Saurabh Koju

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EDUCATION

Bachelors in Computer Engineering   November 2019 – March 2024
Pulchowk Campus, Institute of Engineering   *Lalitpur, Nepal*

- Rank 54 / 12,000 (**top 0.5%**) in national entrance exam.
- Graduated in *First Division* with **78.97%**
- *Relevant Courses:* Theory of Computation, Discrete Structure, Data Structure & Algorithm, Applied Mathematics, Numerical Methods, Probability & Statistics, Artificial Intelligence, Digital Signal Analysis & Processing, Human Language Technology

Certifications

- **GRE:** 337 (Quant 170, Verbal 167)
- **IELTS:** 8.5 (Listening 9.0, Reading 9.0, Writing 8.0, Speaking 7.5)

RESEARCH EXPERIENCE

Research Assistant   October 2024 - Present
Multimodal Learning Lab – Supervisor: Dr. Binod Bhattarai   *University of Aberdeen, UK & NAAMII*

- Working on research projects on **Surgical World Models**, **Medical Imaging** and **Generative Modeling**.
- Introduced **surgical world model** based on inverse dynamics model that **learns latent actions from unlabeled surgical videos**.
- Working on a novel method to obtain **latent actions that can be transferred across surgical contexts** with coarse latent action modeling.
- Contributed to spatial proteomics image generation project with diffusion models.

Research Intern   July 2024 - September 2024
Multimodal Learning Lab – Supervisor: Dr. Binod Bhattarai   *University of Aberdeen, UK & NAAMII*

- **SAGES CVS Grand Challenge 2024:** *CVS Criteria Prediction in Cholecystectomy Videos, MICCAI 2024* Developed a novel object-token transformer with relative layout embeddings that secured **Fourth position** in two sub-challenges: CVS Classification and Robustness. *Challenge Report Preprint (Team mmll)*

PREPRINTS AND PUBLICATIONS

- **SurgWorld: Multi-Step Latent Action Modeling for Cross-Context Generalization in Surgical World Model.** *Under Review.*
  Saurabh Koju, Love Panta, Rudra P. K. Poudel, Yash Raj Shrestha, Prashnna Kumar Gyawali & Binod Bhattarai

- **Surgical Vision World Model.** *Workshop on Data Engineering in Medical Imaging, MICCAI 2025. Paper*
  Saurabh Koju, Saurav Bastola, Prashant Shrestha, Sanskar Amgain, Yash Raj Shrestha, Rudra P. K. Poudel & Binod Bhattarai

TEACHING EXPERIENCES

- **Instructor,** *Competitive Programming Workshop, IEEE Pulchowk*   July 2023
  Prepared and delivered a 5-day workshop on competitive programming
- **Instructor,** *Software Fellowship, LOCUS 2023*   June 2023
  Prepared and delivered lectures on Data Structure and Algorithms
- **Instructor,** *Competitive Programming Workshop, Thapathali Campus*   July 2022
  Prepared and delivered a 6-day workshop on competitive programming

Selected Academic Projects

- **Automata Toolkit:** Implemented functionalities to convert between DFAs, NFAs and regular expressions, minimize DFAs, and visually simulate DFAs and NFAs.
- **Interpreter for Custom Programming Language:** Implemented a general CFG parser using Earley Parsing; Full fledged implementation of functionalities typical of a high level programming language.
- **VHDL Simulator:** Implemented a subset of VHDL to simulate digital circuits programmatically; Added automatic circuit diagram generation from VHDL specifications.

Awards and Achievements

- **International Math Olympiad**
  Secured **1st position in National Math Olympiad** and represented Nepal at IMO 2019 (Bath, UK)
- **Other Olympiads**
  - **Winner of Various National Math and Physics Competitions:** Physics–Math Olympiad 2019 by Mechatrix, Maths Hunt 2018 by St. Xavier's College
  - **Top 6** in National Physics Olympiad, 2019 pre-selection test
- **Competitive Programming**
  - Achieved **Global Ranking of 76 (1st Nationally)** Among 7091 Teams in IEEEXtreme Programming Competition 17.0
  - **Winner of Various National Coding Competitions:** LOCUS Codejam 2022, Yomari Coding Competition 2023, LOCUS Codejam 2023
  - Achieved Maximum Rating of **1793** on Codeforces
- **SmartBots** First Runner up at SmartBots Coding Challenge
  Involved development of an efficient game playing bot for a card game, competition involved 94 teams nationwide
- **Scholarship** Merit-based full tuition waiver in undergrad based on entrance exam ranking

Volunteer Experiences

- **Reviewer**, *Workshop on Data Engineering in Medical Imaging, MICCAI 2025*   2025
- **Mathematics Coordinator**, *Maths and Physics Society, Pulchowk Campus*   2022 – 2023

Technical Skills

- **Languages**: Python, C/C++, JavaScript
- **Frameworks**: PyTorch, NumPy, Matplotlib, Scikit-learn, MMDetection
- **Machine Learning**: Computer Vision, Generative Modeling, Reinforcement Learning
- **Other Tools**: Git, LaTeX, Shell Scripting, Docker, Slurm, Linux Environment