Saurabh Gupta

Senior Year B.Tech Student
Computer Science and Engineering
Indian Institute of Technology Delhi

+91 9911592327
cs1070185@cse.iitd.ernet.in
http://www.cse.iitd.ernet.in/~cs1070185

Academic Details

Year	Degree	Institute	Percentage/CGPA
2007-Present	BTech in Computer Science and Engineering	Indian Institute of Technology Delhi	CGPA = 9.938/10 **Institute Rank 1**
2007	Class XII CBSE-AISSCE	Bal Bharati Public School Rohini, Delhi	**90.2%** 99% in Computer Science
2005	Class X CBSE-AISSE	Bal Bharati Public School Rohini, Delhi	**93.4%** 100% in Mathematics

Objective

To pursue graduate studies in computer science and engineering, leading to a career in research. I am interested in computer vision and machine learning.

Major Projects

- **Improving Performance with MKL in SVMs** — Dr. Manik Varma, MSR India; Dr. Prateek Jain, MSR India
  Summer Internship and B.Tech Project — *May 2010 - Present*
  Support Vector Machines learn linear classifiers from labelled training data to predict labels for previously unseen test data. Kernels with SVM's allow to learn non linear classifiers, and hence lead to much higher classification accuracies in practice. We are learning **non linear kernel combinations** to give us even better classification accuracies and are seeing a possibility of a significant performance increase. Also, looking at new regularizers (which take into account the model complexity) for use in the MKL objective. Working towards submitting this to one of ICML, NIPS or ECCV.

- **Unsupervised Video Surveillance** — Prof. Subhashis Banerjee, CSE, IITD
  Student Undergraduate Research Award (SURA - 2009) — *May 2009 - October 2009*
  This project involved the development of a novel technique to detect unusual activities in videos in an unsupervised manner. We used pLSA with an appropriate choice for features on video clips to obtain clustering of similar videos, and any new activity different from the ones learnt was flagged as unusual. We also extended the idea to multi person unusual activity detection.

Other Projects

- **Captcha Reader** — Prof. Prem Kalra
  Digital Image Analysis Course Project — *November 2010*
  I made a simple captcha reader to read the captcha in use for the institute web mail. It involved letter segmentation and training in a semi supervised manner using a KNN classifier.

- **Using Structural Information for Object Recognition** — Prof. Subhashis Banerjee
  Computer Vision Course Project — *April 2010*
  I investigated various feature vectors and techniques and frameworks for incorporating structural information in object recognition tasks.

- **Non Photo-realistic Rendering** — Prof. Prem Kalra
  Digital Image Analysis Course Project — *September 2010*
  Implemented color quantization, dithering, image segmentation and edge enhancement (by edge linking, differential thickening and smoothing) to give a painterly look to photo-realistic images.

- **Knowledge Management** — Prof. Subhashis Banerjee
  Independent Project — *January 2010 - October 2010*
  Conceptualized new web 2.0 based IT services such as Interest Group Discussion Forums, Campus

Wiki, Project Database to allow easier collaboration, better information organization and formalizing undocumented technical know how. Designed intuitive user interfaces and work-flows for these services and customized existing open source drupal and foswiki project (by adding kerberos authentication, LDAP integration), to finally deploy these services in the institute.

- **Funny Cell** Assistant Prof. Aaditeshwar Seth
  Computer Networks Course Project *March 2010 - April 2010*
  This project was based on a molecule based inter-cell communication simulator designed by our professor. We designed and analyzed robust communication protocols for inter cell molecular communication among antibody cells in a loss full unreliable medium. Also designed combat strategies against infection cells.

Scholastic Achievements

- **Institute Rank 1**: Consistently maintaining institute rank 1 among 450 students over the last 3 years at IIT Delhi. Receiving scholarships and awards for the same.
- Awarded with the **Student Undergraduate Research Award (SURA), 2009** for the project on Unsupervised Detection of Unusual Activities
- **Kalpana Chawla Award, 2009** for contribution to research at IIT Delhi.
- Ranked 83^{rd} in the **Joint Entrance Examination(IIT-JEE 2007)** taken by over 250,000 students across the country.
- Among the top 400 students who qualified for Indian National Physics Olympiad (**INPhO**), Indian National Chemistry Olympiad (**INChO**) and Indian National Mathematics Olympiad (**INMO**) in the year 2006-07.
- **CBSE Merit Scholarship**: Receiving scholarship for securing 29^{th} rank among 600,000 students in AIEEE 2007.
- **NTSE Scholar**: Among the top 700 students receiving the National Talent Search Examination scholarship (NTSE-2005). Topped the state level examination.

Conferences/Workshops Attended

- **Research Intern** at **Microsoft Research India, Bangalore** in the Vision Graphics and Visualization Group and worked with Manik Varma and Prateek Jain.
- Attended the **2010 Winter School on Machine Learning and Computer Vision** organized by IISc Bangalore with Microsoft Research(**MSR**) and Canadian Institute for Advanced Research (**CIFAR**) featuring lectures by researchers such as Jitendra Malik, William Freeman, Yair Weiss, Brendan Frey and Martin Wainwright.
- Attended the Special Interest Groups in Communications (**SIGCOMM**) Conference, 2010
- Will attend the Seventh Indian Conference on Computer Vision, Graphics and Image Processing(**ICVGIP**).
- Will attend the 3rd Microsoft Research India Computer Vision and Graphics Shindig.

Relevant Courses

- **Computer Science:** Computer Vision, Digital Image Analysis, Approximation Algorithms, Numerical and Scientific Computing*, Parallel Programming*, Computer Networks, Operating Systems, Theory Of Computation, Analysis and Design of Algorithms, Programming Languages, Digital Hardware Design, Computer Architecture, Discrete Mathematical Structures, Data Structures, ICTs for Development.
- **Mathematics:** Graph Theory*, Numerical Optimization, Statistical Methods and Algorithms, Probability Theory, Stochastic Process, Real Analysis, Differential Equations, Linear Algebra, Matrix Theory.

*Courses to be done in Spring 2011.

Computer Skills

- **Programming Languages:** Java, C/C++, Perl, Python, SML, Lex, Yacc, Prolog, PHP, MySQL, JavaScript, VHDL, MIPS32 (Assembly Language).
- **Software Packages:** Matlab, OpenCV, Xilinx, Latex, Doxygen.
- **Platforms:** Linux and Windows.

Extra Curricular Activities

- **Programming Contests**: Actively participate in online programming contests(OPC) and have won the following awards.
  - Blue Coder on Topcoder with a rating of 1496.
  - Won the 1st prize in inter college pen and paper based algorithms event at Tryst 2010 (Technical Festival IIT Delhi).
  - Qualified for the ACM ICPC 2009 Gwalior Kanpur Site Contest held at IIITM Gwalior.

Position Of Responsibility

- Member of the department **System Administrator** team since May 2009. Maintain over 100 clients, 10 servers and around 15 IT services, like authentication, mailing, directory service, internet access, course management, remote client management.
- Served as a **Student Mentor** for the CSE Department First Year Students. Helped them get acquainted with the college studies and environment.

References

- **Manik Varma**, Researcher, Vision Graphics and Visualisation Group, Microsoft Research India, +91-080-66586000, manik@microsoft.com.
- **Subhashis Banerjee**, Professor, Department of Computer Science and Engineering, Indian Institute of Technology Delhi, +91-011-26591288, suban@cse.iitd.ernet.in.
- **Prateek Jain**, Associate Researcher, Algorithms Research Group, Microsoft Research India, +91-080-66586000, prajain@microsoft.com.