Eklavya Sarkar

PhD Candidate

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https://eklavyafcb.github.io
Nationality: Swiss

Research Interests

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

Work Experience

2021–Present **Research Assistant (PhD Candidate)**, *Idiap Research Institute*, Martigny, CH
Supervisor: Dr. Mathew Magimai Doss, Senior Researcher, Speech and Audio Processing.

- *Thesis*: Audio Segmentation Methods for Analyzing Vocal Communication.
- *Project*: Swiss National Science Foundation's *NCCR Evolving Language*.
- *Topics*: Voice activity detection, diarization, bio-acoustics, self-supervised learning.

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.
- Generate novel types of face morphs by implementing additional losses to StyleGAN2.

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, (5.4/6.0).

2018 – 19 **MSc Data Science**, *University of Bath*, UK, Distinction.

2015 – 18 **BSc Computer Science**, *University of Liverpool*, UK, Distinction.

Publications

Interspeech **Sarkar, E.**, Magimai-Doss, M. (2023), *Can Self-Supervised Neural Representations Pre-Trained on Human Speech distinguish Animal Callers?*

Interspeech **Sarkar, E.**, Prasad, R., Magimai-Doss, M. (2022), *Unsupervised Voice Activity Detection by Modeling Source and System Information using Zero Frequency Filtering.*

ICASSP **Sarkar, E.**, Korshunov, P., Colbois, L. and Marcel, S. (2022), *Are GAN-based Morphs Threatening Face Recognition?*

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

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.

NLP **Toxic Comment Classification**
- Implemented approaches such as Log Regression, Trees, LSTMs, Naive-Bayes.

Leadership Experience

2022–23 **Organizer**, *Perspectives on AI Symposium Series*, Idiap Research Institute.
- Participated in organization: finding sponsors, budgeting, designing the event 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.

Academic Duties and Mentorship

Fall '21, '22 **Lead Teaching Assistant**, Master in Artificial Intelligence, UniDistance Suisse
- Module: *Introduction to Speech Processing* (4 ETCS), by Dr. Magimai-Doss.
- Led TAs to grade assignments, exams, and provide critical feedback.

Exam Proctor, Ecole Polytechnique Fédérale de Lausanne.

Reviewer, IEEE Transactions on Technology and Society (2021).

Awards

Aug 2020 **International Create Challenge**, *3rd Prize*, AI-Hackathon. Adversarial Attacks Detection.

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, W&B, Mamba/Conda, SGE, Jupyter, Kaggle, Colab, xCode, Eclipse.

Languages

Fluent: English, French, Hindi. Intermediate: German.