Parag Sarvoday Sahu

Junior Undergraduate | Electrical Engineering
Computer Graphics | Computer Vision | Machine Learning

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EDUCATION

Indian Institute of Technology Gandhinagar — **8.78**/10
B.Tech in Electrical Engineering with Minors in Computer Science and Engineering — 2022-2026

Chhattisgarh Public School, Raipur — Percentage: **95.8**
Class XII, Central Board for Secondary Education — 2020-2021

Chhattisgarh Public School, Raipur — Percentage: **94**
Class X, Central Board for Secondary Education — 2018-2019

PUBLICATIONS

TensoIS: A Step Towards Feed-Forward Heterogeneous Inverse Subsurface Scattering
Ashish Tiwari, Satyam Bhardwaj, Yash Bachwana, **Parag Sarvoday Sahu**, Shanmuganathan Raman
Submission under review

EXPERIENCES

Summer Research Internship, Photonic Sensors Lab
SRIP, IIT Gandhinagar

Advisor: Prof. Arup Lal Chakraborty • IIT Gandhinagar • Project Link — *May '24 - Jun '24*

- Worked on developing a mobile ambient methane gas concentration detection setup.
- Understood the working of a lock-in amplifier and worked on its implementation on an FPGA board.
- Implemented Serial Peripheral Interface (SPI) protocol-based data transfer between an FPGA board and a Raspberry Pi.

RESEARCH WORKS

Inverse Rendering of Heterogeneous Translucent Objects

Computer Vision & Graphics | Prof. Shanmuganathan Raman | IIT Gandhinagar — *Aug '24-Present*

- Estimated **subsurface scattering parameters** of heterogeneous translucent objects media using **multi-view images**.
- Generated a large-scale dataset using Mitsuba 3, with heterogeneities generated using Fractal-Perlin Noise Model.
- Captured real-world objects and corresponding environment maps to evaluate generalization beyond synthetic data.

In-Band Full Duplex Radios with Self-Interference Cancellation

Adaptive Filtering | Prof. Nithin V. George | Video Presentation — *Jan '24 - Apr '24*

- Studied existing literature to understand the principles of In-Band Full Duplex radio systems.
- Implemented Steepest Descent algorithm in MATLAB for self-interference cancellation in both batch and online settings.
- Evaluated algorithm robustness under noise; observed degradation in non-Gaussian environments.

SELECTED PROJECTS

Scene Describer for the Visually Impaired

Embedded Systems & AI Integration | Prof. Jhuma Saha | IIT Gandhinagar | Project Link — *Mar '25 - Apr '25*

- Built a low-cost assistive system to capture and audibly describe scenes for visually impaired users using AI.
- Integrated ESP32-CAM, Azure AI Vision, and ESP8266 for image captioning and audio playback.
- Developed a Python controller for image retrieval, AI captioning, speech synthesis, and audio streaming.

Panorama Stitching using Feature Matching and RANSAC

Image Processing | Prof. Shanmuganathan Raman | IIT Gandhinagar | Project Link — *Sep '24 - Oct '24*

- Built a panorama stitching pipeline using SIFT feature matching and RANSAC-based homography estimation.
- Analyzed performance on varied image sets by tuning matching thresholds and geometric transformations.

Spatial Filtering and Edge Detection Techniques

Image Processing | Prof. Shanmuganathan Raman | IIT Gandhinagar | Project Link — *Aug '24 - Sep '24*

- Implemented spatial filters including box, Gaussian, and Laplacian to smooth images and enhance structural features.
- Applied Sobel and Prewitt operators for edge detection, tuning thresholds and kernel sizes to study sensitivity and robustness.

Child Safety Monitoring App built using MATLAB Simulink's Android Support Package

Digital Signal Processing | Prof. Nithin V. George | IIT Gandhinagar | Project Link *Aug '23 - Nov '23*

- Created an ecosystem to enable parents to track their children's location and trigger alarms in case of emergency.
- The app measured level of danger based on direct criteria like boundary crossing, fall detection, and overspeed.
- Employed TCP/IP and UDP protocols to enable reliable data transmission and real-time communication within the app.

AWARDS AND ACHIEVEMENTS

- Awarded the **Bipin and Rekha Shah Scholarship** for academic and overall excellence at IIT Gandhinagar for AY 2024–25.
- Awarded the **Prof. D.V. Pai Scholarship** for academic and overall excellence at IIT Gandhinagar for AY 2023–24.
- Successfully led a 20-member student team managing event operations for **TEDxIITGandhinagar 2024**.
- Selected for **Invention Factory 2023**, a national program to Prototype, Pitch, and Patent original inventions.
- Ranked in the **top 1%** among over one million candidates in **JEE Advanced 2022** for admission to the IITs.
- Secured **AIR under 400** in the **IISER Aptitude Test 2022** (50,000+ candidates); received admission offer from IISER Pune.
- Secured 1st rank in Chhattisgarh in NAEST 2020, conducted by IAPT to assess experimental and conceptual physics skills.

SKILLS

Programming Languages: Python | C | C++ | MATLAB | Verilog

Tools: MATLAB Android Simulink | Mitsuba 3 | Latex | Xilinx Vivado | Git | Arduino IDE | Autodesk Inventor

Libraries: Numpy | Matplotlib | Pandas | Seaborn | PyTorch

RELEVANT COURSES

Computer Vision | **Machine Learning** | Data Structures and Algorithms | Digital Signal Processing | Signals, Systems, and Random Processes | Probability, Statistics, and Data Visualization | Numerical Methods | Data-Centric Computing | Calculus of Single Variable and Linear Algebra | Principles and Applications of Electrical Engineering