Nilay SHETH

Embedded | Control Systems

5 yrs of work exp. in the automotive, robotics & aerospace industry

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Netherlands, EU resident/national
29 yrs, male

Professional Experience

zepp solutions — Delft, Netherlands — Feb 2021 - current

Embedded 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 & diagnostics for 15 pumps/motors/valves.
- Adding state estimators, kalman observers, J1939-21 communication & 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 & software architectures.

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

AlphaPilot — Lockheed Martin, USA — Jan2019 - Jan2021

Robotics & 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 & deployed an optimal control algorithm to plan the trajectories in a time optimal manner.
- Designed outlier rejection based filters - RANSAC localization for GPS denied navigation.
- Sensor fusion for lower covariance state estimates and multi-PnP for better position estimates.
- Implemented non-linear control for attitude heading and reference systems (AHRS).
- Designed several support tools around the hardware in the loop (HiL) test setup.
- 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 — Jul2016 - Aug2017

Firmware Applications Engineer

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

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

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

Academics and Co-curriculars

TU Delft, Netherlands — Aug2017 - Sep2019

M.Sc. Masters of Science 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) — Aug2012 - May2016

B.Tech, Bachelor of Technology in Electronics Engineering

- General secretary for the robotics chapter of VJTI & team captain for Robocon 2014.
- Finalists ABU Robocon 2014 & 2016: winning the Panasonic Award for Innovation for India.
- 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).
- MIT Media Labs: wrist watch camera, Texas Instruments Challenge: wrist watch multimeter
- Courses on numerical techniques, applied math, digital signal processing, op-amps and filters, wireless communication, electromagnetic wave theory, VLSI design, control systems.

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, ref: 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).