Eklavya Sarkar

PhD Candidate

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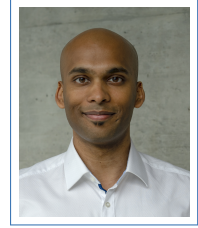
Research Interests

Deep Learning, Self-Supervised Learning, Speech Processing, Computer Vision

Work Experience

2021–Present **Research Assistant**, *Idiap Research Institute*, Martigny, CH
Supervisor: Dr. Mathew Magimai Doss, Senior Researcher, Speech and Audio Processing
- Topic: Audio Segmentation Methods for Analyzing Vocal Communication.
- Project: Swiss National Science Foundation's *NCCR Evolving Language*.

2020 – 21 **Research Intern**, *Idiap Research Institute*, Martigny, CH
Supervisor: Dr. Sébastien Marcel, Senior Researcher, Biometrics Security and Privacy
- Investigated vulnerabilities of modern facial recognition systems against deepfake attacks.
- Implemented additional losses to StyleGAN2 to generate identity-conserving morphs.

2017 **Research Intern**, *CERN*, Geneva, CH
Supervisor: Dr. Archana Sharma, Principal Scientist, CMS Experiment
- Refined production code efficiency by completing pull requests on data acquisition tools.
- Contributed to open-source data acquisition tools and radiation physics R&D experiments.

Education

2021–Present **PhD Machine Learning**, *Ecole Polytechnique Fédérale de Lausanne*, CH.
2018 – 19 **MSc Data Science**, *University of Bath*, UK, Distinction.
2015 – 18 **BSc Computer Science**, *University of Liverpool*, UK, Distinction.

Publications

Interspeech **Sarkar et al.**, *Unsupervised Voice Activity Detection by Modeling Source and System Information using Zero Frequency Filtering*, 2022.

ICASSP **Sarkar et al.**, *Are GAN-based Morphs Threatening Face Recognition?*, 2022.

Thesis

MSc **Optimising Facial Information Extraction and Processing using Deep Learning**
Grade: Distinction

BSc **Unsupervised Learning: Kohonen Self-Organizing Maps**
Grade: Distinction

TM **Exoplanets: Discoveries and Prospects**
Grade: Distinction

Academic Projects

NLP **Toxic Comment Classification**
- Attempted to solve Kaggle competition with beyond *off-the-shelf* implementations.
- Compared approaches such as Log Regression, Trees, LSTMs with baseline Naive-Bayes.

RL **Flappy Bird Deep Q-Learning Network**
- Trained model to play Flappy Bird using a DQN, and surpassed human level performance.
- Refined optimal policy with Experience Replay and Deep Deterministic Policy Gradients.

NLP **Open Information Relation Extraction**
- Summarised body of text by training a ML speech tag classifier using Glove word vectors.
- Improved model by coding backtracking, Viterbi algorithm, Adam optimiser from scratch.

Leadership Experience

2022–23 **Organizer**, *Perspectives on AI Workshop Series*, Idiap Research Institute.
- Finding sponsors, bi-weekly meetings, budgeting, designing website.

2017–18 **President**, *Students Residence Society*, University of Liverpool
- Elected President of a student residence by ballot vote majority to represent 270 students.
- Led ten member committee, generated team vision, chaired meetings, managed events.

Teaching and Supervision

2021–Present **Teaching Assistant**, Master in Artificial Intelligence, UniDistance Suisse
- Module: *Introduction to Speech Processing* (4 ETCS).
- Graded assignments and exams, provided feedback.

Awards

Aug 2020 **International Create Challenge**, *3rd Prize*, AI-Hackathon
Adversarial Attack Detection and Model Robustness

Talks

Nov 2020 Deepfake Attacks, *Idiap*
Institute-wide Presentation

Oct 2013 Exoplanets, *CERN, Univers de Particules Museum*
Invited Speaker

Programming Skills

Languages Python, Java, Javascript, PHP, SQL, C++, C#, TEX, HTML, CSS.
Frameworks PyTorch, Lightning, TensorFlow, Keras, SkLearn, D3.js.
Misc. Git, Unix, SGE, Jupyter, Kaggle, Colab, xCode, Eclipse.

Languages

Fluent English, French, Hindi.
Intermediate German.