Kleanthis Avramidis

3710 McClintock Ave., RTH 318 Los Angeles, CA 90089, United States ✓ avramidi@usc.edu♦ klean2050.github.io

 $\begin{array}{c} {\rm RESEARCH} \\ {\rm INTERESTS} \end{array}$

Physiological and Biomedical Signal Processing, Music Information Retrieval Multimodal Representation Learning, Self-supervised Learning, Affective Computing

EDUCATION

PhD in Computer Science

08/2021 - Present

University of Southern California (USC), Los Angeles, CA

Advisor: Prof. Shrikanth Narayanan

Current GPA: 3.90/4

Joint BSc & MEng in Electrical Engineering

10/2015 - 07/2021

National Technical University of Athens (NTUA), Greece $\,$

Advisor: Prof. Petros Maragos

GPA: 8.40/10 (top 12%), Specialization GPA: 9.14/10

RESEARCH PROJECTS

PRECOG: Multimodal Integration of Neural and Biobehavioral Signals for Predicting Preconscious Responses 05/2023 - Present

USC - UCLA

- Developing representation learning models for brain activity signals (EEG)
- Analysis of human physiology (ECG, GSR, eye-tracking) in controlled settings
- Inference on detecting biomarkers of depression and suicidal ideation

Sensor Fusion for Affective State Detection in Driving 05/2022 - Present USC – Toyota Research Institute NA – MIRISE

- Developing methods for sensor fusion & self-supervision on physiological signals
- Coordinating multiple data collection processes in the driving setting
- Applied methods for Time-Series Segmentation and Clustering to detect change points in drivers' affective state; authored 1 article

CVI Evaluation through Eye-tracking Technology

02/2022 - Present

USC – Children's Hospital Los Angeles

• Designing maps of visual saliency on stimulus images to assess differences of Cortical Visual Impairment (CVI) cases against controls

Automatic Differentiation of Pediatric Papilledema

02/2022 - 08/2023

USC - Children's Hospital Los Angeles - External Sites

- Building deep learning models to differentiate Papilledema from pseudo-cases in challenging pediatric cases, with data collected from multiple sites
- Contributed 1 publication and 2 abstracts within an interdisciplinary team

Wearable Bio-sensing for Family Well-being

10/2021 - 08/2023

UT Austin – Texas A&M – USC

- Configured scripts to clean and process raw data from multiple wearable sensors
- Leading the development of statistical and learning methods to identify predictive elements of family reported well-being and conflict
- Contributing and cooperating with collaborators from the Psychology field
- Expanding methodologies to relevant projects on assessing workplace stress

Diploma Thesis, NTUA

05/2020 - 07/2021

Title: Affective Analysis and Interpretation of Brain Responses to Music Stimuli

- Applied elements of Multiscale Fractal Analysis to extract affective characteristics from musically-induced EEG signals. Authored 1 publication.
- Developed multimodal models to connect music audio and EEG features using adversarial and contrastive learning objectives. Authored 1 publication.

WORK EXPERIENCE

Signal Analysis and Interpretation Lab

08/2021 - Present

University of Southern California, Los Angeles, CA

Graduate Research Assistant, under Prof. Shrikanth Narayanan

- Building a multi-step training framework for audiovisual learning of music representations from official video clips, authored 1 abstract and poster
- Coordinator of project-wise lab and colab meetings, research mentor of a master's student and a sophomore student in Electrical Engineering

Toyota Research Institute North America

05/2023 - 08/2023

Toyota Motor North America, Ann Arbor, MI

Research and Development Co-op, under Paul Schmalenberg, MSc

- Developed methods for sensor fusion & anomaly detection on biosignals
- Created machine learning models for contact-less heart rate estimation
- Coordinated machine learning software for physics-informed AI applications

Computer Vision, Speech & Signal Processing Lab

07/2019 - 07/2021

National Technical University of Athens, Greece

Undergraduate Research Assistant, under Prof. Petros Maragos

• Conducted Research in Musical Instrument Recognition Co-authored 2 publications, completed my MEng Diploma Thesis

SKILLS

Programming Languages: Python, C++, MATLAB, LATEX

Tools and Libraries: Unix, Git, Jupyter, PyTorch, Pandas, Scipy, Librosa, PyDub, ts-learn, scikit-learn, scikit-image, OpenCV, Transformers

Service: IEEE (Graduate Student Membership, Reviewer: ICASSP), ACM (Student

Membership, Reviewer: TOMM), ISRE 2022: Student Volunteer

Languages: Greek (native), English, German

HONORS AWARDS

☆ Future Vision Forum Award

10/2022

Acceptance and grant to participate with a poster presentation at invitation-only Symposium of Human-Centric Computing in Ophthalmology

☆ Oxford Summer School in Machine Learning 2022

08/2022

Accepted to participate at the Machine Learning for Healthcare track

☆ Second Prize @ NEUROHACK 2022

01/2022

Award for a Machine Learning model that identifies and utilizes important biomarkers in predicting Dementia

☆ Computer Science PhD Fellowship

08/2021

University of Southern California

☆ A Great Moment for Education

01/2016

Award and Grant from Eurobank EFG for the highest University Entrance Examination Score of my High School

TALKS EVENTS

1. Society for Affective Science Annual Conference (SAS 2023)

Talk: "Psychophysiology Sensing via Wearables to model Family Well-being" March 2023, Long Beach, CA

2. 2022 Future Vision Forum: Human-Centric Computing

Poster: "Deep Learning Modeling to differentiate Papilledema from Pseudopapilledema in Pediatric Cases" November 2022, Los Angeles, CA

3. International Society for Research on Emotion (ISRE 2022)

Poster: "Context-aware Representations of Affect in Media from Music and Visual Streams: A Self-supervised Approach"

July 2022, Los Angeles, CA

PUBLICATIONS

- K. Avramidis, Dominika Kunc, Bartosz Perz, Kranti Adsul, Tiantian Feng, Przemysław Kazienko, Stanisław Saganowski, and Shrikanth Narayanan "Scaling Representation Learning from Ubiquitous ECG with State-Space Models" arXiv preprint arXiv:2309.15292 (currently under review), 2023
- S. Stewart, K. Avramidis, T. Feng, and S. Narayanan "Emotion-Aligned Contrastive Learning Between Images and Music" arXiv preprint arXiv:2308.12610 (currently under review), 2023
- 3. **K. Avramidis**, T. Feng, D. Bose, and S. Narayanan "Multimodal Estimation of Change Points of Physiological Arousal in Drivers" *Proc. Int'l Conf. on Acoustics, Speech and Signal Processing Workshops*, 2023
- 4. K. Avramidis, K. Adsul, D. Bose, and S. Narayanan "Signal Processing Grand Challenge 2023–E-Prevention: Sleep Behavior as an Indicator of Relapses in Psychotic Patients" Proc. Int'l Conf. on Acoustics, Speech and Signal Processing (ICASSP), 2023
- K. Avramidis, S. Stewart, and S. Narayanan
 "On the Role of Video Context in Enriching Music Representations"
 Proc. Int'l Conf. on Acoustics, Speech and Signal Processing (ICASSP), 2023
- K. Avramidis, M. Rostami, M. Chang, and S. Narayanan "Automating Detection of Papilledema in Pediatric Fundus Images with Explainable Machine Learning" Proc. Int'l Conf. on Image Processing (ICIP), 2022.
- K. Avramidis, C. Garoufis, A. Zlatintsi, and P. Maragos
 "Enhancing Affective Representations of Music-Induced EEG through
 Multimodal Supervision and Latent Domain Adaptation"
 Proc. Int'l Conf. on Acoustics, Speech and Signal Processing (ICASSP), 2022.
- 8. **K. Avramidis**, A. Zlatintsi, C. Garoufis, and P. Maragos "Multiscale Fractal Analysis on EEG Signals for Music-Induced Emotion Recognition" *Proc. European Signal Processing Conference (EUSIPCO)*, 2021.
- 9. **K. Avramidis**, A. Kratimenos, C. Garoufis, A. Zlatintsi, and P. Maragos "Deep Convolutional and Recurrent Networks for Polyphonic Instrument Classification from Monophonic Raw Audio Waveforms" *Proc. Int'l Conf. on Acoustics, Speech and Signal Processing (ICASSP)*, 2021.
- 10. A. Kratimenos, **K. Avramidis**, C. Garoufis, A. Zlatintsi, and P. Maragos "Augmentation Methods on Monophonic Audio for Instrument Classification in Polyphonic Music"

 Proc. European Signal Processing Conference (EUSIPCO), 2020.