NITHISH KRISHNABHARATHI GNANI

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EDUCATION

Master of Science, Intelligent Software for Autonomous Systems Expected June 2026
KTH Royal Institute of Technology, Sweden

Diplôme d'Ingénieur (Master of Science), Autonomous Robotics
Polytech Nice Sophia, Université Côte d'Azur, France
EIT Digital dual master degree program with Minor in Innovation and Entrepreneurship

Bachelor of Technology, Mechanical Engineering
National Institute of Technology Karnataka (NITK), India

SKILLS

Programming	Python, MATLAB, Simulink, P4, C, C++, Embedded C, Shell, Assembly
Hardware	Netronome Agilio Smart NIC, Nordic nRF52 series, Arduino, STM32
Tools	Linux, Git, ROS, Docker, LaTeX, Autodesk Fusion 360
Creative	3D printing, Shotcut, Snapseed
Languages	English (IELTS band score 8/9), French (TCF B1)

EXPERIENCE

Technical Associate 2019 - 2024
Indian Institute of Science (IISc) | Centre for Networked Intelligence (CNI) [🌐] *Bangalore, India*
Led industry-funded research projects. Sponsored by the CNI, at Robert Bosch Center for Cyber-Physical Systems.

Team Leader, Maintenance 2017 - 2018
Hindustan Coca-Cola Beverages Private Limited *Hyderabad, India*
Managed a team of 20+ associates to achieve consistent reliability of utility systems.

SCIENTIFIC PUBLICATIONS

EdgeP4: In-Network Edge Intelligence for a Tactile Cyber-Physical System Testbed Across Cities [🔗]
Nithish K Gnani, Joydeep P, Deepak C, Himanshu V, Soumya R, Kaushal M, T. V. Prabhakar, C Singh
IEEE International Conference on Computer Communications Workshops (INFOCOM) 2024 *Best Paper Award*

Utilizing Operator Intent for Haptic Teleoperation under high latencies [🔗]
H.J.C. Kroep, P. Makridis, J. Huidobro, K. Wosten, D. Choudhary, **Nithish K Gnani**, T.V. Prabhakar, S. Coppens, R.R. Venkatesha Prasad, K. Van Berlo
IEEE Transactions on Mobile Computing, 2025 *IEEE TMC*

Towards a TSN-DetNet Intercity Testbed for Tactile Cyber-Physical Systems [🔗]
Joydeep P, **Nithish K Gnani**, Deepak C, Chandramani Singh, T. V. Prabhakar, H. K. Atluri, Paventhan A
IEEE International Conference on Computer Communications Workshops (INFOCOM) 2024 *IEEE INFOCOM'24*

Sensor Identification via Acoustic Physically Unclonable Function [🔗]
Girish Vaidya, T.V.Prabhakar, **Nithish K Gnani**, Ryan Shah, Shishir Nagaraja
Digital Threats: Research and Practice, 2022 *ACM DTRAP*

Judicious data management for sustaining an energy harvesting sensor node [🔗]
K Singh, P Shukla, Sachin S. M., **Nithish K Gnani**, Prabhakar T. V., Joy Kuri
Concurrency and Computation: Practice and Experience, 2020 *Wiley CCPE*

SELECTED PROJECTS | MORE [🔗]

Designing Tactile Cyber-Physical (TCPS)[🔗]

- Built a TCPS testbed with a robotic arm and haptic device to demonstrate teleoperation for real-time interaction between humans and robots in real and virtual worlds for applications requiring ultra-reliable low latency communication (uRLLC).

- Programmed a Geomagic Touch haptic device with C/C++ to asynchronously get coordinates and velocity and send them to the robot as UDP packets. Programmed a UR3 robotic arm using ROS-Python to receive control packets, move to the desired pose, and send position feedback.
- **Novelty - EdgeP4:** Developed and implemented edge intelligence algorithms for teleoperation, *pose correction* and *tremor suppression* on P4-programmable network edge switch ports. Reduced control loop latency (<100 µs for *pose correction* task) and network load (99% reduction). Multiple algorithms can be hosted on the same edge switch, which can seamlessly switch between the algorithms depending on the tasks.

Time Sensitive Networking (TSN) switch [🔗]

- Implemented a time-slotted scheduling mechanism on programmable smartNICs.
- Achieved bounded latency of 20 s for the scheduled traffic (ST) in the presence of best effort (BE) traffic.
- Demonstrated the algorithm across a physical testbed of two end-hosts connected via two switches.
- The bounded latency is **20x lower** compared to the Linux kernel-based implementation of Time Aware Shaper(TAS), i.e., Linux tc TAPRIO.

Intercontinental Teleoperation [🔗]

- Built the *remote domain* consisting of a robotic arm, depth camera using ROS, and a dynamic drawing mechanism (at IISc, India) and interfaced it with the operator domain consisting of a haptic device (at TU Delft, Netherlands).
- **Novelty - Operator Intent:** A framework that extends Model Mediated Teleoperation to prioritise operator intent to tackle dynamic environments and high latency of up to 1 second.

5G AMMAZING [🔗]

- An end-to-end 5G mmWave system for infotainment.
- **Novelty:** Data & control plane of a video stream split over 5G and regular Wi-Fi.
- **Achievement:** Won first place ($7000 cash award) in 5G Hackathon 2020 by Govt. of India (among 1100+ teams)[🔗]

Airplane IoT data analytics and management [🔗]

- Developed machine learning algorithms to classify anomalies and take corrective actions using real-time data generated from sensors from a MATLAB/Simulink model of an aircraft environmental control system.
- **Novelty:** Developed an algorithm that does linear interpolation between non-consecutive data points from time series data to adaptively store data based on a cost function that balances storage space savings and error in reconstruction of data. Achieved 96% savings in storage space.

Acoustic Physically Unclonable Function (APUF) for sensor device security [🔗]

- APUF is a novel technique to identify sensor devices and their positions by exploiting the physical property variations and acoustic fingerprinting.
- Applications: monitoring calibration-integrity and authentication in sensor-network deployments.
- Applied a K-Nearest Neighbors model to evaluate the accuracy of the uniqueness signature and the position signature for different cases of accumulation and temperature.
- Achieved over 99% identification accuracy with scalability and displacement detection sensitivity of 5 cm.
- **Novelty:** Unlike the usual method of adding PUF circuitry while manufacturing the device, here PUF is extracted using microphones connected to any commercially available device with an ADC.

INTERESTS AND ACTIVITIES

- Designing and 3D printing figurines and functional items for home and office. [🔗]
- Instructor, PG Level Advanced Certification Course in 5G Technologies with AI and Cloud: Taught two batches how to design cyber-physical systems leveraging programmable networks for NSE TalentSprint and IISc.
- Instructor at a P4 Workshop: Taught 20 participants from Power Grid Corporation of India Limited the basics of P4 with a hands-on tutorial.
- Close to my heart: Taught underprivileged girls at Yuwa School in rural Jharkhand, India. Coached students in tackling interviews. Prepared the team to attend the Laureus Awards 2019. Yuwa won the Sports for Good award [🔗].