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Jayesh K. Gupta

Education

2015–present **Ph.D. in Computer Science**, *Stanford University*.

2011–2015 **B. Tech. in Electrical Engineering**, *Indian Institute of Technology*, Kanpur.
Minor in Computer Science, **CGPA - 8.9/10.0**

2011 **Senior School Certificate Examination**, *St. Paul's Sr. Sec. School*, Jodhpur, Rajasthan.
Scored 93.8% marks in XII AISSCE

2009 **Secondary School Certificate Examination**, *St. Paul's Sr. Sec. School*, Jodhpur, Rajasthan.
Scored 94.6% marks in X AISSE

Research Interests

Artificial Intelligence
Machine Learning
Computer Vision
Robotics
Bioinformatics
Information Theory

Publications

Ashesh Jain, Debarghya Das, **Jayesh K. Gupta** and Ashutosh Saxena, **"PlanIt: A Crowdsourcing Approach for Learning to Plan Paths from Large Scale Preference Feedback"**. *ICRA 2015 (under submission).* [website]

Nishchal Verma, **Jayesh K. Gupta**, Sumanik Singh, Rahul Sevakula, Sonal Dixit, **"Feature Level Analysis"**, *IEEE Workshop On Computational Intelligence: Theories, Applications and Future Directions, IIT Kanpur*, pp. 148-152, July 2013. [poster|pdf]

Jayesh K. Gupta, Sumanik Singh, Nishchal K. Verma, **"MTBA: Matlab Toolbox for Biclustering Analysis"**, *IEEE Workshop On Computational Intelligence: Theories, Applications and Future Directions, IIT Kanpur*, pp. 94-97, July 2013. [poster|pdf|website]

Nishchal Verma, Sumanik Singh, **Jayesh K. Gupta**, Rahul K. Sevakula, Sonal Dixit, Al Salour, **"Smart Phone Application for Fault Recognition"**, *2012 Sixth International Conference on Sensing Technology (ICST2012)*, 18-21 Dec. 2012. [pdf]

Awards and Achievements

- Received **Academic Excellence Award** for distinctive performance in the terms 2011-12 and 2012-13.
- **All India Rank 477** in **IIT Joint Entrance Examination 2011**, out of around 500,000.

- Stood 10th in **Regional Mathematics Olympiad 2011**, Rajasthan Region.
- Selected for **KVPY** (Kishore Vaigyanik Protsahan Yojana) Scholarship in 2011.
- Selected in the **Top 1%** in the **National Chemistry Olympiad** 2011.
- Selected in the **Top 1%** in the **Indian National Astronomy Olympiad** 2011.
- Awarded CBSE **Certificate of Merit**, for being among **Top 0.1%** in Science Examination in AISSE, 2009.

Internship

2014 **PlanIt: A Crowdsourcing Approach for Learning to Plan Paths from Large Scale Preference Feedback.**

Mentored by Prof. Ashutosh Saxena (Cornell University)

- PlanIt make it easier for robots to factor in user preferences in path planning by allowing them to obtain these preferences on a large scale.
- Extended the existing cost function based 2-D navigation algorithm to work with high dimensional arm manipulation scenarios. Also worked on visualizing these learned costs as 3-D heatmaps.
- Integrated all these features into the online PlanIt system.
- Co-authored the paper which is under review in ICRA-2015.

Research

2014 **Application of Coded Sampling Bound and Distortion Minimization to SC-FDE systems**

Mentored by Prof. A. K. Chaturvedi (IIT Kanpur)

- Used newly introduced coded sampling bound and distortion minimization techniques to improve pilot placements in SC-FDE (Single-Carrier Frequency Domain Equalization).

2013 **MTBA: Matlab Toolbox for Biclustering Analysis**

Mentored by Prof. Nishchal K. Verma (IIT Kanpur)

- Objective was to allow a user to *compare biclustering results* from different biclustering algorithms and choose the approach that best fits their particular scenario.
- Developed a new Matlab toolbox, MTBA, implementing a variety of *biclustering algorithms* under a *common user interface* while providing additional facilities for data preprocessing, visualization, and validation. [website]

2012 **Feature Level Analysis**

Mentored by Prof. Nishchal K. Verma (IIT Kanpur)

- Undertook a case study of **acoustic and vibrational features** from different working states of an air compressor.
- Graphically analyzed these features to derive the best feature set.
- Built an *SVM model* based upon these features and got comparable results to the standard PCA based SVM model, thus drastically reducing training time.
- This allowed us to reduce implementation costs of condition based monitoring system via use of consumer-grade electronics.

2012 **Condition Based Monitoring of Air Compressors and Motors using Acoustic Data**

Mentored by Prof. Nishchal K. Verma (IIT Kanpur)

- Developed a smart phone application, to *learn different fault states* of an industrial air compressor using *acoustic pattern recognition*.
- Tested the application to recognize the fault state in real time as the air compressor was running. It has performed very well with classification accuracies above 90%.

Other Projects

2014 **TCP over UDP**

Course Project in CS425A (Computer Networks), Prof. Dheeraj Sanghi (IIT Kanpur)

Implemented transport layer protocol over the basic structure of UDP providing TCP like features of congestion control, message reliability, flow control and connection control mechanism.

2014 **Estimation of Direction of Arrival Using Information Theory**

Term Paper, EE301A (Digital Signal Processing), Prof. R. Hegde (IIT Kanpur)

Studied how direction of arrival of acoustic signal can be estimated using mutual information. Implemented the algorithm on MATLAB and compared with the most popular technique used for this purpose, GCC-PHAT.

2012 **Autonomous Quadrotor**

Summer Project under Electronics and Aeromodelling Club (IIT Kanpur)

Built a quadrotor using Arduino Mega 2560 for onboard processing and IMU Razor 9DOF for orientation determination. Xbee was used to communicate with the Arduino from an external computer. Studied application of OpenCV for environment detection.

Technical Skills

Languages C, C++, Python, Ruby, Haskell, Java, R, Bluespec Verilog

Web HTML, CSS, JavaScript, JQuery, SQL

Tools UNIX shell scripting, OpenRAVE, Matlab, GNU Octave, LaTeX, Android SDK, GNU Emacs, OpenCV, Git

Relevant Courses

Mathematics Real and Complex Analysis, Linear Algebra, Differential equations, Probability and Statistics

Computer Science Data Structures and Algorithms, Computer Organization, Operating Systems*, Computer Networks*, Artificial Intelligence Programming†, Machine Learning Techniques†, Machine Learning for Computer Vision†

Electrical Engineering Digital Signal Processing, Principles of Communication, Communication Systems, Information and Coding theory*, Topics in Stochastic Processes†

Biology Introductory Biology, Neurobiology*

* ongoing course, † next semester

Positions of Responsibility

2013-2014 **Hobby Group Leader**, Science CoffeeHouse
Managed activities of the science discussion group at IIT Kanpur, creating a healthy scientific atmosphere to bring together students of all disciplines to share ideas.

2012-2013 **Academic Mentor**, Counselling Service
Provided academic assistance, along with taking extra-lectures in Electrodynamics (PHY103) and Calculus (MTH101) for students struggling with academics.

2012-2013 **Student Guide**, Counselling Service
Mentored 6 freshmen to guide them for a smooth transition into campus life in both academic and extracurricular spheres.

2012-2013 **Secretary**, Quiz Club
Worked for promotion of quizzing activities in the institute. Organized various quizzes, including *National General Quiz* at Antaragni 2012.

Extra-Curricular Activities

- Active member of **Science CoffeeHouse**. Gave talks on topics like *Occam's Razor*, *Support Vector Machines*, *Simulation Argument*.
- Active member of **Quiz Club**.
- Hacker at **Navya**, the campus free and open source software group. Gave talks on using *Git* and *IRC*. Wrote and maintain ScrapOARS to scrape course listing and information into json. Maintain the local Arch Linux mirror.
- Sporadic blogger at Whisperings into the Wire.
- Active contributor to numerous open source projects. See github.