Rittwik Sood

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Education

Purdue University West Lafayette, Indiana
MS in Electrical Engineering | GPA - 4.0/4.0 *Jan 2024 – May 2025 expected*
Relevant Coursework: Random Variables and Signals, Wireless Communication Systems
Linear Optimization, Digital Communication

National Institute of Technology Hamirpur Hamirpur, India
B.Tech in Electronics & Communication Engineering | GPA - 9.72/10.0 *Aug 2014 – May 2018*

- The President of India Gold Medal (**Rank 1** in the institute)
- Director's Gold Medal for Best All Rounder Performer 2018

Work Experience

Qualcomm Inc. Hyderabad, India
Senior Software Engineer - Modem NR5G *Sep 2018 - Aug 2023*

- 5 years in Modem NR5G RF Software team. Primary task included analysing and reading 3GPP spec documents, and programming HW RF components like Antennas, PAs, LNAs, ASMs.
- Worked on **Physical layer** programming of RF front end Digital and Analog components.
- Created critical features and their SW frameworks, like ENDC (LTE + NR5G), NRDC (FR1+FR2, NR Dual Connectivity), MPE (Maximum Polarisation Exposure) on mmw.
- Worked with varoius OEMs on 40+ product lines. Assisted teams across geographies in USA, CHN, Israel and EMEA in day-to-day critical activities and Modem Bring ups.
- Got 2 promotions in 3 years. Was awarded with Orion-Insta and Qualstar Awards in the company for excellent performance and work-ethic (Highest Awards).
- Worked with cross-functional teams like Firmware, Modem Hardware, MAC, System Design, to design new features, test functionalities and enable data communication between various layers.
- NRDC framework created by me from scratch, was presented as a highlight (one of the five features) by Qualcomm CEO at the Mobile World Congress (MWC 2021), Barcelona. Download speed of 10 GBps was achieved for the first time.

Research Experience

Purdue University West Lafayette
Graduate Student | Advisor: Prof. Kim Kwang *Jan 2024 - Ongoing*

- Quantifying disparities in internet coverage (availability and speed, including uplink and downlink) across Midwest states by comparing FCC Broadband Data Collection (BDC) with the Ookla speed database and ISP-provided coverage data in Midwest states to reduce Digital Divide.
- Analyzed correlations between these coverage discrepancies and various demographic factors (such as income, education levels, urban/rural divide, and race) using data from the American Community Survey (ACS) and the U.S. Census Bureau.
- Developing a predictive model to estimate the state of the digital divide in the Midwest for 2025, identifying key deficiencies in internet access based on demographic variable
- Extending the model's applicability to other U.S. states to assist in forecasting future digital divides and optimizing the allocation of digital resources to effectively reduce disparities.

IBT, Karlsruhe Institute of Technology (KIT) Karlsruhe, Germany
DAAD-WISE Scholar | Advisor: Prof. Olaf Dossel, Dr. Nicolas Pilia *May 2017 - Jul 2017*

- Instantaneous phase estimation and analysis of bio-signals including ECG and EEG signals to predict heart and brain disorders well in time [LINK].
- In a period of 3 months, formulated a novel method to predict heart and brain diseases timely, amalgamating benefits of conventional algorithms like Hilbert transform, Sinusoidal decomposition, Mattner method, Short-time Fourier transform etc.
- Performed mathematical analysis and took a comparative study of the novel method against the conventional methods available using various well-known Signal Processing algorithms. A 16% of efficiency improvement was observed by the novel method.

Indian Institute of Technology (IIT) Delhi Delhi, India

Indian Academy of Sciences Research Fellow | Advisor: Prof. Subrat Kar *May 2016 - Aug 2016*

- Tourist Assistance System to help geo-locate the tourists and assist them in the remote areas, devoid of any Mobile communication [LINK].
- Made a prototype with a bluetooth enabled system and a Mobile App interface to evaluate the last available coordinates of the user and through data-analysis, find the most probable radius, where the user may be found.
- Awarded with 'The Best Intern Project' award in the internship.

Academic Projects

Real Time Smart Honking System June 2016 – Apr 2018

- Created a prototype for a disincentive measure to control unnecessary honking on roads. Realised a system to produce a low beep sound in front treading vehicles in a span of 120°. Priority RF signals intimation for emergency vehicles.
- Conducted a study on Delhi roads which found the system to reduce the effective noise pollution by 65%
- Integrated with traffic control system, permitting the emergency to reach the desired destination without wasting time in the traffic.
- Got awarded as Most Innovative Project HP 2016 from Himachal Pradesh Government and received funding to file patent [Patent].

SISO and MIMO System Model Reduction using heuristic algorithms May 2018 – May 2020

- Applied various heuristic algorithms like Genetic Algorithm, PSO and Luus Jakola to reduce complexities of MIMO and SISO Models. [LINK].
- Implemented AGTM (Approximate Generalised Time Moments) method wherein the responses were matched at different time instants to achieve the reduced system.
- Devised a new method, Ensemble Framework for Optimized System (EFOS), resulting into a reduced system with better performance as compared to conventional techniques
- Designed a Digital controller with reduced complexity using EFOS method

IoT Enabled Smart Wearable Device Apr 2016 – Mar 2017

- Smart Wearable assisting in daily activities and in emergency situations [LINK].
- Employed Sensors, cloud infrastructure, Mobile app and worked on ARM architecture

Technical Skills

Languages: C, C++, MATLAB, Python, Embedded C, SQL, Latex
Concepts: Data Structure and Algorithms, Wireless Communication Systems, Cellular Communication, NR5G, Modem Communication
Developer Tools: Git, Docker, Visual Studio, JIRA, PyCharm, Eclipse, Qualcomm Tools
Frameworks & Libraries: PyTorch, NumPy, Matplotlib, Pandas, React, Perforce, Node.js, Jenkins

Leadership and Awards

- Secured 2nd rank Nationwide at ADCOM ARM Design Contest 2015: Competed with 650+ teams from universities and industry across India. Got appreciation from the Governor of Himachal Pradesh [AWARD].
- DAAD-WISE Fellowship 2017: Given to top-100 meritorious students across India, accorded by the German government and EU to undertake research internship in Germany.
- Indian Academy of Sciences Research Fellowship 2016: Amongst Top 200 students to undertake research internship in premier institutes in India. Got selected at IIT Delhi (Only 4 applicants)
- SJVN Merit Scholarship 2014-2018: Accorded to 35 students who have topped in Senior Secondary examination across 5 Indian states. Received a full four-year scholarship for undergraduate studies.
- Founder and First President, Innovative Research Incubation Club (IRIC), NIT Hamirpur: Launched and led the official incubation center of NIT Hamirpur, securing sponsorship from the Government of India and DST. Achieved funding for 3 projects from the Chief Minister Startup Fund within the first 6 months.
- First Student Chair, IEEE Student Branch NIT Hamirpur
- Student Representative: ECE Departmental Under-Graduate Committee (DUGC): Acted as a key liaison for the 2014 ECE batch, effectively mediating and resolving critical issues between students and the administration.
- President, Society of Promotions of Electronics Culture (SPEC): Led the technical team of the ECE department at college level, organizing and executing SPECfest, and earning recognition as the best team for three consecutive years.