Anmol Sharma

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Research Interests	Machine Learning, Pattern Recognition, Computer Vision, Image Processing.

Education

DAV Institute of Engineering & Technology, Jalandhar, India. Fall 2012 - Present
Punjab Technical University
- Final year student of Bachelor of Technology in Information Technology.
- Current Aggregate 76.72%.

Apeejay School, Jalandhar, India. Spring 2010 - Spring 2012
Central Board of Secondary Education (CBSE)
- Graduated with distinction in 12th class majoring in Physics, Chemistry and Mathematics. Major score 93.6% and overall score 92.4%.
- Graduated with distinction in 10th class. Scored 9.4/10 CGPA.

Software Skills

Programming Languages: C, C++, MATLAB, Python.

Image Processing / AI Tools: MATLAB Image Processing Toolbox, OpenCV, SVM^{light}, NumPy, SciPy, Lasagne and Keras with Theano, ImageJ, MATLAB Neural Network Toolbox.

Other Tools: NVIDIA CUDA C, LaTeX, Git, MySQL, Eclipse, Code::Blocks.

Operating Systems: Linux (Ubuntu), Windows.

Work Experience

RadSupport Inc. **Machine Learning Engineer**
San Francisco, CA, USA (Work From Home) April 2016 - Present
- Developing a commercial Computer Aided Diagnosis (CADx) system for mammography as part of a 3 member team. The project is powered by a large internal mammography dataset and leverages the power of Deep Learning for detection and diagnosis of cancerous masses.
- Responsibilities include - designing ML models to classify images, writing internal toolchain to work with proprietary data, testing of ML/DL models, recruiting new ML Engineers by undertaking technical interviews based on ML and data science.
- *Technologies Used:* Python, Keras, Caffe, Theano.

Indian Statistical Institute Kolkata (ISI-Cal) **Research Trainee (INAE Fellow)**
Kolkata, India January 2016 - July 2016
- Developed a novel Computer Aided Detection/Diagnosis (CAD) system for Brain MRI scans capable of automatically delineating tumor region in MRI scan and segment out the region from background.
- Worked in the Machine Intelligence Unit in Medical Image Analysis under the supervision of Prof. Sushmita Mitra and co-supervisor Dr. Uma B Shankar.
- Enrolled in a graduate level course Advanced Pattern Recognition by Prof. C.A. Murthy during the internship period.
- *Technologies Used:* Python, NumPy, SciPy, Theano, Keras, Lasagne, MATLAB

Cube26 Automotive Research **Research Intern**
New Delhi, India May 2015 - June 2015
- Induced as *permanent* member of the Driverless Car Project team due to excellent performance at the Cube26 Automotive Research department.
- The project budget crosses INR 15 Million yearly and the five member team is one of the 12 finalists for the $1 Million prize at the Mahindra Spark the Rise: Driverless Car Challenge.
- Founded and leading the Computer Vision and Machine Learning subgroup for Cube26 Automotive Research.
- *Technologies Used:* C++, OpenCV, CUDA C.

Cube26 **Intern (Automotive Research)**
New Delhi, India December 2014 - January 2015
- Developed Traffic Sign Detection and Pedestrian Detection modules as a part of team working on developing an Autonomous Car for Mahindra Spark The Rise Challenge.

- Optimized all the modules developed by team to GPU using NVIDIA CUDA C, improving performance of each module by at least 200%.
- *Technologies Used:* C++, OpenCV, SVM^{light}, CUDA C.

National Institute of Technology Silchar   Research Intern
Silchar, Assam, India.   June 2014 - July 2014
- Developed a novel Computer Aided Diagnosis (CADx) system to assist radiologists in classifying masses in mammograms as cancerous or non-cancerous. Utilized *Zernike Moments* as features and neural networks for classification.
- The proposed system achieved an overall classification accuracy of 96.7% on MIAS database. The attained performance surpassed all the earlier works.
- *Technologies Used*: MATLAB.

DAV Institute of Engineering & Technology   Research Intern
Jalandhar, Punjab, India.   May 2013 - July 2013
- Assessed performance of various spatial domain filters in denoising a grayscale image under the supervision of Dr. Jagroop Singh.
- Performed detailed survey and analysis of the available filters and investigated to determine the best filter for a number of known noise models by experimentation.
- *Technologies Used:* MATLAB.

Publications
- (In Review) **A. Sharma**, S. Bannerjee, S. Mitra, B.U. Shankar, *"Computer Aided Detection/Diagnosis (CAD) System for Brain MRI Scans using Deep Convolutional Neural Networks and GrowCut Segmentation"*
- (In Review) **A. Sharma**, J. Chakraborty, A. Midya, A. Sadhu, *"Automatic Characterization of Breast Masses into Benign and Malignant using Multi-Objective NSGA-II based Feature Selection"*
- H. P. Kaur, **A. Sharma**, *"Offline Handwritten Signature Verification using Zernike Moments"* Fifth National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG), IIT Patna, 16-18 Dec. 2015
- **A. Sharma**; J. Singh, *"Image Denoising using Spatial Domain Filters: A Quantitative Study,"* IEEE 6th International Congress on Image and Signal Processing 2013 (CISP13), 16-18 Dec. 2013.

Volunteer Work

Sahayak Social Welfare Society

Working on a blood donation based project to enhance donation tasks by incorporating advanced data driven technology.

Google Developers Group for Societal Impact

Heading the inference engine development team for a community project called Code4Kids. The project is backed and mentored by Haryana Governement, and Google Developers Group communities across Chandigarh and Jalandhar.

Projects

DDSM Utility   ○ GitHub

Project to simplify downloading, converting, viewing and extracting annotation information from DDSM Mammography Database. It's one of a kind, and the only known fully working solution for easy access to DDSM Database for research purposes.

An Object Detection Framework Using HOG And SVM   ○ GitHub

Developed a framework to recognize any generic object to facilitate development that aims to train an object detector using the above approach. The classifier can be trained to detect any object given both positive and negative images of the object.

Handwritten Digit Recognition using Image Moments and ANN in MATLAB   ○ GitHub

Developed a framework to recognize offline handwritten digits (0-9) using image moments as shape descriptors and a feed forward artificial neural network as classifier. It was implemented to test the recognition power of orthogonal moments.

ROBOCar: An Accelerometer Controlled RC Car   ○ GitHub

Developed a wireless remote controlled car "ROBOCar" by interfacing a Wii remote to the Raspberry Pi development board using Bluetooth. The main script was written in Python and used the open source WiringPi and WiiMote libraries. The car used accelerometer sensors in the Wii remote to get inputs.

GadgetFreaks Tech News: A High School Project   ○ GitHub

Developed a Symbian S60v5 based phone application to pull RSS feeds from personal website, in high school. The project was implemented in C++, and the app received over 10,000 downloads from the Ovi Store.

Achievements
- Won the **ISTE Student of the Year Award 2015** for outstanding academic and research achievements, given to only one student in a single college.
- Member of Cube26 Automotive Research team, heading the Machine Learning group. The team is one of the 12 teams that advanced to the *Prototype Phase* of *Mahindra Spark the Rise: Autonomous Car Challenge* competition from a pool of over 600 teams from the whole country.
- Served as a reviewer for the 4th IEEE International Conference on Control Systems, Computing and Engineering (ICCSCE 14) held at Penang, Malaysia from 28-30 November 2014.
- Received Summer Research Fellowship 2014 award for undertaking a research project at National Institute of Technology Silchar.
- Presented and published a research paper at IEEE 6th International Congress on Image & Signal Processing (CISP 13') held in Hangzhou, China 16-18 December 2013. The paper is indexed by IEEE Xplore.