KUSHAGRA MAHAJAN

Computer Science and Engineering, IIIT Delhi

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Education

Indraprastha Institute Of Information Technology (IIIT) Delhi — New Delhi, India
Bachelor of Technology in Computer Science; CGPA: 8.75 (till Semester 7) — Aug. 2014 – Dec. 2018

Relevant Courses: *Analysis and Design of Algorithms, Computer Organization, Signals and Systems, Probability and Statistics, Compiler Design, Image Processing, Machine Learning, Computer Vision, Data Mining, Collaborative Filtering, Probabilistic Graphical Models*

Delhi Public School (DPS), Rohini — New Delhi, India
Senior Secondary Education; Score: 91.8% — June 2014

Work Experience

Computer Vision and Machine Learning Lab, IIIT Delhi
Undergraduate Researcher [Guide: Dr. Chetan Arora] — *Aug. 2016 - Present*

Pose Aware Fine-Grained Visual Classification
- Exploited the pose structure in FGVC datasets by creating an ensemble of pose experts and a meta network for pose identification.
- Proposed method demonstrated an improvement in performance on the benchmark Stanford Cars, FGVC-Aircrafts, DeepFashion datasets and the contributed Footwear dataset.

Exploiting Texture Cues for Clothing Parsing
- Used the texture cues from texture descriptors like Gabor and Local Binary Patterns to improve the segmentation accuracy using a two-stream architecture.
- Approach improved the state-of-the-art segmentation performance on the benchmark fashion parsing datasets, Fashionista and CFPD.

Speech Recognition Lab, IIIT Delhi
Undergraduate Researcher [Guide: Dr. Saket Anand] — *May 2017 - Present*

Disentangling Factors of Variation in Speech
- Used cycle-consistency and a discriminator to improve the disentanglement of speaker style information from speech samples in the Timit dataset. We build on the Factorized Hierarchical VAE approach proposed by CSAIL, MIT.
- Developed CNN-RNN architectures for emotion classification on the RECOLA dataset, achieving competitive performance to the state-of-the-art.

Intel Corporation, India
Undergraduate Research Intern [Guide: Tigi Thomas] — *Aug. 2017 - Dec. 2017*

Hand Gesture Detection and Recognition
- Worked on a virtual reality and laptop module for sensor based gesture detection and recognition. Device tested on Google Maps and Music System controls. To be incorporated in laptops.
- Main task was data preprocessing, followed by building of machine learning models for gesture detection and recognition taking into consideration memory constraints and output latency.

Indian Institute of Technology Delhi (IIT Delhi)
Research Intern, Computer Architecture Lab [Guide: Dr. Smruti R. Sarangi] — *Dec. 2015 - Jul. 2016*

Building the EmuARM Emulator and DRAM Simulator
- Worked on an Emulator for compiling, running and debugging assembly programs with both ARM and THUMB architectures. The emulator is currently deployed in the Computer Architecture Course at IIT Delhi and the University of Adelaide.
- Built a cycle accurate model of a DRAM memory controller; it is a publicly available DDR2/3 memory system model which can be used in both full system and trace based simulations. It is part of the CPU Simulator Tejas at IIT Delhi.

Teaching Assistant, IIIT Delhi
Course: Machine Learning [Instructor: Dr. Saket Anand] — *Aug. 2018 - Dec. 2018*
- Teaching Assistant for the Machine Learning course offered in Fall 2018 semester at IIIT Delhi taken by 130 students. I was responsible for preparing and grading assignments, quizzes, and projects.

Publications and Reports

- **K. Mahajan**, T. Khurana, A. Chopra, I. Gupta, C. Arora, A. Rai. "Pose Aware Fine-Grained Visual Classification Using Pose Experts". 25th IEEE International Conference on Image Processing, 2018.[pdf]
- T. Khurana, **K. Mahajan**, C. Arora, A. Rai. "Exploiting Texture Cues for Clothing Parsing in Fashion Images". 25th IEEE International Conference on Image Processing, 2018.[pdf]

Academic Projects

- **Dynamic Traffic Light System** *Jan. 2017 - May 2017*
  Course Project: Computer Vision [Guide: Dr. Saket Anand]
    - Compared the performances of HOG, DPM and Single Shot Detector based models for detecting car density at a traffic junction through surveillance videos. Integrated lane isolation, vehicle speed detection, KLT tracking to create a system which will be deployed on Swarath, the autonomous vehicle at IIIT Delhi.

- **Stock Price Prediction and Analysis** *Sep. 2016 - Oct. 2016*
  Course Project: Machine Learning [Guide: Dr. Saket Anand]
    - Analyzed prediction accuracies for stocks from different sectors using techniques like SVR, Lasso, Ridge Regression, Linear Regression with varying kernels. Used features specific to financial estimations like momentum, volatility, stock exchange index values etc.

- **Marine Objects Recognition and Segmentation** *Sep. 2016 - Dec. 2016*
  Course Project: Image Analysis [Guide: Dr. A V Subramanyam]
    - AlexNet pretrained on ImageNet was used for recognition of marine objects like ships, liners, boats and SegNet was used for object segmentation. DWT filters were used to analyze the limitations of our model due to the relatively small sizes of the objects of interest.

Skills

Programming Languages: C, C++, Java, Python, Matlab, SQL
Tools and Technologies: Caffe, Keras, Tensorflow, Kaldi, OpenCV, Scikit Learn, Linux
Areas of Expertise: Machine Learning, Computer Vision, Deep Learning, Speech Recognition

Awards and Scholarships

- **AICTE INAE Travel Grant 2018** *July 2018, IIIT Delhi*
  Funded by the All India Council for Technical Education - Indian National Academy of Engineering to present our papers at ICIP 2018.
- **Dean's List 2017** *September 2017, IIIT Delhi*
  Part of the Dean's List 2017 for outstanding academic performance.
- **School Gold Medalist and Principal's Cash Award Winner** *May 2014, DPS Rohini*
  Awarded for being a scholar for 7 consecutive years. Received highest marks in Computer Science (99%) in Class 12.

Co-curricular Activities

- **Community Involvement**
    - Teaching Fellow at Vivekananda Kendra (May 2018 - July 2018) and Sewa Bharti (May 2015 - July 2015). I helped under-privileged students gain valuable exposure to computer softwares like Ms Excel, Ms Powerpoint and taught them English grammar and elementary Maths.

- **Interests & Hobbies**
    - Cleared Grade 4 in Electronic Keyboard Practical and Grade 3 in Music Theory from Trinity College, London in January 2014. Member of the Music Club (AudioBytes) at IIIT Delhi from August 2015 - December 2017.
    - Part of the IIIT Delhi Cricket Team from March 2016 - July 2018.