VRAJ PARIKH

Phone: (+91) 8000 98 1472 | Email: vrjparikh@iitkgp.ac.in, vrjparikh@gmail.com | Website: www.vrajparikh.in
Address: W3 210 Meghnad Saha Hall of Residence, Kharagpur, WB 721302

EDUCATION

INDIAN INSTITUTE OF TECHNOLOGY, KHARAGPUR   Kharagpur, IN
Integrated Masters of Technology in Mechanical Engineering   July 2014 – May 2019(*Expected*)
CGPA 7.50

PRAKASH HIGHER SECONDARY SCHOOL   Ahmedabad, IN
AISSCE, AISSE (CBSE)   June 2003 – May 2014
AISSCE: 94% Overall, 98% in Sciences
AISSE: CGPA 10.0

PUBLICATION

Low-Cost Autonomous navigation and Control of a Mechanically Balanced Bicycle with Dual Locomotion Mode
Ayush Pandey et al. IEEE Transport Electrification Conference (ITEC), June 2015.

RESEARCH INTERESTS

Control Systems, Computer Vision, Mechanisms Analysis & Design, Embedded Systems, Automotive Design, Innovative Powertrains

PROJECTS

LOW-COST AUTONOMOUS BICYCLE   LBS Hall Of Residence, IIT Kharagpur
Control Systems Team Member   January 2015 – April 2015

- Developed a low cost mechanically balanced autonomous e-bicycle that could avoid obstacles and follow GPS coordinates to arrive at a given location on the receipt of a text message, while following lanes wherever possible
- Developed *obstacle avoidance system* using three ultrasound sensors to create *obstacle map* and hence avoid them
- Also worked on developing the *SMS decoding API* to be used for getting the GPS coordinates of the target point
- The team won *Gold* at the *Hardware Modelling Competition* 2015 & *KPIT Sparkle* 2015 for the same project

COMPREHENSIVE FITNESS TRACKER FOR THE ELDERLY   IEEE SMB Hackathon, IIT Kharagpur
Control Systems Team Member   August 2015 – Present

- Developed a pair of smart cards to make a remote comprehensive fitness tracker for the elderly people to monitor their pulse, posture and facilitate indoor mapping. Also implemented remote alarm modules in case of emergency
- Worked on the *pedometer and indoor mapping module*, developed a *signature algorithm* for accurate indoor tracking
- *This project has been offered a place in the commercial market by a renowned senior living construction firm*

DESIGN OF UAV FOR LOCALISATION IN GPS DENIED ENVIRONMENTS   ARK, IIT Kharagpur
Senior Team Member, Hardware and Control Design   January 2017 – Present

- Developing *an indigenous hexa – copter* to compete in *International Aerial Robotics Challenge, Asia Pacific, 2017*
- Responsible for overall system design *(Hardware and Embedded Design)*, also responsible for implementing *ROS based High Level Controller* to utilize Visual SLAM methods for *indoor locomotion and target tracking* by UAV
- Working on low level controller optimization, by *integration of VSLAM outputs into the ArduCopter firmware*

ELECTRO-PNEUMATIC QUICK SHIFTING FOR FSAE CAR   TeamKART, IIT Kharagpur
System Analysis, Design & Manufacturing Coordinator   July 2015 – January 2016

- *Design Efficiency:* 1500 shifts at 1000psi tank pressure. *Shift Time:* 143 milliseconds. *Working Pressure:* 200 psi
- Designed *In-house filling system*, First team in India to do so; *Costs one-tenth* one most *commercially available quick shifting systems*, offering similar levels of performance; *Adaptable* line pressure and flow rate up to 600 psi
- *Custom Electronic Control Unit,* implementing *Tunable shift time* & compatible with *flat (CUT) shifting systems*
- *Manufactured*, Rigorously *tested* and *implemented* on K3 (*The FSAE Car for the Season 2015-17*). Images Here

FUSING INERTIAL DATA WITH VISUAL SLAM FOR A UAV   ARK, IIT Kharagpur
Senior Team Member, Hardware and Control Design   January 2017 – Present

- Developing algorithms to fuse *inertial data from IMU's, Ultrasonic Range Sensors, Optical Flow sensors* etc. with Monocular Visual SLAM to *minimize position, velocity and angular errors, for stable grid based localization of quad*
- Implementation of *'Total Energy Control System'* for *efficient throttle control* on the ArduCopter 3.5 firmware
- Future prospects include *design of a Machine Learning based modular planner for indoor localization of drones*

DEVELOPMENT OF LONG RANGE UAV FOR SURVIELLENCE

Asteria Aerospace Pvt. Ltd., IN

Guide: Mr. Kautilya Vemulapalli, Systems Team Lead, Asteria Aerospace Pvt. Ltd

November 2016 – January 2017

- Developed a web based simulator for *monitoring the flow of orders and inventory* in an *uncoordinated supply* chain in the form of an online multi-team web game, used to demonstrate the concept of *Bullwhip Effect*
- Designed the front end of the same using *Bootstrap* and back-end using *My SQL*, hosted on institute server
- *Game mechanics* work similar to that of the *Beer Game* developed at *Massachusetts Institute of Technology*

UNCOORDINATED SUPPLY CHAIN MANAGEMENT SIMULATOR

IIM Ahmedabad, IN

Guide: Prof. Sanjay Verma, Information Systems, Indian Institute of Management Ahmedabad

June 2016 – July 2016

- Developed a web based simulator for *monitoring the flow of orders and inventory* in an *uncoordinated supply* chain in the form of an online multi-team web game, used to demonstrate the concept of *Bullwhip Effect*
- Designed the front end of the same using *Bootstrap* and back-end using *My SQL*, hosted on institute server
- *Game mechanics* work similar to that of the *Beer Game* developed at *Massachusetts Institute of Technology*

TECHNOLOGY ROBOTIX SOCIETY

Technology Students Gymkhana, IIT Kharagpur

Autonomous Events & Administrative Head

February 2016 – Present

- As a head of the *University Robotics Society*, am responsible for the conduction of various events to *promote robotics culture* in the campus of *IIT Kharagpur* as well as in other *institutions in the east to northeast India.*
- Leading a *3* tier team of *50+ members* to ensure the *execution of an intensive yearlong timeline* for conduction of in-house events (11 Events) as well as the *execution of* ROBOTIX 2017, the *largest robotics fest in the country*
- Responsible for *managing workshops* conducted by the society in other colleges, *structured 3 workshops* till date
- Responsible for *Structuring, Prototyping and conducting* the *Autonomous Robotics events* in ROBOTIX 2017

KHARAGPUR AUTOMOBILE RACING TEAM (KART)

Department of Mechanical Engineering, IIT Kharagpur

Chief Transmission Engineer/ Transmission Team Head

February 2016 - Present

- Responsible for *design, analysis and manufacturing the powertrain system for K4*, the *fifth FSAE car* of TeamKART, which would *represent the institute at Formula Student 2018/19*, the largest of its kind in the world
- KART is a *research project* under the guidance of *Prof. A R Mohanty, Dept. Of Mechanical Engineering*, aimed at developing low-cost, optimized, weekend racing vehicles to resemble the Formula One cars at a prototype level
- Raised *INR 10,00,000 (USD 15,000)* in sponsorship, the *largest contribution* by *anyone in the history of the team*

MAKERSPACE, TECHNOLOGY ROBOTIX SOCIETY

Technology Students Gymkhana, IN

Founding Head and Grand Wizard

July 2016 – Present

- Conceptualized the *first* Makerspace of IIT Kharagpur, *a community-based open source hardware hacking lab* to make prototypes of selected hardware implementations; as well as a meeting ground for open software projects
- Developed an *online Internet of Things* based *inventory management framework* for managing the users as well as inventory of this lab autonomously, hence *solving the biggest problem of manning the lab at all points of time*
- Initiated the first Makerspace project and organized a *large online idea hunt* for the second slot of the projects; organized a *money flow system* so as to provide financial support to the undertaken projects. [Here](#) is the proposal

IEEE WINTER WORKSHOP AND K.R.A.I.G.

Technology Students Gymkhana, IN

Mentor & Course Designer

October 2015 – Present

- At Kharagpur Robotics & Artificial Intelligence Group, have *been teaching basic concepts of manual and autonomous hobby robotics* at seminars with an *attendance of 150+ freshmen and sophomores* of IIT Kharagpur.
- Also designed the comprehensive coursework for these yearlong seminars, which is used till date. [Documentation](#)
- Mentored a Group of 30 freshmen and sophomores in December 2015, for a weeklong IEEE sponsored Winter Workshop whose problem statement dealt with making a robot which can mimic human movements.
- Taught intermediate autonomous robotics and basics of control theory; Links here to [images](#) and [documentation](#)

SKILL SET

EMBEDDED SYSTEMS: AVR and Arduino, Raspberry Pi and Similar, IoT, Sensor Integration, Communication Protocols
LANGUAGES & ENVIRONMENTS: C++, C, Python, ROS, OpenCV, bash, MATLAB (Control Systems), Git
MODELLING & ANALYSIS: SolidWorks, ANSYS, MATLAB (Fluid Dynamics), iNSPiRE (Hyper Works Package), EES
HOBBY: Adobe AfterEffects, Adobe Illustrator, Android App Development, HTML & CSS, Audacity

COURSE WORK

IIT KHARAGPUR

Completed
Heat Transfer
Introduction to Flight Vehicle Controls
Transform Calculus
Basic Electronics
Theory of Machines
Kinematics of Machines
Programming And Data Structures

Ongoing
Design of Machine Elements
Refrigeration, AC & IC Engines

ONLINE

Completed
Control of Mobile Robots *(Coursera)*
Machine Learning *(Coursera)*

ACHIEVEMENTS

OLYMPIADS
Conducted by HBCSE & TIFR

Class IX to XII
July 2011 – May 2014

- 2011 – 12: *Only candidate* from Gujarat region of *class IX to clear RMO*; *Missed IMO-TC by 6 Marks*
- 2013: Finished in *top 1% in National Standard Examination in Astronomy*; Got Selected for *INMO & INAO*
- 2014: Finished in *top 1% in National Standard Examination in Physics & Astronomy*; selected for *INAO & INPhO*

ENTRANCE TESTS
National Entrance Tests for University Admissions

Class XII
May 2014 – July 2014

- Got selected for *Indian Statistical Institute*, for its *B. Math. Course*; In the *top 30 from over 40,000 applicants*
- *98%* percentile score in *JEE Mains 2014*, Score: *235/360*, Placed *15th* in Gujarat State merit list (ACPC)
- *98.9%* percentile score in *JEE Advanced 2014*, All India Common Merit List Rank *1636*.

COMPETITIVE HOBBY ROBOTICS
Fun Hardware Implementations in Small Competitions

Undergraduate Years
July 2014 – Present

- *Appreciation* in *Freshers Robosoccer Challenge 2014*, by Technology Robotics Society
- *Appreciation* Award in the *Manual Robotics Category in NSSC 2014*, for the *event Conveyer*
- *Appreciation* Award in the *Autonomous Robotics Category in NSSC 2015*, for the *event Mauler*
- *Silver Medal in IEEE Happy Ageing Hackathon, August 2015*

CO – CURRICULAR ACTIVITIES

MUSIC: Like to play *Synthesizer and Guitar* at Hobby Level
SPORTS: Plays *Badminton, Chess & Football* at Hobby Level
QUIZ, ELOCUTION & DEBATES: Have done *Quizzes, Elocution & Debates at Intra and inter-school level.*

Kharagpur, February 22, 2017