Siba Smarak Panigrahi

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Education

M.Sc. (Thesis) in Computer Science **2022–Ongiong**
McGill University and Mila, Montréal, Canada (Supervisor: Siamak Ravanbakhsh) *GPA: 4.0/4.0*

B.Tech. in Computer Science and Engineering **2018–2022**
Indian Institute of Technology, Kharagpur, India *GPA: 9.73/10*
Department Rank **2** in graduating batch of CSE students (Supervisor: Abir Das, Rameswar Panda).

All India Senior School Certificate Examination (AISSCE) **2018**
Kendriya Vidyalaya Sangathan (KVS), India *98.6%*
Secured AIR 3, Rank 1 in Bhubaneswar Region. Among the top 0.1% of the 1.16 million candidates.

Research Interests

Geometric Deep Learning, Generative Models, Reinforcement Learning

Research Experience

Diffusion Models in Offline Reinforcement Learning **Mila**
Supervisor(s): Prof. Stefan Bauer, Francesco Quinzan, Andrea Dittadi *Aug 2023 - Ongoing*
Training diffusion models to generate and augment novel trajectories for underexplored behaviours in offline RL datasets. The aim is to address the problem of distributional shift and learn better generalizing policies with a diverse dataset.

Equivariant Adaptation of Large Pretrained Models **Mila and McGill University**
Supervisor(s): Prof. Siamak Ravanbakhsh *Feb 2023 - Ongoing*
Implemented equivariant canonicalization networks to orient inputs to a canonical form before passing through pretrained models, effectively eliminated the requirement for designing and training extensive equivariant architectures from scratch.

Visual Grounding in Textual Entailment **IIT Kharagpur**
Bachelor's Dissertation | Supervisor(s): Prof. Abir Das, Dr. Rameswar Panda *Jan 2022 - May 2022*
Investigated the effect of simultaneously and individually visual grounding the premise and hypothesis in NLI task. Trained various BERT configurations by leveraging high-level feature representations of image from ResNet-50 and CLIP.

Contextual Bias in Visual Recognition Models **IIT Kharagpur**
Supervisor(s): Prof. Abir Das, Dr. Rameswar Panda (MIT-IBM Watson AI Lab) *Apr 2021 - Dec 2021*
Evaluated mAP and used GradCAM with state-of-the-art computer vision models to quantitatively and qualitatively determine the contextual bias in images containing exclusive and co-occurring biased pairs. Proposed different biased models to inherently capture contextual bias and knowledge distillation approaches for automated bias mitigation.

Explanation Based Learning in Pretrained Language Models **INK-Lab, USC**
IUSSTF-Viterbi Intern | Supervisor: Prof. Xiang Ren *Jun 2021 - Sep 2021*
Worked on different attention-based regularization and knowledge-distillation techniques to analyze the effect of explanations generated using gradient-based saliency methods in the performance of Pre-trained Language Models.

Improving Digital Marketing with Topological Data Analysis **Adobe Research, India**
Research Intern | Supervisor: Iftikhar Ahamath Burhanuddin *May 2021 - Jul 2021*
Implemented Topological Regularization in LSTM Encoder-Decoder architecture to leverage the topological information from customer navigation patterns and obtain sessions' better latent representation to provide insights on sessions.

Emotion Recognition using EEG Signals **Bennett University, India**
Research Intern | Supervisor(s): Prof. Arpit Bhardwaj, & Divya Acharya *Jul 2020–Aug 2020*
Carried literature reviews of recent papers to understand the basics of Genetic Programming and Multi-Task Cascaded Networks. Designed CNN-based and LSTM-based architectures to obtain **87.72%** and **88.6%** mean accuracy, respectively, for classification of EEG signals into valence, arousal, liking, and dominance.

Publications

[5] **Equivariant Adaptation of Large Pretrained Models** (Paper | ServiceNow Blog)
A. K. Mondal*, **S. S. Panigrahi***, S-O. Kaba, S. Rajeswar, S. Ravanbakhsh
Conference on Neural Information Processing Systems (NeurIPS) 2023.

[4] **Efficient Dynamics Modeling in Interactive Environments with Koopman Theory** (Paper)
A. K. Mondal, **S. S. Panigrahi**, S. Rajeswar, K. Siddiqi, S. Ravanbakhsh
European Workshop on Reinforcement Learning (EWRL) 2023.

[3] **[Re]: Value Alignment Verification** (Paper | Code)
S. S. Panigrahi*, S. Patnaik*
ML Reproducibility Challenge (MLRC) 2021; NeurIPS 2022 Spotlight and Journal Showcase Track.

[2] **Leveraging Pre-trained Language Models for Key Point Matching** (Paper | Code)
M. N. Kapadnis*, S. Patnaik*, **S. S. Panigrahi***, V. Madhavan*, A. Nandy
EMNLP Workshop - Workshop on Argument Mining, 2021.

[1] **Multi-class Emotion Classification Using EEG Signals** (Paper | Code)
D. Acharya, R. Jain, **S. S. Panigrahi**, R. Sahni, S. Jain, S. P. Deshmukh, A. Bhardwaj
International Advance Computing Conference (IACC), 2020.

Key Projects

CausalBench: Inferring gene regulatory network with factor graphs **McGill University and Mila**
Causal Inference and ML Course Project | Instructor: Prof. Dhanya Sridhar

Studied the computational advantages and scalability potential of factor graphs in causal discovery (DCD-FG) for inferring Gene Regulatory Networks along with key factors such as sparsity regularization and the number of factors.

Crystal Symmetry aware framework for Material Generation **McGill University and Mila**
GGM Course Project | Instructor: Joey Bose and Prof. Prakash Panangaden

Implemented equivariant message-passing and knowledge distillation in complex graph encoders (such as DimeNet) to incorporate crystal symmetry (Bravais lattice) information in CDVAE framework for material generation.

Study of Facebook posts during Elections **MIT, USA**
Data Analytics Intern | Supervisor(s): Dr. Kiran Garimella (IDSS, MIT)
Prof. Aaditya Dar (ISB), & Vasundhara Sirnate (The Polis Project)

Designed a complete framework to simplify the study of Facebook posts during elections. Analyzed page characteristics and post reactions from various politics-related Facebook pages and their correlation with election results. Trained simple classification pipelines for assigning the most influenced political party to a post. (Code)

Academic Achievements & Honors

- **Google's CS Research Mentorship Program** (CSRMP) Class of 2023b (2023)
- **CIFAR Deep Learning + Reinforcement Learning** (DLRL) **Summer School** (2023)
- **The Cornell, Maryland, Max Planck Pre-doctoral Research School** (CMMRS) (2023)
- **Oxford ML Summer School** (OxML) (Healthcare track) (2023)
- **Jamsetji Nusserwanji Tata** (JN Tata) **Scholar** (endowment for higher studies) (2022)
- **Eastern European Machine Learning** (EEML) **Summer School** (selected for poster presentation) (2022)
- **Research Week with Google (Computer Vision track)** (1 of 150 selected students) (2022)
- **Prof. J.C. Ghosh Memorial Endowment Prize** (highest CGPA after semester VI) (2021)
- **Indo-US Science and Technology Forum (IUSSTF) - Viterbi** Award (1 of 15 awardees) (2021)
- **DAAD-WISE scholarship**, **University of Freiburg** (declined) (2021)
- **Inter IIT Tech Meet 9.0** (Bronze-winning contingent of IIT Kharagpur) (2021)
- **Open IIT Maths Olympiad** (Team event; 1st position, Gold Medal) (2019)
- **Technology Alumni Association (Delhi Chapter) Award** (highest CGPA after semester II) (2019)
- **Jagadis Bose National Science Talent Search Examination** (Rank 2 of 173 awardees) (2018)
- **Kishore Vaigyanik Protsahan Yojana** (All India Rank 828) (2017)
- **Guest of the Hon'ble Prime Minister of India** to witness Republic Day Parade (2017)
- **KVS Junior Mathematical Olympiad** (Rank 6 in India; Rank 1 in Bhubaneswar region) (2016)
- **Regional Mathematical Olympiad** (Rank 2 in state) (2016)
- **Exchange Student, Sakura Exchange Program in Science** (1 of 90 selected students) (2016)

Relevant Coursework

Mathematics - Linear Algebra, Calculus, Probability, and Statistics
Computer Science - Causal Inference and ML, Geometry and Generative Models (GGM), Probabilistic Graphical Models, Network Science, Deep Learning, Machine Learning, Reinforcement Learning, Natural Language Processing (NLP), Information Retrieval, Principles of Programming Languages, Computer Networks*, Operating Systems*, Algorithms - I* & II, Cryptography & Network Security, Theory of Computation, Compilers*, Software Engineering* (* includes lab component)

Skills

- **Programming Languages** - Python, C, Java, LaTeX, Verilog, MIPS
- **Libraries** - PyTorch, PyTorch Lightning, PyTorch Geometric, Gym, Keras, Huggingface, Timm, Hydra
- **Web Development** - Django, HTML, CSS, Bootstrap, PostgreSQL

Activities and Leadership

Member, Mental Health Committee, Mila
Head, Kharagpur Data Analytics Group (KDAG), IIT Kharagpur (Reading-sessions)
Head, Institute Wellness Group, IIT Kharagpur (Facebook)
Head Boy, Student Council, KV No.2 CRPF Campus, Bhubaneswar

Professional Services

- **Organizing**: ML Reproducibility Challenge (MLRC) 2023, CampusPulse (sponsored **CA$ 6000** GCP credits), Molecular ML Conference (MoML) 2023
- **Volunteering**: DNetCV 2022 (CVPR-Workshop), EMNLP 2021
- **Reviewer**: NeurReps 2023 (NeurIPS-Workshop), MoML 2023, MLRC 2022 (Outstanding Reviewer), DNetCV 2022 (CVPR-W)
- **Posters/Talks**:
  - European Workshop on Reinforcement Learning (EWRL) 2023, VU Brussel (Poster, 2023)
  - NeurIPS 2022 Journal Showcase Track (and Spotlight lightning talks) (Poster & Talk, 2022)
  - 50^{th} Anniversary of School of Computer Science, McGill University (Poster, 2022)
  - KDAG Winter Workshop, lecture on Support Vector Machines (Talk, 2020)