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Objective

Research Internship in the field of Robotics, followed by a PhD and a career in research.

- **Research interests:** Multi-agent Robotics, Artificial Intelligence, Planning Algorithms and Consensus control.

Education

- **Indian Institute of Technology, Madras** — Chennai, India
  B.Tech in Electrical Engg. with M.Tech in Comm. Engg.; **CGPA:** 8.54/10 — Aug. 2011 – Present
    - Minor: Industrial Engineering

- **Sri Sankara Sen. Sec. School** — Chennai, India
  12th Grade, Central Board for Secondary Education: 95.8% — Apr. 2009 – Mar. 2011
    - Major: Physics, Chemistry, Mathematics and Computer Science

- **Sri Sankara Sen. Sec. School** — Chennai, India
  10th Grade, Central Board for Secondary Education: 95.4% — Apr. 2007 – Mar. 2009

Affiliation

- Student Member of IEEE Robotics and Automation Society(RAS).

Projects and Competitions

- **Design Test bed for coordinated control** — Chennai, India
  Guide: Prof.Bharath Bhikkaji, IIT Madras — Aug. 2014 – Present
    - Developed a ROS package for interfacing LEGO EV3 robots with a ROS network using Raspberry Pi.
    - Setup *Navigation* stack for a team of 3 LEGO robots working on a ROS network.
    - Currently working on vision-based localization using an aerial camera and coloured markers to correct for drift in odometry.

- **Lunar Rover Challenge 2014** — Chennai, India
  Shaastra 2014, IIT Madras — Aug. 2013 – Jan. 2014
    - Won 1st **place** in the National competition conducted by Team Indus, (Indian team participating in Google Lunar X-Prize competition).
    - **Adopted Rocker-Bogie Mechanism** for all-terrain capability.
    - Implemented **real-time video transmission** and **wireless control** from laptop over Wi-Fi

- **ARLISS 2013** — Black Rock Desert, NV, USA
  Guide: Prof. Mahesh Panchagnula, IIT Madras — Mar 2013 – Sept. 2013
    - Represented IIT Madras in an international collaboration lead by students of Dr. William Singhose of Georgia Institute of Technology, USA with teams from Greece, Hungary and South Korea.
    - Played a prime role in developing control algorithms for the *Rescue Robots*.
    - Developed a memory-efficient Arduino library for reading position and heading information from GPS and Compass module.

- **Summer Internship in NDE Lab at GE Global Research center** — Bangalore, India
  Guide: Vikram Melapudi, GE GRC — May. 2013 – July 2013
    - Co-invented System and method for detecting an anomaly in pipe assembly (Patent application under process), a novel method for detecting anomalies in subsea pipelines.
    - Studied the propagation characteristics of high frequency Electromagnetic waves through Coaxial Structures using Numerical Simulations performed in COMSOL Multiphysics software.

- ### ABU Robocon 2013
  Pune, India

  Guide: Prof. Prabhu Rajagopal, IIT Madras
  Aug 2012 – Mar. 2013

  - Member of the coding and electrical team involved with developing control algorithms for the Autonomous and Manual robot which won The Fastest Job Completing Robot among over 60 teams from across India.
  - Implemented PID algorithm for the various maneuvers of the *2D holonomic* Manual robot and *Differential drive* Autonomous robot.
  - Achieved 2D Coordinate Tracking by combining inputs from 2 sensors a Trackball and a Magnetic Compass.
  - Developed an Arduino library for interfacing with PS2 Joystick.

- ### Smart Navigation
  Chennai, India

  Summer Project under iBot Club, Center for Innovation, IIT Madras
  May 2012 – July. 2012

  - Conceptualized and prototyped a differential drive navigation system capable of learning paths through user input, from a hand-held device, and autonomously returning to any previously saved *checkpoint* through the shortest route.
  - Developed an original path routing algorithm to determine the shortest route to the destination from the generated graph of learnt paths.
  - Implemented wireless control from a hand-held device for the robot using RF transceivers.

- ### Research Science Initiative Chennai
  Chennai, India

  Guide: Prasantha K. Tripathy, IIT Madras
  May. 2010 – June 2010

  - RSI - Chennai is associated with, and modelled on, the Research Science Institute, that is sponsored by the Center for Excellence in Education based in McLean, Virginia, USA and run in collaboration with the Massachusetts Institute of Technology.
  - Selected as one among 40 top students from the city schools for a 5-week summer research camp with guest lectures and workshops from leading universities in the state.
  - Analysed the properties of Black Holes by studying the solutions to Einstein's field equations. This required understanding very advanced concepts in physics and mathematics.

Scholastic Achievements

- **Placed in the top** 10% of the class in the first semester and thereby awarded change of branch from Aerospace Engineering to Electrical Engineering.
- **Secured All India Rank 2452** out of 470,000 students in the IIT-Joint Entrance Examination 2011.
- **Secured All India Rank 415 (State Rank 13)** out of 1.1 million+ students in AIEEE 2011.
- **Secured All India Rank 8 (State Rank 1)** in 10th National Cyber Olympiad 2011.
- **Placed in the National Top 1%** among 40000 students in National Standard Examination in Physics 2010.
- **Placed in the Statewise Top 1%** in the National Standard Examination in Chemistry 2010.
- **Placed in the Top 5%** in the Zonal Informatics Olympiad 2010.

Technical Skills

- Programming Languages - C, C++, Python
- Scientific Applications - Robot Operating System, OpenCV, Matlab/Simulink, LabView, LaTeX, Verilog, VHDL, GNU Radio Companion, WireShark.
- Simulation software - Gazebo, COMSOL Multiphysics, ANSYS Multiphysics.
- Hardware - AVR MCUs, TI MSP430 family, Arduinos, Single board computers and variety of electronics.
- Web Development - Django(Python), MySQL, JS, HTML, CSS, AJAX.
- Operating Systems - Linux based OS(Ubuntu, CentOS)

Course Projects

- **Application of Max-flow min-cut theorem for Computer Vision** Chennai, India
  Course: Data Structures and Algorithms Jan. 2014 – May 2014
  Course Instructor: Prof. Nitin Chandrachoodan
    - Wrote a review paper on max-flow min-cut theorem based graph-cut algorithms.
    - Analysed the Ford-Fulkerson algorithm and its applications in Computer vision.

- **Implementation of shifted DQPSK on GRC** Chennai, India
  Course: Communication Systems Jan. 2014 – May 2014
  Course Instructor: Prof. Andrew Thangaraj
    - Implemented the model of communication of a $\frac{\pi}{4}$ DQPSK and $\frac{\pi}{8}$ Differential 8 PSK in GRC.
    - The model consisted of modulation of data, implementation of root-raised cosine filters, up-conversion to passband, transmission, down-conversion to baseband and slicing.
    - Also implemented sub-carriers in the given bandwidth with different channels carrying different modulation schemes such as DQPSK, 16-QAM and 64-QAM.

- **Spectrum Analyzer** Chennai, India
  Course: Analog Circuits Laboratory Jan. 2014 – May 2014
  Course Instructor: Prof. Nagendra Krishnapura
    - Built a spectrum analyser capable of displaying the spectrum of the input signal from 0.5 to $5kHz$ observed using an oscilloscope.
    - The spectrum analyser consisted of a second order low pass filter, a doubly balanced mixer, linear ramp generator, local oscillator with frequency sweeping capabilities, a high-Q band pass filter and an envelope detector.

- **Wrist-Flexer for cerebral palsy children** Chennai, India
  Course: National Service Scheme Sept. 2011 – Mar 2012
  Course Instructor: Prof. Manivannan
    - Conceptualized and prototyped a low-cost portable easy-to-use device to stabilize fine wrist movements.
    - The elastic powered device, which can be made from products available at home, helps in rehabilitation in early stages of extensor muscle problem.
    - Successfully tested under the supervision of a pediatrician who provided a positive feedback.

Teaching Experience

- **The WebOps Club** Chennai, India
  Center for Innovation, IIT Madras Aug 2013 – Apr 2014
    - Conducted over 10 sessions on various web technologies which were attended by over 50 students.
    - Conducted personalized training sessions for a team of 10 freshers.
    - Mentored an elite team of 5 students and completed 3 industry projects.
    - Organized *SuDo Hackathon*, the first of its kind event by a technical club at IIT Madras.

- **Cost-effective Control Lab for undergraduate students** Chennai, India
  Guide: Prof.Bharath Bhikkaji, IIT Madras May. 2014 – July 2014
    - Designed 3 benchmark control experiments for an undergraduate control lab course.
    - Demonstrated feasibility of using LEGO Mindstorms kits as a pedagogical tool.
    - Gave video lectures for demonstrating and explaining the theory behind the experiments.

Positions of Responsibility

- **Founder - The WebOps Club IITM** May 2013 – Apr. 2014
    - Centre for Innovation(CFI) is a student run lab which nurtures technical creativity and provides guidance and resources for the students of IIT Madras to pursue their endeavors in engineering.
    - Founded The WebOps club (under Center for Innovation), currently the fastest growing technical club in IITM with over 180 active members.
    - United the various web operations teams in the institute and transformed the club into the first developer community of IIT Madras.
    - Generated INR 1L in revenue, through consultancy projects, the first in the history of clubs in IITM.

- **Web Operations Coordinator - Shaastra 2013**   Apr. 2012 – Jan. 2013
  - Developed and maintained the Shaastra website which received 10 million+ cumulative hits with over 15,000 unique visitors.
  - Created the first ever Facebook application for Shaastra for improving user experience.
  - Developed social media publicity tools for Shaastra's Sponsorship and Publicity team.

Extra-curricular Activities

- **Web Development**
  - Won 1st place in Ericcson Industry Defined Problem statement at Shaastra 2014. Created web and mobile apps that aggregate and prioritize municipal complaints.
  - Conceptualized and developed a chrome extension - Wiki-it - which allows for selectively downloading wikipedia articles and features numerous editing tools.
  - Developed an Online Voice Conference Reservation System for internal use in Infosys using ASP and Oracle in a span of 2 weeks as part of Catch Them Young 2008.

- **Arts**
  - Won 1st place in Choreo Night (Group Dance Competition) at Saarang 2012, one of the largest cultural festivals in India attended by 50,000+ students across the country.
  - Won 2nd place in Inter-Hostel Choreo Night as part of LitSoc 2012, the intra-college cultural festival.
  - Performed Drums in a Music Show organized by *Jus Drums School of Percussion* which was presided over by legendary percussionist Anandan Sivamani