Dhruv Agrawal

Academic Details

Year	Degree / Exam	Institute	GPA / Marks(%)
----	B.Tech in Electrical Engineering	Indian Institute of Technology Delhi	7.378
2009	CBSE	DAV Public School, Kota	89.8
2007	CBSE	Maharana Mewar Public School, Udaipur	95.8

Industrial Training

Automatic Echocardiogram View Classification using Radially Oriented Histogram of Gradients, GE Global Research, Bangalore (May, 2012 - July, 2012)

Description -
- Designed a image descriptor to enable Automatic Cardiac View classification.
- Tested on a clinical dataset and yielded accuracy over 98%.

Achievement -
- US Patent in process.
- Paper to be submitted to ISBI San Francisco, USA.

IIT Delhi Thesis

Title - Medical Imaging
Supervisor - Prof. Santanu Chadhary
Description -Collaboration with GE

Qualifying Exams

JEE Rank: 147 (GE)

Scholastic Achievements

- **Publications and Patents** :
  - "Autonomous Robot for small-scale NFT systems" (**Primary Author**), *ASABE Annual Meeting, Dallas (USA), July 2012*. **(Published)**.
  - "Automation of Hydroponic Installations using a Robot with Position Based Visual Feedback" (**Co-author**),*CIGR-Ageng 2012, Spain, July, 2012***. (Published)**.
  - "Apple sizing with low-cost hand-held stereo vision device"**, (Primary Author),** *ASABE Annual Meeting, Dallas (USA), July 2012*. **(Abstract Accepted)**.
  - "Automatic Echocardiogram View Classification using Radially Oriented Histogram of Gradients" **(Primary Author),** *ISBI, San Francisco (USA), March 2013***.** (In Submission).
  - **US Patent** as a **Primary contributor** (in process of filing).
- **National and Regional Scholarships & Awards** :
  - Awarded **NTSE** (National Talent Seach Examination) scholarship
  - Awarded **CBSE Merit Scholarship** for AIEEE, 2009: **All India Rank - 323**.
  - Awarded **"Maharana Fateh Singh Award"** by MMCF for outstanding academic performance in secondary school.
  - Received **"Brilliant Student Medal"** for All Rajasthan Talent Search Examination for 2 years.
- **International/National Olympiads** :
  - Only student selected among the batch of 550 students for an internship at the Robotics Institute, **Carnegie Mellon University**, USA.
  - Received "Certificate of Accomplishment" for **Stanford University**'s online courses on **Machine Learning**and **Artificial Intelligence**.
  - Awarded National **Top 1%** certificate for National Physics, Chemistry and Astronomy olympiads.
  - Achieved **AIR 9** in NSTSE (National Science Talent Search Examination, 2009).

Publications

- **Autonomous Robot for small-scale NFT systems (Primary Author), ASABE Annual Meeting, Dallas (USA), July 2012.** (Published)
- **Automation of Hydroponic Installations using a Robot with Position Based Visual Feedback (Co-author), CIGR-Ageng 2012, Spain, July, 2012.** (Published)

- **Apple sizing with low-cost hand-held stereo vision device (Primary Author), ASABE Annual Meeting, Dallas (USA), July 2012.** (Abstract Accepted)
- **Automatic Echocardiogram View Classification using Radially Oriented Histogram of Gradients (Primary Author), ISBI, San Francisco (USA), March 2013.** (In Submission)

Internships

- **Robotics Institute, Carnegie Mellon University, Pittsburgh (USA)** (Jun, 2011 - Dec, 2011) :
  - **Autonomous Robot for Small-scale NFT systems**:
    - Started the project from scratch and did a comparative analysis of possible techniques to be automated.
    - Optimized the utilization of a fund of $10,000 for hardware procurement in an international team of 4 researchers.
    - Responsible for system design and software development to meet the goals of the project.
    - Designed and fabricated a first of its kind affordable autnomous robot for small-scale hydroponic plantations.
  - **Apple Sizing using Stereo Camera based hand-held device**:
    - Designed a small, low-cost, hand-held device for accurate estimatation of apple size automatically, saving time, effort and avoiding transcription error.
    - Designed a segmentation algorithm and tested on the collected dataset.

  Research papers presented at ASABE Conference, USA, 2012 and CIGR-Ageng, Spain, 2012.
- **GE Global Research, Bangalore** (May, 2012 - July, 2012) :
  - Designed a histogram based global image descriptor and compared with the pre-exisiting image desriptors for Automatic View classification of ECG, achieved above 98% accuracy on clinical dataset..
  - Verified the robustness of the algorithm by n-fold Cross validation and displayed the results using Multi-Dimensional Scaling and other Manifold Learning techniques.

  *Research paper in submission to **ISBI, USA,** 2013 and **US Patent** in the process of filing.*
- **Techtronics Education, Gurgaon** (Nov, 2010 - May, 2011) :
  - **Irrigation controlling robot:**
    - Designed and fabricated a ATV robot to survey the localized soil moisture data of a farm.
    - An optimum irrigation strategy is planned for the automated sprinkler system by the server.
  - **Gantry Drawing robot:**
    - Fabricated a robot that imitates an image and draws it onto a sheet of paper.
    - Developed algorithm to create an image with less distortions with time constraints.

Projects

- **Collaborative Online Eigen-tracking (Mini project)** (Jan, 2012 - May, 2012) :
  - Analysed code profile and optimized C++ OpenCV code to improve the performance 3-fold.
  - Studied Incremental PCA based Object tracking, could be used to collaboratively track an object over a camera network.
- **Smart Card** (Jan, 2011 - May, 2011) :
  - Unified Smart Card payment system for all public addmission fee collections (buses, tourist spots)
  - Prototyped and maintained and database and demonstrated transactions.
- **Monte-Carlo simulations for pricing Options** (Jan, 2012 - May, 2012)
- **Fingerprint Verification System for Biometric Measurements** :
  - Implemented Gabor Filter-Bank based finger print verification system used in Biometric measurements.
  - Achieved 98% using k-Nearest Neighbor classifier and designed a GUI for demonstration.
- **Pattern Recognition projects** :
  - Bayesian Belief Networks:
    - Implemented Bayesian Belief Networks for modelling Fish size dependencies.
  - Pattern Recognition in Financial Time Series:
    - Surveyed data-mining and retrieval techniques used in FTS analysis.
    - Articulated comparisons between popularly used algorithms.

Technical Skills

- **Programming langauages and software skills:**
  - C/C++, Java, MATLAB, Octave, R, LaTeX, OpenCV, ROS (Robot Operating System).
  - Xilinx, Diptrace, Solidworks, GIMP.
- **Relevant courses:** Introduction to Analysis and Differential Equations, Introduction to Algebra and Matrix

Analysis, Signals and Systems, Introduction to Probability Theory and Stochastic Processes, Digital Image Processing, Pattern Recognition, Digital Communications, Investment Planning, Statistical Methods and Algorithms, Introduction to Stochastic Processes and Simulations.

Extra Curricular Activities

- **Chess (International Player) :**
  - **International FIDE rated player** (1811).
  - Participated in over 10 National championships, 3 **International events**.
  - Won 3 state championships, 2 Zonal championships, **U-19 State champion at the age of 14**.
  - Won **silver medal** at **Inter-IIT** 2011.
  - Felicitated by BSA, IIT Delhi by **"Colors in Chess"**.
- **Robotics :**
  - **ROBOCON DD-MIT:**
    - Core team member of IIT Delhi team of 24 for conception and fabrication of robots.
    - Stood 4th highest score among 58 teams in the league matches.
    - Initiated new microcontroller & remote platform utilization leading to better performance; coordinated, channelized components procurement & inventory maintenance reducing global costs by 20%.
    - Acquired invaluable experience in working with multidisciplinary teams, designing 10 robots for competitions, planning game strategies, manufacturing, marketing, collaborating and troubleshooting.
  - **Display of Projects:**
    - Demonstrated robots at IIT Delhi Open House, received wide media coverage and appreciation.
- **Sports (Inter Hostel) :**
  - Actively participated in Hockey, Cricket, Chess and Athletics inter-hostel.
  - Won two Gold (Chess), two Silver (Hockey and Relay race) and one bronze (Chess).
  - Awarded **"Outstanding contribution to Sports"** by Shivalik Hostel.
- **Others :**
  - **NCC (Air wing) cadet**: Cleared "A" certificate exam which includes a camp, rifle shooting and paraciling and flying a microlight aircraft.
  - Received "**Certificate of Social Service**" from HelpAge India for raising funds for the elderly.
  - Got invited for "CSIR Programme on **Youth for Leadership in Science**" at CEERI, Pilani.

Positions of Responsibility

- **Event Coordinator, Tryst** (Mar, 2012 - Mar, 2012) :
  - Coordinator, Robotics that included 3 events: Robowars, Robomaze
  - Formulated the problem statement, designed the competition arena
  - Event saw maximum participation as compared to any other event, exceeding 200.
- **Hostel Captain, BSA** (July, 2011 - May, 2012) :
  - Captained Shivalik Chess and Hockey Team.
  - Won Gold medal for the second consecutive year in Chess inter-hostel championship.
  - Encouraged active participation in all Chess events, won prizes in Bughouse chess and other events.
  - Formed a completely new team in Hockey with 80% freshers and managed to defeat last year winners.
- **Captain School Chess Team** (July, 2004 - Mar, 2007) :
  - Consecutively won the West Zone U-19 Chess Championship.
  - Won back-to-back Board Prize (best individual player) with a unbeaten record (won 20, drew 1 out of 21 played).
  - Represented West Zone at the National championships, achieved 4th position in Rapid Individual event.
  - Felicitated by the Home Minister, Rajsathan at the Udaipur District Republic Day celebrations for the above accomplishments.
- **B.Tech Representative, Hostel** (July, 2012 - Present)

Other Interests

Chess, Field Sports, Hiking.