Nilay SHETH

Embedded | Control Systems

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Professional Experience

zepp solutions — Delft, Netherlands — Feb 2021 - current

Embedded and Control software engineer

2½ years at zepp solutions, an H_2 fuel cell systems company prominent in the automotive industry.

- Safety critical drivers for 30 onboard sensors, control and diagnostics for 15 pumps/motors/valves.
- Adding state estimators, kalman observers, J1939-21 communication and J1939-73 diagnostics stack.
- Realizing software architectures for safety critical ISO26262 ECUs (engine control units).
- 4G telemetry pipeline for on field vehicles, data analysis tools, build tools for embedded firmware.
- Expanding zepp's fuel cell test bench system, system integration testing, factory acceptance testing.
- Onboarding zepp's firmware team to the V-model, build processes and software architectures.

MISRA C | python | Jenkins CI/CD | J1939/CAN | Infineon Aurix | V-model | static/dynamic/docs tools | 4G telemetry

AlphaPilot — Lockheed Martin, USA — Jan2021 - Jan2019

Robotics perception and control engineer

2 years at AlphaPilot/AI Robotic Racing with TU Delft MAVLab, Lockheed Martin, MIT Aerospace.

- Won the AI racing world championship against 432 research teams, with a prize of $1M (highlights).
- Designed the race drone's state estimation/localization, control and trajectory planning pipeline.
- Firmware for PercEvite, Sense-and-Avoid air traffic control (European Single-Skies initiative).

C++ | computer-vision | linux-preemptive RT | ROS | Matlab | Python | UAV | HiL

Espressif Systems, — Shanghai, China — Aug2017 - Jul2016

Firmware applications Engineer

A year at Espressif, prominent in the IoT space with inexpensive and feature packed WiFi chips.

- Developed applications in esp-idf and Amazon Web Services for embedded platforms.
- Speech analysis and audio processing with FFT and LAPACK in C on ESP32's tensilica Processor.
- Motor control drivers: BLDC/brushed/servo and I2C/SPI/UART drivers for LCDs for HMI applications.

C | FreeRTOS | ESP32 | ESP8266 | esp-idf | Matlab | git | AWS

SRA, VJTI — Society of Robotics and Automation, Mumbai — Mar2016 - Nov2013

General Secretary and team captain

Robocon poses an annual semi-autonomous robotics challenge for countries in the Asia Pacific region.

- Finalists in 2014 & 2016: taking our university international, winning the Panasonic Award for Innovation.
- Mentored India's debut FIRST Robotics FRC6026 team to finish in the top 10 of Australian regionals.
- Undertook workshops on embedded robotics for 300+ students around Mumbai (ARM, AVR, ESP32).
- Won GridWarrior with the fastest grid solving robot at TechFest 2014, IIT-Bombay.

C/C++ | STM32 | AtMega1280 | motor driver | harness management | NI Rio

Academics and Co-curriculars

TU Delft, — Netherlands — Sep2019 - Aug2017

Masters in Control and 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.
- Networked & Distributed Control: convex optimization, sampling + synchronization algorithms.
- Vehicle Dynamics: ABS, path planning algorithms, localization with Particle Filters.

Veermata Jijabai Technological Institute (VJTI) — May2016 - Aug2012

Bachelor of Technology in Electronics Engineering

- Graded 'A+' on Bachelor thesis on Swarm Robots in Closed Loop Visual Odometry system, using Li-Fi.
- Courses on numerical techniques, applied math, digital signal processing, op-amps and filters, wireless communication, electromagnetic wave theory, VLSI design, control systems.
- MIT Media Labs: wrist watch camera, Texas Instruments Challenge: wrist watch multimeter

Publications

Dec 2019	Research in drone racing featured at Business Insider Nature Wired Bloomberg BBC.
Sep 2019	Thesis on state estimation and optimal control for racing drones.
Sep 2017	Advances in Intelligent Systems and Computing (Springer, Germany) on LiFi Swarm Robots.
Dec 2015	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	Git, C/C++, SafeRTOS, FreeRTOS, PxROS, MATLAB, Python, OpenCV, ROS, multi-threading.
Controls	PID, Kalman filters, state estimation, system identification, LAPACK, closed loop motor-control.
Embedded	Infineon Aurix, STM32, ESP32, NI-Rio, MQTT, PCB design, oscilloscope.
Languages	English (fluent), Hindi (fluent), Gujarati (fluent), Dutch (A2).