Pulkit Goyal

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ADDITIONAL PROJECTS

- **An Evolutionary Approach to a Modified Multi-Objective Job-Shop Problem** — IIT Roorkee
  Course Project, Operating Systems — *Mar 2018*
  - Compared evolutionary algorithms (GA, PSO, SA, and ACO) to optimize the number of machines given a time constraint, single-task jobs, and identical machines in MATLAB [presentation] [report]

- **Digital Circlism (Algorithmic Art)** — IIT Roorkee
  Course Project, Computer Graphics — *Oct 2017*
  - Implemented mean-shift segmentation and Euclidean distance transform (EDT) for finding the best fit for different size circles in a colored image (digital circlism) [report]

- **Comparison of Regression Techniques for Short-Term Time-Series Prediction** — IIT Roorkee
  Course Project, Artificial Neural Networks — *Apr 2017*
  - Conducted a comparative study of LSTM, SVR, and ARIMA for short-term time-series prediction [report]

- **Stereo-Imaging Using Segmentation** — IIT Roorkee
  Course Project, Mathematical Imaging Techniques — *Oct 2016*
  - Formulated method to make disparity map by hierarchical segmentation and iterative cluster comparison

- **Servo Controlled, 3D-Line Following Robot Using Computer Vision** — IIT Roorkee
  Team Robocon IIT Roorkee — *Feb 2016*
  - Developed a 3-wheeled robot with front wheel steering for line following over a contoured surface, streaming image from an on-board camera, finding the orientation of line using edge/contour detection algorithms, and passing appropriate signal to a servo motor for steering

- **General Curve Tracing – Four (Omni-)Wheel Holonomic Robot** — IIT Roorkee
  Team Robocon IIT Roorkee — *Oct 2015*
  - Designed a control system for a holonomic four-wheeled robot to trace any explicit mathematical curve
  - Improved magnetometer accuracy using regression to calibrate and obtain the sensor mapping [report]

- **Coordinate Based Navigation – Four (Mecanum-)Wheel Holonomic Robot** — IIT Roorkee
  Team Robocon IIT Roorkee — *Sept 2015*
  - Built a point-to-point navigation system for a holonomic robot with or without orientation lock
  - Interfaced magnetometer, IR sensor, and encoder; Kalman filter for smoothing sensor data

- **Stair Climbing Robot** — IIT Roorkee
  Team Robocon IIT Roorkee — *Aug 2015*
  - Designed a small pneumatic-based RC wheeled robot that could climb stairs of variable dimensions

- **Fuzzy Logic Library** — IIT Roorkee
  Team Robocon IIT Roorkee — *July 2015*
  - Formulated a generalized scalable fuzzification rule base (on different membership functions/methods)
  - Developed a fuzzy logic library in C++ for control of wheeled robots [code]

- **Quadcopter** — IIT Roorkee
  Best Project, Models and Robotics Section; Srishti 2015 — *Mar 2015*
  - Fabricated and automated a quadcopter using 3-D printed chassis, BLDC motors, Arduino, and IMU
  - Implemented and compared various control algorithms for stable flight

ADDITIONAL EXPERIENCE (CONFERENCES/WORKSHOPS/SUMMER-SCHOOLS/COMPETITIONS)

- **NeNa 2023** — Frankfurt, Germany
  Project — fnirsPy: A Sufficient, Easy, and Flexible fNIRS Preprocessing Library — *Sep 2023*
  [poster][picture]

- **SRISTI-UNICEF Summer School on Inclusive Innovations in Rural India** — Gandhinagar, India
  Project — An Ergonomic Chula (Stove): 40% More Efficient than Traditional Wood-Based Stove — *Jun 2018*

- **6th Inter-IIT Tech Meet — Engineers' Conclave | 2nd Position** — IIT Madras
  Project — Automation of Equatorial Mount Telescope using Stepper Motors, Raspberry Pi, and Stellarium — *Jan 2018*

- **5th Inter-IIT Tech Meet — Indoor Localisation** — IIT Kanpur
  Project — A Wheeled Robot to Locate a Wi-Fi Beacon Based on the Received Signal Strength — *March 2017*
  [picture]

- **Industrial Automation Workshop — Delta Electronics** — Gurgaon, India
  Proposal — IIoT Warehouse Automation and Monitoring Solutions — *Feb 2017*

- **Techfest 2016–17 — Satellite Image-Classification | 5th Position** — IIT Bombay
  Project — An SVM based classifier for Satellite Image-Classification — *Dec 2016*

- **Cognizance 2016 — "'Cyborg Break-In" | Organizer (>200 participants)** — IIT Roorkee
  Designed and coordinated a center-stage automatic ground robot obstacle maze course competition — *Mar 2016*

- **Cognizance 2015 — "Robosapiens" | 2nd Position (>50 Teams)** — IIT Roorkee
  Developed two wheeled robots (automatic + semi-automatic) to work in tandem to solve an obstacle course — *Mar 2015*

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