Apostolos Kalatzis

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I am a Ph.D. candidate at the Gianforte School of Computing with training in computational physiology, machine learning, robotics, and human factors. My research involves human subjects, wearable technology and the design of machine learning models to better augment human cognition in Human-Computer, and Human-Robot interactions.

EDUCATION

Montana State University, Bozeman, Montana , USA

- Ph.D. in Computer Science — Aug 2019- Present
  - Advisor: Dr. Laura Stanley
  - Focus: Human-Computer Interaction, Human-Robot Interaction, Affective Computing, Cognitive Workload

California State University, Los Angeles, Los Angeles, California , USA

- M.Sc. in Computer Science — Aug 2016 – May 2019
  - Advisor: Dr. Mohammad Pourhomayoun
  - Focus: Machine Learning, Dimension Reduction.
  - Cumulative GPA: 3.7 / 4.00

University of West Attica, Athens, Greece

- B.S. in Computer Engineering — Feb 2007 – Sep 2013
  - Supervisor: Prof. Michael Glabedakis
  - Thesis: Executive Construction, Equipment Design, Functional and safety specifications of Police Criminal Investigation Department.

RESEARCH EXPERIENCE

Montana State University, Bozeman, PI: Dr. Laura Stanley — Aug 2019 – Present

- NSF Grant (AMELIA) : Student lead at Montana State University - Bozeman
- Developed affective recognition models for predicting clam and stress states in VR.
- Developed machine learning models for cognitive workload recognition.
- Developed methods for personalizing human-system interactions using a two-Layer multimodal approach.
- Designed methods and machine learning models for real time Cognitive Workload recognition and robot adaptation in Human-Robot Collaboration.
- Monitored Task Performance in Human-Robot Collaboration Under Varying Levels of Cognitive Workload and User Interface Information Exchange.
- Developed UI in Mixed Reality for Effective Human-Robot Collaboration.

California State University, Los Angeles, PI: Dr. Mohammad Pourhomayoun — Jan 2018 – May 2019

- Supervisors: Prof. Mohammad Pourhomayoun
- Thesis: Interactive Dimensionality Reduction in Remote Health Monitoring system.
- Designed advanced algorithms based on machine learning for monitoring patients with chronic diseases.
- Created advanced data analytics methods to predict health conditions and providing clinical interventions with the goal of preventing medically adverse events.

PUBLICATIONS

PEER REVIEW CONFERENCE PAPERS

[1] Apostolos Kalatzis, Vishnunarayan G. Prabhu, Saidur Rahman, Mike Wittie and Laura Stanley. Emotions Matter: Towards Personalizing Human-System Interactions Using a Two-Layer Multimodal Approach. *In Proceedings of the 2022 ICMI Conference on Multimodal Interaction*, 2022.

[2] Saidur Rahman, Apostolos Kalatzis, Mike P. Wittie, David L. Millman, and Laura Stanley. Dynamic Checkpoint Initiation in Serverless MEC. *In 2022 IEEE International Conference on Omni-layer Intelligent Systems (COINS)*, 2022.

[3] Saidur Rahman, Apostolos Kalatzis, Mike Wittie, Ahmed Elmokashfi, Laura Stanley, Stacy Patterson, David L Millman. Short and Sweet Checkpoints for C-RAN MEC. *In 2021 IEEE Cloud Summit (Cloud Summit)*, 2021.

[4] Apostolos Kalatzis, Ashish Teotia, Vishnunarayan G. Prabhu, and Laura Stanley. A Database for Cognitive Workload Classification using Electrocardiogram and Respiration Signal. *In International Conference on Applied Human Factors and Ergonomics*, 2021.

[5] Apostolos Kalatzis, Laura Stanley, Rohith Karthikeyan, and Ranjana K. Mehta. Mental stress classification during a motor task in older adults using an artificial neural network. *In Adjunct Proceedings of the 2020 ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2020 ACM International Symposium on Wearable Computers*, 2020.

[6] Apostolos Kalatzis, Bobak Mortazavi, and Mohammad Pourhomayoun. Interactive Dimensionality Reduction for Improving Patient Adherence in Remote Health Monitoring. *In Proceedings of 5th Annual Conference on Computational Science and Computational Intelligence*, Las Vegas, Nevada, USA, 2018.

WORKSHOP PAPERS

[1] Yoo SangSeo, Apostolos Kalatzis, Navid Amini, Zilong Ye, and Mohammad Pourhomayoun. Interactive Predictive Analytics for Enhancing Patient Adherence in Remote Health Monitoring. In *the 8th ACM MobiHoc2018 Workshop on Pervasive Wireless Healthcare*, Los Angeles, California, USA, 2018.

POSTER PAPERS

[1] Apostolos Kalatzis, Mohammad Vahedi, and Mohammad Pourhomayoun. Interactive Learning for Data Acquisition in Remote Health Monitoring. *In Proceedings of 2019 NASA Direct STEM Annual Symposium*, California State University,Los Angeles, California, USA, 2019.

[2] Apostolos Kalatzis, Ashish Teotia, Vishnunarayan G. Prabhu, and Laura Stanley. Classifying Affective States in Virtual Reality Environments Using Electrocardiogram and Respirational Signals. *In 2021 IEEE International Conference on Artificial Intelligence and Virtual Reality (AIVR)*, 2021.

IN PRESS

[1] Apostolos Kalatzis, Sarah Hopko, Ranjana K. Mehta, Mike P. Wittie and Laura Stanley. Sex Parity in Cognitive Fatigue Model Development for Effective Human-Robot Collaboration. *In 2022 IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS*, 2022.

UNDER REVIEW

[1] Apostolos Kalatzis, Saidur Rahman, Mike Wittie and Laura Stanley. A Real-time Machine Learning and Edge Computing Framework for Real-Time Cognitive Workload Detection and Co-Robot Adaptation. *ACM Transactions on Human-Robot Interaction (THRI)*, 2022.

TO BE SUBMITTED

[1] Apostolos Kalatzis and Laura Stanley. An Augmented Reality UI for Pick and Place Guidance in Human Robot Collaboration. *In IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS*, 2023.

[2] Apostolos Kalatzis, Mike Wittie, and Laura Stanley. Indentifying Optimal Robot Speed Adaptations With Respect to Cognitive Workload Limitations Using Q-learning. *ACM Transactions on Human-Robot Interaction (THRI)*, 2023.

[3] Apostolos Kalatzis, Saidur Rahman, Mike Wittie and Laura Stanley. The effect of Augmented Reality Assistance on Task Performance and Cognitive Workload in Multimodal Human-Robot Interactions. *ICMI Conference on Multimodal Interaction*, 2023.

TALKS AND PRESENTATIONS

Emotions Matter: Towards Personalizing Human-System Interactions Using a Two-Layer Multimodal Approach. ICMI Conference on Multimodal Interaction 2022

Sex Parity in Cognitive Fatigue Model Development for Effective Human-Robot Collaboration. International Conference on Intelligent Robots and Systems, IROS. 2022

Enhancing Human Cognition in Human-Robot Interaction. Gianforte School of Computing, Fall Seminar Talk. 2022 2022

Classifying Affective States in Virtual Reality Environments Using Electrocardiogram and Respirational Signals. IEEE International Conference on Artificial Intelligence and Virtual Reality (AIVR). 2021

A Database for Cognitive Workload Classification using Electrocardiogram and Respiration Signal. In International Conference on Applied Human Factors and Ergonomics. 2021

AI/ML in UX Design. Montana State University-Bozeman. 2021

Mental stress classification during a motor task in older adults using an artificial neural network. In the 2020 ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2020 ACM International Symposium on Wearable Computers. 2020

Interactive Dimensionality Reduction for Improving Patient Adherence in Remote Health Monitoring. 5th Annual Conference on Computational Science and Computational Intelligence. 2018

Interactive Predictive Analytics for Enhancing Patient Adherence in Remote Health Monitoring. In the 8th ACM MobiHoc2018 Workshop on Pervasive Wireless Healthcare. 2018

RESEARCH GRANTS

National Science Foundation 2028972: An Artificial Intelligence-Inspired Computing Application for Detecting the Early Onset of Pneumonia $255,315 - **Principal Investigator.**

AWARDS

- Meritorious Award, Montana State University 2019
  Outstanding new doctoral student.
- Recognition for actively engaging in Research, California State University, Los Angeles. 2019
- Undergraduate Researcher Award, University of West Attica 2013

PRESS AND NEWS COVERAGE

Montana State University News Service
MSU graduate student on frontier of adapting robots to work better with humans.
Montana State University News Service
MSU researchers win $1.2 million grant to improve worker-robot interaction.
ABC FOX Montana
MSU students study robotics to improve workforce.

PROFESSIONAL AFFILIATIONS & ACTIVITIES

Joint Honor Society,
Los Angeles, California, USA

- Member 2018 – Present

Greek Traditional Dances 2000 – Present

TEACHING EXPERIENCE

Graduate Teaching Assistant, Montana State University

- Social and Ethical Issues in Computer Science Fall 2019
  - Assisted head faculty member with classroom instruction material, exams, and record keeping.
  - Led, supervised, and planned recitations.
  - Managed course content through online Learning Management Systems.

Graduate Teaching Assistant, California State University, Los Angeles

- Advance Machine Learning, Advance Topics in Data Science Spring 2019
  - Assisted head faculty member with classroom instruction material, exams, and record keeping.
  - Lead, supervised, and planned Labs.
  - Managed course content through online Learning Management Systems.

OTHER WORK EXPERIENCE

Immersive Reality Group, Bozeman, MT, USA

- Data Scientist Apr 2021 – Oct 2022
  - Developed machine learning models for respiration infection diseases.
  - Built pipelines for physiological data collection, processing, and feature extraction.
  - Developed rule based algorithm for classifying respiration diseases based on human input.

AB Vasilopoulos, Vonitsa, Aitoloakarnania, Greece

- System Administrator Nov 2015 – Jul 2016
  - Configured, tested and maintained network equipment.
  - Planned and implemented upgrades to System hardware and software.
  - Maintained and monitored the server room, the wireless Network and other server infrastructure.

Vonitsa City Hall, Vonitsa, Aitoloakarnania, Greece

- Software Engineer Intern Sep 2013 – Aug 2014
  - Provided continued maintenance and development of bug fixes and patch sets for existing web applications.
  - Performed all testing and troubleshooting methods and documented resolutions in the system.
  - Wrote test cases so that the applications could be tested in a legitimate environment.

OUTREACH

What is Computer Science

- Harding high school
- West Yellowstone high school

SERVICE

Organizer

- Montana State University Department of Computer Science prospective student visit day spring 2020.
- MSU Department of Computer Science new graduate student orientation fall 2020.

Reviewer

- ACM International Conference on Multimodal Interaction, ICMI (2022)

MENTORING

Mentored 3 Undergraduate students over a span of 3 years leading an NSF Project

- Connor Marcus 2021- Present

- Now Sophomore in Computer Science.

- Kajia Coziar 2020- 2022
  - Now graduate student in Computer Science at Montana State University-Bozeman.
- Michael Wetherbee 2019- 2021
  - Now cloud engineer at FDM Group.

REFERENCES

- **Dr. Laura Stanley** Montana State University
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- **Dr. Mohammad Pourhomayoun**
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- **Dr. Mike Wittie**
  Chief Scientist at BLOCKY
  Bozeman, Montana
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