Sounder Rajendran

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EDUCATION

Coimbatore Institute of Technology – Coimbatore, India *Bachelor of Electrical and Electronics Engineering*, CGPA: **8.23/10**	April 2019
G.D. Matric Hr. Sec. School – Coimbatore, India *Higher Secondary School,* Percentage: **96.6%**	May 2015
Nirmala Matha MHSS – Coimbatore, India *Secondary School*, Percentage: **97.4%**	May 2013

RESEARCH INTERESTS

To work in research and development of secured, low-powered cyber-physical systems and connected devices in lines of semantic technologies, industrial IoT and Artificial Intelligence of Things.

To develop end-to-end automated and real time verification, validation solutions for testing security, standardization & compatibility of Internet of Things devices and applications.

RESEARCH EXPERIENCE – NOTABLE PROJECTS – www.sounder.world/projects

Closed Loop Validation of Touch, Voice & Extended Reality Systems – *Robert Bosch, India*
- *Patent Pending* research to imitate a human's touch, voice commands and gesture control as inputs to auto-validate limitations of Personal Digital Assistant devices.
- Technologies used: Signal Acquisition and Processing using NI DAQ, NLP (Text-to-Speech, Speech-to-Text), OpenCV, 4DoF SCARA (3R1P) robot arm design, ROS & embedded systems

May 2021 – June 2022

Autonomous Customer Engagement Robot Swarm (ACERS) – *Innovation team, TCS*
- Mobile Semi-humanoid robots to have act as Airport attendants; LSTM for voice conversations with humans.
- Gesture and voice triggered to initiate service request; used ROS 3D perception and navigation stack, Raspberry Pi & D435 Intel Real Sense Depth Camera for 3D point cloud.

June 2018 – Sept 2018

Intelligent Distributed Generation in Cloud-Connected Urban Microgrids – *Dept. of EEE, CIT*
- *Best Project Award*, CIT 2019. Reliability threat mitigation and efficiency increase in generation and distribution of power in renewable energy microgrids. Used Power Electronics & Power system design concepts.
- Increased user transparency and improved peer-to-peer electricity transactions using Internet of Things & block-chain ledgers. Used IoT, cloud computing & embedded systems.

Apr 2018 – Mar 2019

UAV-AGV Symbiotic Pair for Solar Farm Maintenance – *Dept. of EEE, CIT*
- Autonomous quadcopter and autonomous ground vehicle pair share tasks to traverse circuitous path with variable priority scheduling.
- UAV is time triggered to capture and transfer image data of work field via 2.4 GHz communication to UGV to plan path to be taken in order of task priorities.
- Aerial mapping, OpenCV & dynamic task allocation, low-power embedded system design.

Apr 2017 – Mar 2018

Compact Floor Cleaner Robot – *Inter College Research (Dept. of Robotics, PSG & Dept. of EEE, CIT)*
- Designed the navigation, control algorithms, and implemented digital control systems.
- Used pre-built 2-D maps with multi sensor array (accelerometer, magnetometer, gyroscope and quadrature encoders) data processing for spatial localisation.

June 2017 – Dec 2017

TECHNICAL SKILLS

- **Programming languages & math packages:** C, C++, Python, JavaScript, Dart, Verilog, MATLAB, Mathematica.
- **Frameworks and software packages:** Robot Operating System (ROS), LabVIEW, Xilinx, Keil, Arduino, Multisim, OpenCV
- **Technical expertise:** Embedded systems, Internet of Things, Cloud Computing, Machine Learning, Deep Learning, Data Analytics, UX design and Computer Vision.

PROFESSIONAL EXPERIENCE

Robert Bosch Engineering & Business Solutions – Coimbatore, India
Senior HMI & IoT Engineer – Human Machine Interface Centre of Excellence

- R&D of **patent pending** closed loop automated testing of voice and extended reality HMI devices (NLP, Python).
- R&D of proprietary cyber security threat mitigation in firmware layer of Bosch IoT Gateways (RNN, Python, C++).
- Developed end-to-end **Industry 4.0 Cyber Physical Systems** monitoring & control tool (Python/Angular).
- Designed & Integrated IoT system for remote accessibility & control of HMI test framework (LabVIEW/Bosch IoT Suite).
- Designed and Programmed Sensor Fusion for enhanced positional data for Bosch Sensortec

Sept 2019 – June 2022

Tata Consultancy Services – Chennai, India
Engineering Intern – Innovation Team, United Airlines Division

- Designed and developed ACERS: Autonomous Customer Engagement Robot Swarm (Semi-humanoid robots swarm to be used as Airport passenger assistants).
- Built multi-agent systems monitoring & control tool (NodeJS and C++).
- Developed a public sentiment analysis tool that crawls Twitter and Facebook in search of custom tags and analyse associated texts using Natural Language Processing.

June 2018 – Aug 2018

Siemens Ltd. – Coimbatore, India
IoT Intern

- Contributed to firmware development & sensor library development of SIMATIC IOT2020 Gateway (**Embedded C**).
- Developed communication protocol interface tool for SIMATIC IOT2020 Gateway's inbuilt RS232, USB & Ethernet connectivity and external BLE, MQTT and LoRaWAN connectivity and evaluated their performance (Python).
- Developed drivers to interface Siemens IoT Gateways to Siemens Cloud MindSphere (C++).

Jan 2018 – June 2018

NxtStep Robotics Startup – Coimbatore, India
Co-founder & Chief Operations Officer

- Designed and developed Compact Floor Cleaner Robot. Used 2D mapping using encoders, SolidWorks & Arduino.
- Designed Guided Fire Extinguisher Robot – Second Place at Anokha National Hackathon.
- Managed a team of 10 for design & fabrication of Portable Urban Mobility Vehicle.

Aug 2016 – Jan 2018

TEACHING AND MENTORING EXPERIENCE – www.sounder.world/mentor

Guest Lecturer & Project Mentor – Embedded and Cyber Physical Systems
Department of Electrical and Electronics Engineering, Coimbatore Institute of Technology

Sept 2021 – June 2022

Guest Lecturer – SVM & Random Forest Techniques, National Faculty Development Programme
Department of Computer Science and Engineering, CMR Engineering College, Hyderabad

June 2021

Guest Lecturer & Project Mentor – IoT for Real Time Projects
School of Computer Technology and Applications, Kongu Engineering College, Erode

Oct 2020 – Jan 2021

Guest Lecturer, Machine Learning – An Industry Perspective
Department of Computer Science and Engineering, Bannari Amman Institute of Technology, Erode

Aug 2020

Teaching Assistant – Data Analytics
Department of Electrical and Electronics Engineering, Coimbatore Institute of Technology

Sept 2018 – May 2019

LEADERSHIP AND VOLUNTEER EXPEIRENCE – www.sounder.world/leader

Innovation Champion, EHG Department,
Robert Bosch Engineering and Business Solutions

Feb 2021 – June 2022

District Priority Projects Chairman,
Rotaract Club of Coimbatore Spectrum, Rotary International District 3201

Aug 2020 – June 2022

Treasurer, EEE Department Association,
Coimbatore Institute of Technology, Coimbatore

June 2018 – May 2019

Workshop co-ordinator, EEE Department Association,
Coimbatore Institute of Technology, Coimbatore

Jan 2017 – May 2018

Board Member and active volunteer,
Youth Red Cross Society, CIT, Coimbatore

Jan 2017 – June 2022

House Captain, Uranus (Red) House,
G.D. Matric Hr. Sec. School, Coimbatore

June 2014 – June 2015

PRESENTATIONS

PROJECT PRESENTATIONS

- **Portable Urban Electric Mobility Vehicle,**
  <u>Best Project Award</u>, *Science and Technology Festival, Confederation of Indian Industries*

  Feb 2019

- **Semi-Autonomous All-terrain Fire Extinguisher Robot**,
  <u>Best Project Award</u>, *National Technical Symposium, AL-Ameen Engineering College, Erode*

  Aug 2016

PAPER PRESENTATIONS

- **Smart Load Shifting in Nanogrids using low-power Wireless Sensor Networks**,
  Conference on Energy Conservation, Coimbatore Institute of Technology

  Jan 2018

- **Mobile Autonomous Robot using 2D mapping and multisensory localisation**,
  National Technical Symposium, AL-Ameen Engineering College, Erode

  Aug 2016

AWARDS AND HONORS – www.sounder.world/awards

Technical Awards

- Best Student Entrepreneur, CIT 2019
- Best Project Award, Confederation of Indian Industries and JKKN Educational Inst. 2019
- II Place, EO GSEA 18 (Global Student Entrepreneur Awards), Indian Chapter, 2018
- II Place, Open Hackathon at Anokha National Tech fest, Amrita University, 2018
- II Place at Fire Extinguisher Robot Design, Anokha National Tech fest, Amrita University, 2018

Service Awards

- DRR Special Recognition Award, Rotary International District 3201
- Outstanding Social Project Award, Rotaract South East Asia Conference, 2021
- Outstanding Professional Development Project, Rotaract South Asia, 2021

University Service Awards

- Exemplary Performance-EEE Association Treasurer, 2019
- Exemplary Performance-Workshop Manager, 2018