# CHIRAG NAGPAL

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## EDUCATION

**University of Pune, India**                                              2012 - 2016
*Bachelor of Engineering (Computer Engineering)*, 5<sup>th</sup> Semester
Overall Percentage: 80.5% , **First** Position in Department

**Delhi Public School, Jaipur**                                          2010 - 2012
*AISSCE (CBSE, Class XII)*
Physics, Chemistry, Mathematics, Multimedia and Web Technology
Percentage: 94% , **Second** Position in Class

**St. Joseph's Convent School, Pathankot**                               2008 - 2010
*AISSE (CBSE, Class X)*
Science, Mathematics and English
GPA: 10

## EXPERIENCE

**Indian Institute of Science, Bangalore**                               May - July 2014
*Science Academies' Summer Research Fellow, Supercomputer Education and Research Center*

· Guide: **Padmashree Prof. N. Balakrishnan**, Associate Director, Indian Institute of Science
· Project: **'Application of Machine Learning Techniques for Twitter User Classification'**.

**Netaji Subhas Institute of Technology, New Delhi**                     Dec 2013 - Jan 2014
*Student Mentor, Texas Instruments Centre For Embedded Product Design*

· Guide: **Prof. DV Gadre**, Associate Professor, NSIT, New Delhi
· Mentored undergraduate students from leading universities in India on TI Microcontrollers.
· Trained students on software packages, CadSoft EAGLE and TI Code Composer Studio.
· Guided students with embedded system projects on TI MSP430 and ARM Cortex M4.

## PROJECTS

**Spatio-Topical Modelling of Tweets from India**                        Aug - Sep 2014

· Utilised 'R' packages, 'tm' and 'topicmodels' to carry out topical categorisation of a corpus of over 400,000 geo-located tweets by applying Latent Dirichlet Allocation.
· Topic wise visualisations of tweets were generated using package 'mapdata'
· Currently, implementing a fuzzy geographical clustering algorithm based on DBSCAN for topical clustering.

**Extending DBSCAN to Cluster Density Specific Regions**                 Sep 2014

· Implemented a modified DBSCAN algorithm in Python with a new input parameter *Max Points*.
· Algorithm was tested on dataset from CHAMELEON. Cluster visulisations were generated with MatPlotLib.

**Application of Machine Learning Techniques for Twitter User Classification**       May - July 2014
*Research Project at SERC, Indian Institute of Science*

· Developed Python scripts for Tweet mining using Twitter REST and Streaming API.
· Utilised NLTK and SciKit to implement algorithms like Decision Trees, Naive Bayes and SVMs
  on features like discription, followers, friends.
· Trained classifiers to classify Twitter accounts into Users, Organisations & Celebrities and
  Music, Sports & Politics.
· Presented results to Hon'ble Governor of Andhra Pradesh and Telangana, **Shri. E.S.L Narasimhan**.

**Wireless Environment Sensing Network with IoT extension**             Mar - Apr 2014
*ARM Cortex A8 (BeagleBone Black), MSP430*

· Developed an environment sensing node with LM35, DHT11, LDR interfaced to MSP430 and XBee.

- Coordinator node was developed on ARM A8 based BeagleBone Black serving as an Intenet of Things server.
- Frontend was developed as a webpage, served by coordinator using processing.js with backend in Python.
- Work was featured on leading electronics blog, **Hack A Day**, **Dangerous Protoypes**,
  **Official MSP430 Blog** and stood 1$^{st}$ in **'Amalgam'** college project competition, 2014

### GPIO Access Through Linux User Space
*ARM Cortex A8 (BeagleBone Black)*

Nov - Dec 2013

- Implemented a novel technique of GPIO access using the Linux mmap() system function and /dev/mem.
- Studied the architecture of the TI AM3359 ARM A8 Controller with special regard to GPIO addressing.
- Achieved a GPIO toggle rate of over 2MHz as compared to the standard 3kHz speed.
- Work was featured on leading electronics blog, **Hack A Day**.

### Mobile Camera Robot
*ARM Cortex A8 (BeagleBone Black)*

Sep - Oct 2013

- Implemented a Web Server using LIGHTTPD and Wi-Fi with static IP on ARM Cortex A8 running Linux.
- Established a 640x480 resolution video stream from a webcam through a simple PHP based web page.
- Interfaced an HMC5883 Magnetometer using I$^2$C, and L293DNE Motor Driver for direction & control.

***Complete details of other projects at* www.chiragnagpal.com/projects.html**

## TECHNICAL SKILLS

| | |
|---|---|
| **Programming Languages** | C/C++, Python, Java, Shell Scripting, R, Latex, Qt, Processing |
| **Platforms** | x86, Arduino, MSP430, ARM Cortex M4, ARM Cortex A8 |
| **Operating Systems** | Unix, Linux, Embedded Linux, Windows |
| **Tools** | NLTK, WEKA, EAGLE, Eclipse IDE, Xilinx ISE, GIMP |

## PUBLICATIONS

- Currently reviewing *'BeagleBone Electronic Projects'*, PACKT Publishers, Birmingham, UK (In Press)
- **C. Nagpal**, K. Singhal, 'Twitter User Classification Using Ambient Tweet Metadata', Arxiv

## OUTREACH

Have been featured multiple times on leading websites, links below

- http://hackaday.com/2014/04/06/hackaday-links-april-6-2014/
- http://dangerousprototypes.com/2014/03/31/beaglebone-black-and-msp430-based-wireless-sensing/
- http://hackaday.com/2013/12/07/speeding-up-beaglebone-black-gpio-a-thousand-times/
- http://dangerousprototypes.com/2013/12/18/laser-pointer-controlled-with-a-pc-mouse/01111

## AWARDS AND ACHIEVEMENTS

- IET Scholarship Award, West Zone Winner, 2014 (Awarded to Top 5 students across India)
- Selected for Science Academies' Summer Research Fellowship, 2014 at IISc, Bangalore
- 1$^{st}$ position in 'Amalgam', alumni sponsored project comepetition, AIT Pune, 2014
- Selected for MIT Media Lab DIY Workshop, India, 2014 (could not attend due to University Exams)
- Sir Ratan Tata Memorial Scholarship, for standing 1$^{st}$ in Computer Department, 2014 & 2013.
- Merit Scholarships by Indian Army for excellence in academics in the years 2014, 2013, 2012 & 2010.
- All India Rank 5, 'National Creativity Aptitude Test', 2013
- All India Rank 41, National Defence Academy Services Selection Board, 2012 conducted by UPSC.
- Selected for INSPIRE, Innovation in Science Pursuit for Inspired Research program, Rajasthan University, 2010.

## EXTRA CURRICULAR

- Student Member, IEEE
- Qualified Amateur Station Operator's Certificate Exam (HAM Radio)
- Open Source enthusiast and contributed to the Angstrom Linux.
- Attended workshop on 'Creativity and Achievement Motivation' at IIT, Delhi after qulifying NCAT, 2013.
- Board Member, College Magazine, 'Srijna' and Team Member of College Quiz and Debate Club.
- Hobbies include Horse Riding, Swimming, Basketball & Golf.