



Saurabh Band

Msc. Embedded systems

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PROFILE

PhD researcher in IoT reliability at the University of Bremen, specializing in fault detection and diagnosis for low-power edge devices. Experienced in designing lightweight, explainable anomaly detection methods under strict energy and memory constraints. Strong background in embedded systems, edge AI, and wireless sensor networks, with proven experience across academic research and industrial software development.

ACHIEVEMENT

3rd Place, EWSN'24 Sustainability Competition – Designed power-efficient computation strategy under strict energy constraints ([link](#)).

TECHNICAL EXPERTISE

Embedded & IoT:

ESP32, MSP430, STM32, Arduino, Raspberry Pi, MicroPython,

Edge AI & Data Analysis:

Anomaly Detection, Fault Diagnosis, Time-Series Analysis, Feature Engineering, Lightweight ML for MCUs, Explainability

EXPERIENCE / INTERNSHIP

Research Assistant

Dept. of Sustainable Com. Net., University of Bremen

- Ph.D. research in the field of reliability of IoT sensor nodes
- Designed and implemented a lightweight fault detection and diagnosis framework for IoT edge devices, enabling root-cause identification under strict energy and memory constraints.
- Developed event-trace-based monitoring and anomaly detection methods for resource-constrained microcontrollers using MicroPython and C/C++.
- Conducted systematic performance and overhead evaluation (F1-Score, Power, RAM, firmware size) on real sensor nodes.
- Validated solutions on heterogeneous low-power platforms and duty-cycled wireless stacks (e.g., Contiki-MAC).
- Supervised Master's theses and projects; taught IoT and Edge Computing modules.
- Tools: *ESP32, MSP430, Python, MicroPython, C++, ML/DL*

Additional Contributions & Leadership

- Core organizing team member for an international summer school for Master's students, responsible for technical coordination and program execution.
- Represented the research group at Open Campus and Space Expo events, communicating IoT and space-related research to students, industry visitors, and the general public.

Software Developer and Consultant

08/2021

- 11/2021

getCoding GmbH

- Designed and developed a production-ready software solution based on customer requirements.
- Implemented face recognition models and integrated ML pipelines into deployed applications.
- Designed CI/CD pipelines and adapted applications for multiprocessing environments.
- Built and deployed standalone Windows applications in Python.
- Tools: *Python, Tensorflow, PyQt, Jupyter, Django, React.js, Javascript, GitLab*

Student research assistant

10/2020

- 08/2021

ZeTeM, University of Bremen

- Developed an automated system to determine the fetus health using deep-learning models based on CTG signal
- Tasks: Pre-processing data, building functions to extract features, classification of data, character recognition using deep-learning model
- Tools: *Python 3, Matlab, PyTorch, Jupyter, WEKA*

Student research assistant

04/2020

- 08/2020

DST, Chemnitz University of Technology

- Successfully tested deep learning architectures (ResNet50, RAPiD) for public and custom datasets
- Tasks: Pre-processing datasets (CIFAR-10/100, custom), implementing deep-learning models, reducing features using Principal Component Analysis (PCA), data visualization
- Tools: *PyTorch, Tensorflow2.0, Python3, Jupyter*

Intern

Ttention Inc.

08/2019

- 12/2019

- Successfully developed web application and acquired knowledge about REST framework, MySQL, MVC framework
- Tools: *Django, Python3*

ML & Computer Vision:

PyTorch, TensorFlow, tfLite,
Edge-Impulse, OpenCV, Matlab

Systems & Software:

Python, C/C++, CI/CD, Git, Linux, Django,
REST APIs, Multiprocessing, PyQt,
SQLAlchemy, InfluxDB, Javascript,
React.js

Wireless & Low Power:

WiFi, LoRa, Bluetooth, Power Profiling,
Intermittent-Computing

SOFT SKILLS

- Cross-disciplinary collaboration (CS, Psychology, Biology)
- Technical mentorship & student supervision
- Technical communication with academic and non-technical audiences (open campus, tech-expo)
- Prioritization, and deadline-driven execution
- Analytical problem-solving and system-level thinking

PUBLICATIONS

"Reliability Analysis of a Monitoring System for Extraterrestrial Habitats," Proc. 20th Int. Conf. on Wireless and Mobile Computing, Networking and Communications (WiMob), Oct. 2024, pp. 331–338.

"(Poster) Navigating the Unknown: Anomaly Detection in Sensor Nodes Based on Event Traces," Proc. 20th Int. Conf. on Distributed Computing in Smart Systems and the Internet of Things (DCOSS-IoT), Apr. 2024, pp. 756–758. d

LANGUAGE SKILLS

Marathi	C2
Hindi	C1
English	C1
German	A2

REFERENCE

Prof. Dr. Anna Förster
(Commets, University of Bremen)
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SELECTED PROJECTS

Unsupervised Domain Adaptation for Object Detection - Master's Thesis

11/2020
- 06/2021

Chemnitz University of Technology: Computer Vision

- Improved object detection performance (mAP) by 14% on fisheye camera data using unsupervised domain adaptation techniques.
- Adapted a state-of-the-art object detection network (YOLOv3) to handle domain shift between synthetic and real-world fisheye data.
- Designed and evaluated two domain adaptation strategies, systematically analyzing the impact of data augmentation on detection accuracy.
- Conducted controlled experiments and quantitative evaluations to validate robustness across domains.
- Tools: PyTorch, Python, Jupyter, SSH

Selecting Influential Examples for Active Learning - Research Project

11/2019
- 01/2020

Chemnitz University of Technology: Computer Vision

- Improved model performance by 6% by identifying and prioritizing informative training samples for active learning.
- Used a pre-trained ResNet50 for feature extraction and applied KNN-based labeling with soft-voting for sample selection.
- Proposed and evaluated strategies for identifying unique and influential samples to reduce labeling effort.
- Analyzed trade-offs between dataset size, model performance, and computational cost.
- Tools: TensorFlow 2.0, Python

Evaluation of Power Supply Strategies for an Op-amp Signal Processing

05/2019
- 08/2019

Chemnitz University of Technology: Measurement and Sensor Technology

- Analyzed the impact of noisy power supply conditions on op-amp signal integrity in embedded signal-processing systems.
- Performed FFT-based frequency-domain analysis to quantify noise-induced distortions in the output signal.
- Correlated simulation results with hardware measurements to validate system behavior.
- Tools: Arduino, C++, Python, LTspice

Currency Recognition and Conversion System - Bachelor's Thesis

07/2017
- 02/2018

Mumbai University: Image Processing

- Developed a computer vision system to identify currency type and denomination with a real-time graphical user interface.
- Implemented feature extraction and classification pipelines.
- Tools: OpenCV (Python), PyQt

EDUCATION

Embedded systems (Masters)

09/2018
- 07/2021

Chemnitz University of Technology

GPA: 2.0

Electronics & Telecommunication (Bachelors)

08/2015
- 05/2018

Mumbai University

GPA: 2.0