Nilay SHETH
Embedded | Control Systems

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💼 PROFESSIONAL EXPERIENCE

MAVLab Delft **AlphaPilot** Lockheed Martin `Jan2019-current`	**EMBEDDED AND CONTROL RESEARCHER, AEROSPACE FACULTY, TU DELFT** › Part of the drone race team, responsible for state estimation, control and trajectory planning. › Finished as world champions at AIRR amongst 432 research teams, with a prize of $1M 🔗 (highlights). › AlphaPilot 🔗 AI Robotic Racing (AIRR) is about autonomous racing against human pilots and was mentored by experts from Lockheed Martin, Drone Racing League and MIT's Aerospace lab. › Firmware for 🔗 PercEvite, Sense-and-Avoid air traffic control (European Single-Skies initiative). `Matlab/Python` `C/C++` `ESP32` `PPRZ UAV` `HiL` `ROS` `multithreading` `computer vision`
Espressif Systems, Shanghai `Jul2016-Aug2017`	**FIRMWARE DEVELOPER	APPLICATIONS ENGINEERING** › Added Linear Algebra (LAPACK) and FFT support, MIPS and FLOPS profiling for matrix inversion. › Developed parts of the famous 🔗 esp-idf alongwith Amazon Web Services for embedded platforms. › Audio Processing for Speech Analysis using Fixed point arithmetic on ESP-32's Tensilica Processor. › Designed motor control drivers: BLDC/brushed/servo and I2C/SPI drivers for LCDs for HMI applications. `C` `FreeRTOS` `esp-idf` `Matlab` `git`
FIRST Robotics, Sydney `Jan2015-Mar2016`	**COACH FRC-6024	CONTROL SYSTEMS** › Layed out the control system and drive-train over the CAN bus of NI-Rio (credits to WPI-lib). › Mentored India's debut FRC team to finish in the top 10 of Australian regionals. `NI-RoboRio` `labview` `C++/java`
ABU Robocon, Asia Pacific region `Nov2013-Mar2016`	**TEAM CAPTAIN ABU-ROBOCON	SECRETARY, ROBOTICS AND AUTOMATION CHAPTER VJTI** › Competition for prototyping mechatronic systems addressing novel problem statements in robotics. › Quarter-Finalist at Robocon 2016, Semi-Finalist at Robocon 2014: promoting VJTI to internationals. › Represented India at the International ABU-RoboCon, winning the Panasonic Award for Innovation. `Embedded C` `drivetrain control` `AtMega` `power harness` `motor control` `soldering`

🎓 ACADEMICS AND CO-CURRICULARS

TU Delft, Netherlands `Aug 2017-Sep2019`	**MASTERS IN EMBEDDED SYSTEMS** › Satellite Orbit Determination: GPS, non linear least squares, orbit dynamics, tracking and prediction. › Implemented detumbling on the 🔗 Attitude Control subsystem of Delft's PocketCube satellite. › Magnetometer & IMU calibration, closed loop attitude control laws over Hardware in Loop (HIL) tests. › Networked & Distributed Control: convex optimization, sampling + synchronization algorithms. › Vehicle Dynamics: ABS, path planning algorithms, localization with Particle Filters.
Veermata Jijabai Technological Institute (VJTI) `Aug2012-May2016`	**BACHELOR OF TECHNOLOGY IN ELECTRONICS ENGINEERING** › Graded 'A+' on Bachelor thesis on 🔗 Swarm Robots in Closed Loop Visual Odometry system, using Li-Fi. › Product ideas: 🔗 Hybrid HID ARM Cortex and wrist-watch multimeter at Texas Instruments Challenge. › Designed a line following and grid solving robot winning at TechFest 2014, IIT-Bombay. › Undertook workshops on embedded robotics for 300+ students around Mumbai (ARM, AVR, ESP32). › MIT Media Labs DI: Open Sourced and prototyped a 🔗 wrist band for taking 360°panoramas. › numerical techniques, applied math, digital signal processing, op-amps and filters, VLSI design.

📖 PUBLICATIONS

Dec 2019	Our work on drone racing is featured at 🔗 Business Insider 🔗 Wired 🔗 Bloomberg 🔗 TU Delft 🔗 BBC.
Sept 2019	Master study in Embedded Sytems, 🔗 Thesis on state estimation and optimal control for racing drones.
Sept 2017	Published in Advances in Intelligent Systems and Computing (Springer, Germany) on 🔗 LiFi Swarm Robots.
Dec 2015	Published 🔗 MOSFET based motor drivers with closed loop control at the 12th International IEEE Conference, Indicon.
Jun 2015	Hindustan Times, India: Tech students engineer fixes for health-care issues: reference: SRA, VJTI.
Aug 2014	NHK Japan, Hindustan Times, Times of India: City College VJTI representing India internationally, ref-RoboCon 2014.

🔧 SKILLS

📃 Programming	Embedded C, C++, FreeRTOS, Keil, MATLAB, Python,Labview, OpenCV, ROS, multi-threading.
⚙️ Controls	LAPACK for uCs, HiL tests, Adaptive control laws, Kalman and RANSAC filtering, system identification.
🔌 Embedded	STM32, MSP432, ESP32, closed loop motor-control, NI-Rio, Multisim, KiCad, oscilloscope, soldering.
🖥 Softwares	Git-scm, Eclipse, Photoshop, CorelDraw, Latex.
🌐 Languages	English (fluent), Hindi (fluent), Mandarin (limited proficiency).