

# CHIRAG NAGPAL

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## EDUCATION

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- 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

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- 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

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- 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 visualisations 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 Internet 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 Prototypes**, **Official MSP430 Blog** and stood 1<sup>st</sup> in ‘Amalgam’ college project competition, 2014

### **GPIO Access Through Linux User Space**

Nov - Dec 2013

*ARM Cortex A8 (BeagleBone Black)*

- 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**

Sep - Oct 2013

*ARM Cortex A8 (BeagleBone Black)*

- 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<sup>2</sup>C, and L293DNE Motor Driver for direction & control.

*Complete details of projects at [www.chiragnagpal.com/projects.html](http://www.chiragnagpal.com/projects.html)*

## **TECHNICAL SKILLS**

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

## **PUBLICATIONS**

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

## **OUTREACH**

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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**

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- 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<sup>st</sup> position in ‘Amalgam’, alumni sponsored project competition, 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<sup>st</sup> 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**

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- 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 qualifying NCAT, 2013.
  - Board Member, College Magazine, ‘Srijna’ and Team Member of College Quiz and Debate Club.
  - Hobbies include Horse Riding, Swimming, Basketball & Golf.