Kleanthis Avramidis

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RESEARCH INTERESTS

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

1. **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
2. 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
5. **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
6. **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.
7. **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.