using hidden markov model. This paper discussed the application of a *Hidden Markov Model(HMM)* and level building dynamic programming algorithm to the problem of robust machine recognition of connected and degraded characters forming words in a poorly printed text
- * This seminar was part of the *Artificial Intelligence* course work.

Spectral Analysis of Annihilation filter

Course Project, Autumn 2010

Guide: Prof. S.N.Merchant, Dept. of EE, IIT Bombay

- * Implemented the annihilation filter techniques to identify the complex exponentials by using minimum number of samples and extended the annihilation filter methods to estimate the signal from the samples of gaussian noise affected copies of the original signal by implementing the standard *MUSIC* and *PISARENKO's* algorithms

Blind Image Deconvolution

Course Project, Autumn 2011

Guide: Prof. Raj Babu, Dept. of EE, IIT Bombay

- * Implemented a blind image deconvolution algorithm using expectation-maximization techniques.
- * This involved modeling the image as an ARMA model and finding the Maximum likelihood image consistent to the model

L1 Norm Regularization

Course Project, Autumn 2011

Guide: Prof. Saketha Nath, Dept. of CSE, IIT Bombay

- * Performed a literature survey on the existing algorithms to solve the L1 Norm Regularization problem or the LASSO.
- * Implemented the Feature sign search algorithm, an efficient sparse coding algorithm for solving the LASSO problem.

Rendering High Dynamic Images

Course Project, Autumn-2011

Guide: Prof. S.Chaudiri, Dept. of EE, IIT Bombay

- * Recovered High Dynamic Range Radiance Maps from Photographs using the algorithm described by Debevec, P. and Malik, J.
- * Implemented Ward's tone-mapping algorithm to compress the wide dynamic range of an HDR data set into the much narrower dynamic range of display device, hence producing a good quality *HDR* image.

Course Work

Mathematics: Linear Algebra, *Probability & Stochastic Processes*, *Advanced Probability & Stochastic Processes*, *Convex Optimization*, Matrix Computations, Ordinary Differential Eqns, Partial Differential Equations, Complex Analysis

Signal Processing: Signals and Systems, *Data Analysis and Interpretation*, Communication systems, Digital Communications, Digital Signal Processing, *Speech Processing*, *Image Processing*, Adv. Topics in Signal Processing, *Markov Chains and Queuing Systems*

Computer Science: Intro. to Programming, Discrete Structures, Data Structures and Algorithms, *Artificial Intelligence*, Cryptography and Network Security, *Foundations of Machine learning*, *Information theory*, *Probabilistic Graphical Models*, *Computer Vision*, *Combinatorial Optimization*

Electronics: Analog electronics and lab, Digital electronics and lab, Microprocessors and lab

Software Skills

Programming: C, C++, MATLAB[®], 8085 Assembly

Operating Systems: Windows and LinuxOS

Other Packages: Mathematica, Prolog, L^AT_EX, SCILAB, Verilog HDL, MultiSim

Extracurricular activities

served as an organiser for Exhibitions in Techfest-2009, Asia's Largest College Technical Festival and E-Summit-2009, the Entrepreneurship Summit organised by the Entrepreneurship Cell of IIT Bombay

served as an Co-ordinator for Exhibitions in Techfest-2010, where I was a host to number of exhibitors from various countries exhibiting modern day technologies

worked as a technical manager to a startup named Edgeways where I have mentored over 1000 college students preparing for Joint Entrance Examination, most competitive exam in India.

is an avid lover of adventure sports, have hiked many mountains in the Western Ghats. Have Successfully hiked **Mt. Fuji** in Summer'11, performed **Bunge Jumping** from a height of 42m

References

Prof. Madhu N. Belur

Department of Electrical Engineering, Indian Institute of Technology, Bombay

Prof. Haimonti Dutta

Center for Computational Learning Systems, University of Columbia