Sagar Verma

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Education

Doctor of Philosophy in Signal and Image Processing Sciences — **Oct. 2019 – June 2023**
CentraleSupélec, Université Paris-Saclay & Schneider Electric — *Gif-sur-Yvette, France*

Thesis: Deep Neural Network Modeling of Electric Motors

M.Tech in Computer Science and Engineering — **July 2015 – May 2017**
Indraprastha Institute of Information Technology Delhi — *Delhi, India*

Thesis: Action Recognition in Egocentric Videos

B.Tech in Information Technology — **July 2010 – May 2014**
National Institute of Technology Raipur — *Raipur, India*

Thesis: Reinforcement Learning for Aerial Aerobatics

Professional Experience

CTO & Co-Founder — **Jan 2020 – March 2025**
Granular Data Inc. — *Cambridge, MA, USA*

- Sold company in March 2025 to the **largest insurance adjusting firm in the U.S.**, following significant traction in defense and insurance tech sectors.
- **Led** the research and software development team, driving cutting-edge innovation and ensuring seamless technical execution across strategic projects.
- Served as **Principal Investigator (PI)** for a **$750K defense contract** with the U.S. Air Force Research Lab (AFRL) and Space Dynamics Lab, spearheading the development of **GeoEngine**, a first-of-its-kind geospatial AI platform now widely adopted by **U.S. Department of Defense agencies, property restoration firms, insurance tech companies, and academic institutions**.
- Secured a **$100K grant from the National Geospatial-Intelligence Agency (NGA)** to advance research in geospatial AI.
- Spent **three years in the B2G sector**, successfully delivering on defense contracts with AFRL, followed by **one year transitioning** B2G geospatial AI models, satellite data, and platforms into **B2B applications** for insurance and property restoration.
- Managed a **30-person cross-functional team** across research, engineering, and operations, ensuring efficient collaboration and execution of large-scale, high-impact initiatives.
- **Filed two patents** in automated property measurement and multi-view synthesis, in addition to **one granted patent and three pending patents**.
- Published **18 peer-reviewed research papers**, advancing the fields of geospatial AI and computer vision.
- Built a **multi-view synthesis model** to measure roofs using top-down aerial imagery and oblique mobile photos. Integrated **LLMs and Retrieval-Augmented Generation (RAG)** to interpret local building codes in the context of property inspections, cross-referencing with visual data to generate comprehensive insurance claims documentation.
- Developed a **custom-trained damage detection model** capable of identifying **127 distinct damage types** in roof shingles and components, optimized for **multi-resolution drone and mobile imagery**.

Research Intern — **Sept 2018 – July 2019**
Schneider Electric & INRIA — *Paris, France*

- **Investigated** the feasibility of using **neural networks** to model **electrical motor dynamics**, enhancing advanced control system solutions.
- **Translated research** into an **ANRT CIFRE grant application** for further development.
- **Resulted in** a **paper published in AAAI** and the successful award of an **ANRT CIFRE grant for a Ph.D.**

Junior Research Fellow — **May 2017 – Aug 2018**
Indraprastha Institute of Information Technology Delhi — *Delhi, India*

- Vision models for *Human Pose, Shape, and Motion.*
- Published two papers on egocentric videos and fashion understanding.

Research Areas

Computer Vision, Multimodal Learning, Reinforcement Learning, Energy-Efficient Neural Networks, Optimization Techniques for Learning-Based Control Systems, Anthropomorphic Dexterous Systems, Egocentric Video Understanding

Teaching Experience

- **Course Instructor, CentraleSupélec:** MVA-DL (3A-MDS-E2-DL), Fall 2023. Created course content, assignments, and projects with two professors and three TAs; organized lab sessions with DeepMind, Meta AI, and Cohere AI. With Prof. Maria Vakalopoulou and Prof. Stergios Christodoulidis.
- **Teaching Assistant, CentraleSupélec:** Machine Learning (2EL1730), Spring 2019–2023. Organized annual in-class Kaggle competitions. With Prof. Fragkiskos D. Malliaros.
- **Teaching Assistant, CentraleSupélec:** MSc Artificial Intelligence, Fall 2022. With Prof. Maria Vakalopoulou.
- **Teaching Assistant, CentraleSupélec:** FDL-DSBA, Fall 2020–2021. With Prof. Maria Vakalopoulou.
- **Teaching Assistant, CentraleSupélec:** MSc Machine Learning, Fall 2019–2022. With Prof. Fragkiskos D. Malliaros.
- **Teaching Assistant, CentraleSupélec:** Introduction to Deep Learning (Intro-DL), Spring 2020. With Prof. Maria Vakalopoulou.
- **Teaching Assistant, CentraleSupélec:** Foundations of Machine Learning (DSBA-FML), Fall 2020. With Prof. Maria Vakalopoulou.
- **Teaching Assistant, IIIT Delhi:** Deep Learning (CSE641), Winter 2017. First deep learning course at IIITD; set up the initial in-class deep learning cluster. With Prof. Chetan Arora and Prof. Saket Anand.
- **Teaching Assistant, IIIT Delhi:** Data Structures and Algorithms (CSE102), Winter 2016.
- **Teaching Assistant, IIIT Delhi:** Introduction to Programming (CSE101), Monsoon 2015.

Selected Publications

- **S Verma**, μ-Dex: Learning Dexterous Control Embeddings from Egocentric Demonstrations, *Submitted to WACV 2026*.
- **S Verma**, Predictive Joint-Embedding of sEMG and Pose for Robust Gesture Representation, *Submitted to AAAI 2026*.
- **S Verma**, EMG Signals to Tendon Control Forces for MyoHand Actuation, *RAS 2025*.
- **S Verma**, *emg2tendon*: From sEMG Signals to Tendon Control in Musculoskeletal Hands, *RSS 2025*.
- **S Verma**, K Gupta Post Wildfire Burnt-Up Detection using Siamese UNet, *ECML PKDD Workshop 2023*.
- K Gupta, **S Verma** Shrink & Cert: Bi-Level Optimization for Certified Robustness, *ICML Workshop 2023*.
- K Gupta, **S Verma**, CertViT: Certified Robustness of Pre-Trained Vision Transformers, *ICML Workshop 2023*.
- A Panigrahi, **S Verma**, M Terris, M Vakalopoulou Have Foundational Models Seen Satellite Images?, *IGARSS 2023*.
- M Terris, **S Verma** Investigating Model Robustness Against Sensor Variation, *IGARSS 2023*.
- **S Verma**, K Gupta, Robustness of Neural Networks used in Electrical Motor Time-Series, *NeurIPS Workshop 2022*.
- **S Verma**, N Henwood, M Castella, JC Pesquet Can GANs Recover Faults in Electrical Motor Sensors?, *ICLR Workshop 2022*.
- **S Verma**, N Henwood, M Castella, JC Pesquet Neural Speed-Torque Estimator for Induction Motors in the Presence of Measurement Noise, *IEEE TIE 2022*.
- **Verma et. al.** Europa: Increasing Accessibility of Geospatial Datasets, *IGARSS 2022*.
- **Verma et. al.** GeoEngine: A Platform for Production-Ready Geospatial Research, *CVPR 2022*.
- Lassau et. al. Integrating Deep Learning CT-Scan Model, Biological and Clinical Variables to Predict Severity of COVID-19 Patients, *Nature Communications 2020*.
- **S Verma**, JC Pesquet Sparsifying Networks via Subdifferential Inclusion, *ICML 2021*.
- **S Verma**, A Panigrahi, S Gupta QFabric: Multi-Task Change Detection Dataset, *CVPR Earthvision 2021*.
- **S Verma**, S Singh, A Majumdar Multi-Label LSTM AutoEncoder for Non-Intrusive Appliance Load Monitoring, *EPSR 2021*.
- **S Verma**, N Henwood, M Castella, JC Pesquet Neural Networks based Speed-Torque Estimators for Induction Motors and Performance Metrics, *IECON 2020*.
- **Verma et. al.** Modeling Electrical Motor Dynamics using Encoder-Decoder with Recurrent Skip Connection, *AAAI 2020*.
- M Papadomanolaki, **S Verma**, M Vakalopoulou, S Gupta, K Karantzalos Detecting Urban Changes with Recurrent Neural Networks from MultiTemporal Sentinel-2 Data, *IGARSS 2020*.
- **S Verma**, S Singh, A Majumdar Multi Label Restricted Boltzmann Machine for Non-Intrusive Load Monitoring, *ICASSP 2019*.
- **S Verma**, S Anand, C Arora, A Rai Diversity in Fashion Recommendation using Semantic Parsing, *ICIP 2019*.
- **Verma et. al.** Making Third Person Techniques Recognize First-Person Actions in Egocentric Videos, *ICIP 2019*.
- Jammi et. al. Tooling Framework for Instantiating Natural Language Querying System, *VLDB 2019*.

Patents

- **S Verma**, M Castella, JC Pesquet, N Henwood, AK Jebai Method for Training a Model Able to Predict a Corrected Time Series Signal (EP4418165A1), *2024*.
- **S Verma**, S Gupta Geospatial Intelligence Platform (2023081362), *2023*.

Grants, Funding Sources, & Awards

- 2024: Winner in ECCV Map-Free Challenge.
- 2023: Awarded Google TPU Research Grant ($420,000).
- 2023: Won Best Method in the 1st Workshop on Maritime Computer Vision (MaCVi) at WACV.
- 2023: Received CHABUD Most Innovative Solution Award at ECML-PKDD.
- 2021: Secured Capital Innovator Grant from the National Geospatial Agency (NGA), USA ($120,000).
- 2020: Principal Investigator for U.S. Air Force Research Lab (AFRL) and Space Dynamics Lab (SDL) contract ($750,000).
- 2020: Won Techstars Boston Winter Founders Award ($120,000).
- 2019: Winner of the Hyperspace Challenge hosted by Air Force Research Lab (AFRL) and IARPA, USA.
- 2019: Awarded CIFRE Scholarship by ANRT, France.
- 2019: Awarded in Hyperspace Challenge by U.S. AFRL ($10,000).
- 2019: PRAIRIE Young Researcher Scholarship by Meta AI, France.

Mentorship

- **Master's Students, Liverpool John Moores University:** Aakaash Panigrahi (2023, *EvalSports*), Shubham Goswami (2023, *Level AI*), Nitin Bhojwani (2022, *Clarifai*)
- **Bachelor's Students, IIT Gandhinagar:** Muhammad Yusuf Hassan (2024, *UMass Amherst*), Hitesh Jain (2024, *Infilect AI*), Progyan Das (2024, *Microsoft Research*), Siddhesh Kanawade (2024, *Granular AI*), Shweta Pardeshi (2021, *UC San Diego*), Kavita Vaishnaw (2021, *Google*)

Contributions

- **Area Chair:** International Conference on Artificial Neural Networks (ICANN), 2021
- **Reviewer:** NeurIPS (24, 23, 22), ICML (25, 23), AISTATS 23, AAAI (24, 23, 22), ICLR 22, TCSVT (21, 20), CVIU 20

Skills

Python, C++, MATLAB, PyTorch, JAX, FastAPI, ReactJS, NodeJS, MongoDB, Kubernetes, LaTeX, Additive and Subtractive Manufacturing Techniques