2022 IEEE/ACM Conference on Connected Health: Applications, Systems and Engineering Technologies (CHASE 2022)

Arlington, Virginia, USA 17 – 19 November 2022



IEEE Catalog Number: ISBN:

CFP22D42-POD 978-1-6654-6560-1 **Copyright © 2022, Association for Computing Machinery All Rights Reserved**

*** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

IEEE Catalog Number: ISBN (Print-On-Demand): ISBN (Online): ISSN: CFP22D42-POD 978-1-6654-6560-1 978-1-4503-9476-5 2832-2967

Additional Copies of This Publication Are Available From:

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA Phone: (845) 758-0400 Fax: (845) 758-2633 E-mail: curran@proceedings.com Web: www.proceedings.com



2022 IEEE/ACM International Conference on Connected Health: Applications, Systems and Engineering Technologies (CHASE) CHASE 2022

Table of Contents

Message from the General Chairs	xi
Organizing Committee	
Technical Program Committee	xiii
Steering Committee	xv

Regular Papers

Design and Validation of an Open-Source Closed-Loop Testbed for Artificial Pancreas Systems
Predicting Weight and Strenuousness from High-Speed Videos of Subjects Attempting Lift
Estimation of Hip, Knee, and Ankle Joint Moment Using a Single IMU Sensor on Foot via Deep Learning
Post-Lift Analysis of Thermal Imprint for Weight and Effort Detection

Self-rPPG: Learning the Optical & Physiological Mechanics of Remote Photoplethysmography with Self -Supervision
Zahid Hasan (University of Maryland, Baltimore County), Abu Zaher MD Faridee (University of Maryland, Baltimore County), Masud Ahmed (University of Maryland, Baltimore County), and Nirmalya Roy (University of Maryland, Baltimore County)
 Robot-assisted Psycho-education to Enhance Alzheimer's Caregiver Health
Estimating Human Attitude during Robot-mediated Referential Communication Tasks
 BayesLDM: A Domain-Specific Modeling Language for Probabilistic Modeling of Longitudinal Data
Computational Framework for Sequential Diet Recommendation: Integrating Linear Optimization and Clinical Domain Knowledge
 AutoWean: Extubation Failure Risk Estimation for Critically Ill Patients
ICD-BAS: Detecting Ventricular Arrhythmia using Binary Architecture Search for Implantable Cardioverter Defibrillators

Short Papers

 Wearable Optical E-Tattoo for Deep Neck Hemodynamic Monitoring	18
 Dual-Mode Chest Wearable E-Tattoo for the Mobile Detection of Cardiac Time Intervals	23
 Federated Fuzzy Clustering for Longitudinal Health Data	28
Collaboratively Learning Optimal Patient Outcomes Using Smart Contracts in Limited Data Settings	33

Poster and Demo Papers

Poster: Corrective Real-Time Feedback for Smartwatch Devices using Quaternion Manipulation 138 Slobodan Milanko (unaffiliated)
 Vitals: Camera-Based Physiological Monitoring and Health Management Platform
Poster: Forecasting Task Failure in Strength Training
Melanoma Segmentation and Classification Employing MELC Imaging and Graph Encodings 144 Luis Carlos Rivera Monroy (Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany), Martin Eberhardt (Universitätsklinikum Erlangen, Germany), Christian Ostalecki (Universitätsklinikum Erlangen, Germany), Andreas Baur (Universitätsklinikum Erlangen, Germany), Julio Vera (Universitätsklinikum Erlangen, Germany), and Andreas Maier (Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany)

Poster: Intelligent Fuzzifier-Based Cluster Validation for Incomplete Longitudinal Digital Trial Data
Hieu Ngo (University of Massachusetts Dartmouth), Hua Fang (University of Massachusetts Dartmouth), and Honggang Wang (University of Massachusetts)
Poster: Kinetic Tremor Measurement via IMU Sensing Data Analysis
Poster: Head and Neck Tumor Segmentation with Sliced 3D PET Scans
Demo Paper: A Package of Objective Measurement Tools for Physical and Social Exertional Activities for Patients with Illness-Limiting Capacities
Design of AI-Powered Augmented Reality Games for Autistic Children
Towards Hardware and Software Integration of Noninvasive Transcutaneous Oxygen Monitor 156 Devdip Sen (Worcester Polytechnic Institute), Mohammed Almatrood (Michigan State University), Bige Deniz Unluturk (Michigan State University), and Ulkuhan Guler (Worcester Polytechnic Institute)
GlucoScan: Noninvasive Glucose Monitoring Device
Implementation of a Medical History Visualization Framework for Doctors
A Wearable Soft Exoskeleton for Shoulder Motion Assistance
Data-Driven Modeling and Prediction of Obstructive Sleep Apnea Based on Physics-Guided Pathophysiological Understanding
Monkeypox At-a-Glance from Google Trends and Reddit

Camera-Based Heart Rate Variability and Stress Measurement from Facial Videos
A Mobile Health (mHealth) Technology for Maternal Depression and Stress Assessment and Intervention during Pregnancy: Findings from a Pilot Study
An Early Detection of Oral Epithelial Dysplasia Based on GoogLeNet Inception-v3
Let Every Voice Be Heard: Developing a Cost-Effective Community Sampling Frame in Rural Alabama to Combat COVID-19 (poster)
Poster: Preliminary Outcomes of a Culturally Tailored Mindfulness Mobile App for Mental Health within Underserved African American Communities During COVID-19
 Shoupa: An AI System for Early Diagnosis of Parkinson's Disease
Wearable Technology and Machine Learning to Monitor Upper-Limb Use in Brain Injury Survivors
Cristiana Ernesto (University of Lisbon), Federico Parisi (Harvard Medical School), Catherine Adans-Dester (Harvard Medical School), Anne O'Brien (Harvard Medical School), Gloria Vergara-Diaz (Harvard Medical School), Randie Black-Schaffer (Harvard Medical School), Ross Zafonte (Harvard Medical School), Hugo Ferreira (University of Lisbon), and Paolo Bonato (Harvard Medical School)

DOVE: Noninvasive Shoulder-based Opioid Overdose Detection Device Anush Lingamoorthy (Drexel University, USA), Amanda Watson (University of Pennsylvania, USA), Ethan Donlon (University of Pennsylvania, USA), James Weimer (Vanderbilt University, USA), and Jacob S. Brenner (University of Pennsylvania, USA)	182
Deploying a Human Robot Interaction Model for Dementia Care in Federated Learning Xiaowen Su (University of Tennessee Knoxville), Fengpei Yuan (University of Tennessee Knoxville), Ran Zhang (Miami University, USA), Jian Liu (University of Tennessee Knoxville), Marie Boltz (Penn State University), and Xiaopeng Zhao (University of Tennessee Knoxville)	184
Poster: A Machine Learning-Based Approach to Enhance the Accuracy of Sound Measurements in iOS Devices for Accessibility Applications	186

Workshop Papers

An Improved Framework to Assess the Evaluation of Extended Reality Healthcare Simulators using Machine Learning Avinash Gupta (University of Illinois Urbana Champaign) and Harris Nisar (University of Illinois Urbana Champaign)	. 188
	193
A Real-Time Analysis of Human Performance in Interactive and Adaptive Mixed-Reality Simulation Mukhil Umashankar (University of Illinois Urbana-Champaign, USA)	. 198
 Deep-Learning Enabled Assessment of Neurocognitive Performance in Object Following in Mixed Reality Ansh Sharma (University of Illinois Urbana-Champaign, USA), Keerthana Nallamotu (University of Illinois Urbana-Champaign, USA), Mukhil Umashankar (University of Illinois Urbana-Champaign, USA), Shenlong Wang (University of Illinois Urbana-Champaign, USA), and Inki Kim (University of Illinois Urbana-Champaign, USA) 	203

Author Index 209
