Ankush — CV

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Education

Indian Institute of Technology Bombay, Mumbai, India — Jul '17 – May '21

- Bachelor of Technology (B.Tech) in Engineering Physics
- **Minor** *(earned by crediting 5 additional courses)* in Electrical Engineering

Technical Skills & Interests

Programming Languages	Python, R, TensorFlow, Verilog/ System Verilog, Verilog AMS, VHDL, C/ C++, Robot Operating System (ROS), Bash
Design and Simulation	Cadence Virtuoso, Cadence Simvision/ Viva, PSpice, LTSpice, MADE flow (TI DV env), Synchronicity DesignSync
Other Tools	Jupyter, Arduino IDE, MATLAB, Eagle, Autocad, 3D view, LaTeX
Interests	Machine Learning, Statistics, Reinforcement Learning, Robotics

Technical Publications

- *"Enhanced customer engagement with quick and precise PSpice models using AI"*, **Ankush Ankush**, Aayush Garg, Venkateswaran P, Guha L, Avishek Pal ,TI Technical Leadership Conference, Texas, 2023
- *"ML driven PSpice model"*, **Ankush Ankush**, Aayush Garg, Venkateswaran P, Guha L, Avishek Pal,Texas Instruments India Technical Conference, India, 2023

Industrial Experience

Texas Instruments | **Bengaluru, India** — *Jun '21 – Present*

Mixed Signal Design Verification Lead, Analog Power Products Department

- Led pre-silicon design verification for 4 power path protection projects deployed in industrial, automotive and enterprise segments to successful tape-out with a track record of zero 'simulatable' bugs in silicon
- Developed and meticulously managed comprehensive parametric, system and manufacturing test plans & verification environments for Analog Power Products, ensuring rigorous testing and quality assurance
- Enhanced SoC test and verification plans by collaboratively optimizing coverage at both block and system levels through close coordination with cross-functional teams like Design, Systems, and Test team
- Created a UVM integrated functional DV framework enabling comprehensive regression, checker review, and RTL/GLS violation analysis within a 2-day timeframe, significantly expediting digital design iterations
- Collaborated with Applications team to spearhead the development of ML-generated PSpice Model for analog/mixed-signal devices, enhancing early customer engagement and minimizing design-phase gaps
- Pioneered the upload of ML-based PSpice device model for the TI product TPS25961 on ti.com
- Collaborated with various teams across worldwide TI, to provide DV support on time critical projects
- Worked closely with Test team to optimize test program using Alternative Testing, saving device cost
- Guided the industry's first AI-driven device-level finite state machine generation, using unsupervised learning to autonomously detect discrete states in analog devices' continuous space, enabling self-learning
- Deployed machine learning for automated waveform review in Design Verification in multiple analog-centric chips, thereby eliminating the manual review process and reducing cycle time by a couple of weeks
- Mentored new hires and interns for design verification execution, focusing on pre-silicon stages
- Initiated AI/ML connectivity on the development of machine learning initiatives across various teams at TI
- Conducted a "Getting Started on ML" session for TI DFT, Test, and FuSa (Functional Safety) engineers

Texas Instruments | **Bengaluru, India** *May '20 – Jul '20*

Intern

- TI internship program to design a crucial digital averaging filter block for the PMBUS digital telemetry circuit of TPS25990 (eFuse)
- Developed and validated multiple digital averaging filter algorithms, ultimately achieving an exceptional shared modified FIR algorithm with superior outcomes in area, error, frequency, and stability

CataConn | **Startup** *Oct '20 – Jun '21*

Founder, Guided by Prof. Aparna Rao, IITB

- Administered over 100 teaching hours, recruited and supervised a team of more than 10 tutors for personalized 1-on-1 IIT-JEE coaching, and provided guidance to a cohort of 500+ students
- Developed a machine learning-driven tutor search platform, optimized SEO techniques, and garnered over 300K site impressions in just 5 months

Research and Technical Projects

ML Driven PSpice Modeling *Sep '22 – Present*

(Filed **1 patent** *at the US-PTO)*

- Designed an automation suite to efficiently generate quick and precise top behavioral PSpice models for analog devices using a strategically optimized set of test cases, effectively representing device behavior
- Developed a comprehensive workflow involving automated data extraction from waveform databases, data preprocessing, and neural network architecture creation for training on dedicated servers
- Implemented a hierarchical ML approach incorporating insights from internal blocks and transient delays
- Successfully produced PSpice device models for TPS25961 (eFuse) and TPS1213-Q1 (High-side driver)

Mars Rover Project, IIT-B *Sep '18 – Aug '21*

Electronics Subdivision Head, leading a team of 15 *members & build an all-terrain rover prototype, which secured 4th place amongst 28 international teams at the Indian Rover Design Challenge(IRDC) 2020*

- Developed and executed end-to-end electronics subsystems, encompassing logic units with RPi and Intel NUC, along with hardware components such as Motor Drivers, DC-DC Converters, and Bio-Sensors
- Optimized the circuit design of the same to neatly fit in the area as specified by the mechanical design team; used GX-160, USB connectors to simplify the circuit interfaces of the actuators & motors
- Utilized potentiometer feedback from actuators, point cloud data from the on-board depth camera (Realsense D435) and Virtual URDF arm model to enable intuitive control of the robotic arm
- Worked on robotic arm automation with Inverse kinematics (IK) algorithms & depth cam (stereo vision)

Microprocessor, IITB-Proc *May '19*

Course Project, Supervisor Prof. Virendra Singh, Department of Electrical Engineering, IITB

- In a Team of 4, designed a 16-bit, Multi-cycle Microprocessor, IIT-Proc in VHDL which executes instructions like AND, NAND, Store, Load, BEQ and JUMP
- Designed the datapath diagram and FSM for the control unit of the microprocessor
- Designed components such as ALU and Register file with 8-registers

Semiconductor Research Corporation *Dec '21 – Present*

SRC is a non-profit research consortium that sponsors semiconductor research and workforce development in academia on behalf of the semiconductor industry

- *[SRC 3160.005]* Leading technical liaison and TI coordinator for SRC project with **Prof. Abhijit Chatterjee** from Georgia Institute of Technology on **"ML-Assisted Scalable DfT and BIST of AMS Systems"**
- *[SRC 2982.001]* Technical Liaison for the SRC funded industry-academia on **"Machine Learning Assisted Verification Methodology for Analog & Mixed Signal Circuits"** with Anna University Team

HEXAPOD *Jun '18 – Jul '18*

Institute Technical Summer Project

- Built an arduino based six-legged moving robot (Hexapod) with 18 degrees of freedom
- Established a wireless communication and syncing with PS2 controller
- Manufactured the bot by using Laser cutting and 3D-printing

Positions of Responsibility

Coordinator Media and Publicity (Techfest-IITB) *Jul '18 – Dec '18*

Asia's largest college Technical festival, footfall of 1.75 lakhs+, 500+ universities

- Conceptualized, Executed and Managed various events like Science and Technical Competitions
- Coordinated with 100+ College Ambassadors across India to conduct various competitions and workshops in their respective colleges
- Led a team of 10+ organizers to increase outreach of events conducted by Techfest

Department Alumni Secretary *April '18 – Mar '19*

Engineering Physics Department, Student alumni relations cell(SARC)

- Organized, strengthened and expanded the Department Alumni database since 1965
- Organized two CORE TALKS to enhance the core culture by Alumni of Physics department.
- Collected 35+ projects by contacting alumni from different core industries to float among the 120+ students as a part of Industrial Learning Program
- Assisted SARC in conducting mock interviews and successfully brought 60+ alumni to prepare 350+ final year students for their placements
- Hosted Annual Alumini day with 700+ attendees and raised funds approx. INR 36.8 crores

Honors and Awards

- Two times recipient of prestigious **Texas Instruments Global Recognition** for Outstanding Contributions
- Achieved **All India Rank 912** in JEE Advanced among **220,000** students [2017]
- Acquired **All India Rank 1957** in JEE mains out of **1.2 Million** students [2017]
- Awarded Certificate of Merit by the CBSE for obtaining A1 grade in all subjects in class X [2015]
- Awarded **Merit-based scholarship** in high school based on academic performance [2015]
- Received the **Madhuri Gupta Scholarship** from the Bombay Sappers Association (BSA) for all four years of my undergraduate studies, an honor awarded to only two students nationwide annually [2017 – 2022]
- Amongst State-wise **Top 1%** in National Standard Examination in Chemistry (NSEC), organized by IAPT and was among **300** who qualified for Indian National Chemistry Olympiad [2016]

Key Courses Taken

Cadence	SystemVerilog for Design and Verification v21.10, SimVision for Debugging Mixed-Signal Simulations vXcelium22.03
Electrical	Introduction to Electronics, Analog Circuits, Digital Systems, Electronic Devices and Circuits, Signals And Systems, Power Electronics, Electronics Lab (Microprocessors), Terahertz : Technology & Applications, , Microwave Integrated Circuits
Physics	Group theory, Photonics, Quantum Mechanics I and II, General Theory of relativity and Special relativity, Waves & Oscillations & Thermodynamics, Statistical Physics, Electromagnetic Theory, Quantum Optics, Physics of Quantum Devices
Miscellaneous	Computer programming and utilization, Calculus, Linear Algebra, Introduction to Numerical Analysis Data Analysis and Interpretation, Differential Equations

Volunteer and Community Work

Back to School Campaign *Jun '22 – Present*

Campaign Volunteer, Corporate Social Responsibility (CSR) program, organized by Youth for Seva

- Provided valuable assistance to underprivileged students, fostering their educational pursuits
- Contributed to the distribution of essential school materials to children residing in various rural locations across Karnataka, India, thereby improving their initial school experience
- Actively participated in a campaign (as a volunteer) that collectively aided over 20,000 children through various forms of support

Sapling Plantation Drive

Volunteer, Corporate Social Responsibility (CSR) program

- Participated in the sapling plantation drive organized by TI India at Bangalore University
- Collaborated with the team to plant 1000 saplings of native species as part of a forest thickening project

Extra-Curricular Activities

- Active member for ML in Design Verification Initiative @ TI
- **XLR8, Aug '17, Electronics and Robotics Club**: Designed, built, and programmed a robot using a differential steering mechanism, AT Tiny 2313 IC, Bluetooth module HC-05, and L293D motor drive
- **RC Plane, Nov '17, Aeromodelling Club**: Explored aircraft mechanisms and flight basics while investigating design parameters for improved performance, resulting in optimized fuselage, stabilizers, and wing designs
- Successfully completed one year training in Yoga (2017-2018) under National Sport Organization
- Organizer of Mood Indigo (2017), Horizon and workshops (Cultural fest of IIT Bombay)
- Mentored a group of four students in XLR8'18 and then mentored couple of groups during ITSP'19