

2019 IEEE/ACM International Conference on Connected Health: Applications, Systems and Engineering Technologies (CHASE 2019)

**Arlington, Virginia, USA
25 – 27 September 2019**



**IEEE Catalog Number: CFP19D42-POD
ISBN: 978-1-7281-4688-1**

**Copyright © 2019 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. 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:	CFP19D42-POD
ISBN (Print-On-Demand):	978-1-7281-4688-1
ISBN (Online):	978-1-7281-4687-4

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

CURRAN ASSOCIATES INC.
proceedings
.com

2019 IEEE/ACM International Conference on Connected Health: Applications, Systems and Engineering Technologies (CHASE) **CHASE 2019**

Table of Contents

Committees .ix.....

2019 IEEE/ACM International Conference on Connected Health: Applications, Systems and Engineering Technologies (CHASE)

Demo Abstract: LiftRight: Quantifying Training Performance using a Wearable Sensor .1.....
Slobodan Milanko (Old Dominion University) and Shubham Jain (Old Dominion University)

Demo Abstract: MirrorMatch: Real-Time Detection of Repetitive Movements using Smartphone
Camera .3.....
Noah Jennings Noah (Old Dominion University) and Shubham Jain Jain (Old Dominion University)

Poster Abstract: A Machine Learning Approach to Identify High-Cost Elderly Renal
Transplant Recipients .5.....
Rui Fu (University of Toronto) and Peter C. Coyte (University of Toronto)

Poster Abstract: Know You Better: a Smart Watch Based Health Monitoring System .7.....
Yang Gu (ICT, CAS), Jianfei Shen (ICT, CAS), and Yiqiang Chen (ICT, CAS)

Poster Abstract: Automated Detection of the Onset of Ventricular Depolarization in
Challenging Clinical ECG Data .9.....
Christopher Baek (Sensydia Corporation), Kanav Saraf (University of California Los Angeles), Michael Wasko (Sensydia Corporation), Xu Zhang (University of California Los Angeles), Yi Zheng (Sensydia Corporation), Per Borgstrom (Sensydia Corporation), Aman Mahajan (University of Pittsburgh), and William Kaiser (University of California Los Angeles)

Poster Abstract: Investigating Fusion-Based Deep Learning Architectures for Smoking Puff
Detection .11.....
Benjamin Marlin (University of Massachusetts Amherst) and Meet P. Vadera (University of Massachusetts Amherst)

Poster Abstract: A Wearable Diagnostic Assessment System for Attention Deficit Hyperactivity Disorder .13.....
Xinlong Jiang (Chinese Academy of Sciences; Beijing Key Laboratory of Mobile Computing and Pervasive Device; University of Chinese Academy of Sciences), Yunbing Xing (Chinese Academy of Sciences; Beijing Key Laboratory of Mobile Computing and Pervasive Device), Teng Zhang (Chinese Academy of Sciences; Beijing Key Laboratory of Mobile Computing and Pervasive Device), Wuliang Huang (Chinese Academy of Sciences; Beijing Key Laboratory of Mobile Computing and Pervasive Device), Chenlong Gao (Chinese Academy of Sciences; Beijing Key Laboratory of Mobile Computing and Pervasive Device; University of Chinese Academy of Sciences), and Yiqiang Chen (Chinese Academy of Sciences; Beijing Key Laboratory of Mobile Computing and Pervasive Device; University of Chinese Academy of Sciences)

Poster Abstract: A Comprehensive Approach for Cough Type Detection .15.....
Ebrahim Nemati (Samsung Research America), Md. Mahbubur Rahman (Samsung Research America), Viswam Nathan (Samsung Research America), Korosh Vatanparvar (Samsung Research America), and Jilong Kuang (Samsung Research America)

Poster Abstract: Unobtrusive Sleep Monitoring with Low-Cost Pressure Sensor Array .17.....
Haoyan Liu (University of Arkansas), Enrique Sanchez (University of Arkansas), James Parkerson (University of Arkansas), and Alexander Nelson (University of Arkansas)

Poster Abstract: Augmented Reality Based Therapy System for Social Skill Deficits .19.....
Kewei Sha (Baylor College of Medicine), Zhandong Liu (Baylor College of Medicine), and Jack Dempsey (University of Colorado)

Poster Abstract: A Novel and Efficient Approach to Evaluate Biometric Features for User Identification .21.....
Namrata Kayastha (University of Houston-Clear Lake) and Kewei Sha (University of Houston-Clear Lake)

Poster Abstract: Analysis of Cyber-Security Vulnerabilities of Interconnected Medical Devices .23.....
Yanchen Xu (University of Virginia), Daniel Tran (University of Virginia), Yuan Tian (University of Virginia), and Homa Alemzadeh (University of Virginia)

Poster Abstract: mTEH: A Decision Support System for Tele-Ophthalmology to Improve Eye Health of Wisconsin Population in Community Settings .25.....
Jannatul F Tumpa (Marquette University), Riddhiman Adib (Marquette University), Dipranjan Das (Marquette University), Sheikh I Ahamed (Marquette University), Judy Kim (Medical College of Wisconsin), Velinka Medic (Medical College of Wisconsin), Al Castro (United Community Center), Mirtha Pacheco (United Community Center), Rebecca Rowland (City of Milwaukee Health Department), and Jay Romant (City of Milwaukee Health Department)

Examining Cross-Validation Strategies for Predictive Modeling of Anterior Cruciate Ligament Reinjury	27
<i>Dae-young Kim (University of Maryland-Baltimore County), Varun Mandalapu (University of Maryland-Baltimore County), Joseph M. Hart (University of Virginia), Stephan Bodkin (University of Virginia), Nutta Homdee (University of Virginia), John Lach (University of Virginia), and Jiaqi Gong (University of Maryland-Baltimore County)</i>	

MCPS: Medical Cyber Physical Systems in Internet of Medical Things Workshop

Health Monitoring in Smart Homes Utilizing Internet of Things	29
<i>Lauren Linkous (Virginia Commonwealth University), Nasibeh Zohrabi (Virginia Commonwealth University), and Sherif Abdelwahed (Virginia Commonwealth University)</i>	
Implementing Real-Time Clinical Decision Support Applications on OpenICE: A Case Study Using the National Early Warning System Algorithm	35
<i>David Arney (Massachusetts General Hospital), Yi Zhang (Massachusetts General Hospital), Julian M. Goldman (Massachusetts General Hospital), and Barbara Dumas (Qualitypark US)</i>	

EdgeDL 2019: Deep Learning on Edge for Smart Health and Wellbeing Applications

A Key Management Scheme for Establishing an Encryption-Based Trusted IoT System	41
<i>Quazi Mamun (Charles Sturt University) and Muhammad Rana (Charles Sturt University)</i>	
An Edge-Assisted and Smart System for Real-Time Pain Monitoring	47
<i>Emad Kasaeyan Naeini (University of California, Irvine), Sina Shahhosseini (University of California, Irvine), Ajan Subramanian (University of California, Irvine), Tingjue Yin (University of California, Irvine), Amir M. Rahmani (University of California, Irvine), and Nikil Dutt (University of California, Irvine)</i>	
Fuzzy C-Means Clustering and Sonification of HRV Features	53
<i>Debanjan Borthakur (McMaster University), Victoria Grace (Muvik Labs), Paul Batchelor (Muvik Labs), Harishchandra Dubey (UT Dallas), and Kunal Mankodiya (URI, Kingston, RI)</i>	

SCCH: Secure and Cloud Connected Health

eHeart-BP, Prototype of the Internet of Things to Monitor Blood Pressure	58
<i>Néstor Germán Bolívar Pulgarín (Universidad Nacional de Colombia), Libia Denise Cangrejo Aljure (Universidad Nacional de Colombia), and Octavio Jose Salcedo Parra (Universidad Nacional de Colombia)</i>	

Users' Internet Searches as Proxies for Disease Escalation Trends 64
Izzat Alsmadi (Texas A&M University) and Rand Obeidat (Bowie State University)

Additional Paper

Detecting Kratom Intoxication in Wearable Biosensor Data.....69
*Joshua Rumbut, Hua Fang and Honggang Wang (University of Massachusetts Dartmouth),
Darshan Sing (Universiti Sains Malaysia), Stephanie Carreiro (University of Massachusetts Medical School) and Edward Boyer (Harvard Medical School)*

Author Index 71