2013 IEEE International Conference on Healthcare Informatics

(ICHII 2013)

Philadelphia, Pennsylvania, USA
9-11 September 2013
Welcome from General Chairs .................................................................................................................................................. xiii
Welcome from Program Chairs .................................................................................................................................................. xv
Conference Organizers .......................................................................................................................................................... xvii
Program Committee .............................................................................................................................................................. xix

Keynote Speaker

Improving Safety in Medical Devices and Systems ............................................................................................................... 1
Harold Thimbleby

Parallel Oral Presentation Sessions

Session: Drug Management

Dealing with Data Sparsity in Drug Named Entity Recognition .............................................................................................................. 14
Dimitrios Piliouras, Ioannis Korkontzelos, Andrew Dowsey, and Sophia Ananiadou

Harnessing Social Media for Drug-Drug Interactions Detection ........................................................................................................... 22
Haodong Yang and Christopher C. Yang

Toward Creating a Gold Standard of Drug Indications from FDA Drug Labels .......................................................................................... 30
Ritu Khare, Jiao Li, and Zhiyong Lu

Session: Human Factors I: Applications

MediFrame: A Tablet Application to Plan, Inform, Remind and Sustain Older Adults’ Medication Intake ................................................................. 36
Lea Gulstav Dalgaard, Erik Grönvall, and Nervo Verdezoto

On-Demand Virtual Health Counselor for Delivering Behavior-Change Health Interventions .................................................................................. 46
Reza Amini, Christine Lisetti, Ugan Yasavur, and Naphtali Rishe
Using Medical Device Logs for Improving Medical Device Design ................................................................. 56
    Abigail Cauchi, Harold Thimbleby, Patrick Oladimeji, and Michael Harrison

Session: Health Text Analytics I

Supervised Extraction of Diagnosis Codes from EMRs: Role of Feature Selection, Data Selection, and Probabilistic Thresholding ................................................................. 66
    Anthony Rios and Ramakanth Kavuluru

Using Co-occurrence Analysis to Expand Consumer Health Vocabularies from Social Media Data .............................................................................................................................. 74
    Ling Jiang and Christopher C. Yang

Automatic Information Extraction in the Medical Domain by Cross-Lingual Projection .................................................................................................................................................... 82
    Asma Ben Abacha, Pierre Zweigenbaum, and Aurélien Max

Session: Interactivity and Modality

Empirical Evaluation of Traditional vs. Hybrid Interaction Metaphors in a Multitask Healthcare Simulation ........................................................................................................ 89
    Lauren Cairco Dukes, Jeffrey Bertrand, Manan Gupta, Rowan Armstrong,
    Tracy Fasolino, Sabarish Babu, and Larry F. Hodges

Olfactory Measurement System to Quantify the Ability to Smell Using Pulse Ejection ....................................................................................................................................................... 99
    Aya Fukasawa, Risa Suzuki, and Ken-Ichi Okada

Elderly Cardiac Patients’ Medication Management: Patient Day-to-Day Needs and Review of Medication Management System ...................................................................................... 107
    Anandhi Vivekanandan Dhukaram and Chris Baber

Session: Health Organization and Epidemiology

Jeev: A Low-Cost Cell Phone Application for Tracking the Vaccination Coverage of Children in Rural Communities ........................................................................................................ 115
    Anas Katib, Deepthi Rao, Praveen Rao, and Karen Williams

Evaluating Strategies for Pandemic Response in Delhi Using Realistic Social Networks ..................................................................................................................................................... 121
    Huadong Xia, Kalyani Nagaraj, Jiangzhuo Chen, and Madhav Marathe

Face Matching for Post-Disaster Family Reunification .............................................................................................. 131
    Eugene Borovikov, Szilárd Vajda, Girish Lingappa, Sameer Antani, and George Thoma
Session: Human Factors II: Effects and Outcomes

Do Health Care Users Think Electronic Health Records are Important for Themselves and Their Providers? Exploring Group Differences in a National Survey ................................................................. 141

  Denise L. Anthony and Celeste Campos-Castillo

Dispelling Myths and Misinformation Using Social Media: A Three-Countries Comparison Using the Case of Tuberculosis ................................................................. 147

  Yin-Leng Theng, Lynette Ying Qin Goh, May O. Lwin, and Schubert Foo Shou-Boon

Put a Face to a Name: Providing Hospital Patients with Photographs of Their Care-Team Members May Improve Patient-Clinician Communication and Increase Overall Patient Satisfaction ........................................ 153

  Lora Appel and Rob Wu

Session: Health Risk Prediction I

Any Language Early Detection of Epidemic Diseases from Web News Streams ........................................ 159

  Romain Brixtel, Gaël Lejeune, Antoine Doucet, and Nadine Lucas

Fall Detection Based on Sequential Modeling of Radar Signal Time-Frequency Features ................................................................. 169

  Meng Wu, Xiaoxiao Dai, Yimin D. Zhang, Bradley Davidson, Moeness G. Amin, and Jun Zhang

Risk Prediction of a Multiple Sclerosis Diagnosis ..................................................................................... 175

  Joyce C. Ho, Joydeep Ghosh, and K.P. Unnikrishnan

Session: Home Assistance and Individual Care

Estimating Daily Energy Expenditure from Video for Assistive Monitoring ......................................................... 184

  Alex Edgcomb and Frank Vahid

Automated In-Home Assistive Monitoring with Privacy-Enhanced Video ................................................................. 192

  Alex Edgcomb and Frank Vahid

A Publish/Subscribe Middleware for Body and Ambient Sensor Networks that Mediates between Sensors and Applications ................................................................. 199

  Christian Seeger, Kristof Van Laerhoven, Jens Sauer, and Alejandro Buchmann
Session: Web-Based Architectures and User Interactions

The Effects of Interaction and Visual Fidelity on Learning Outcomes for a Virtual Pediatric Patient System .......................................................... 209

Toni Bloodworth Pence, Lauren Cairco Dukes, Larry F. Hodges, Nancy K. Meehan, and Arlene Johnson

Social Support and Exchange Patterns in an Online Smoking Cessation Intervention Program .............................................................. 219

Mi Zhang, Christopher C. Yang, and Xuemei Gong

Supporting N-Screen Medical Data Access in mHealth ........................................ 229

Richard K. Lomotey and Ralph Deters

Session: Health Risk Prediction II

Heart Failure Risk Models and Their Readiness for Clinical Practice .................................................. 239

J.J.G. (Gert-Jan) De Vries, Gijs Geleijnse, Aleksandra Tesanovic, and A.R.T. (Ramon) Van De Ven

Automated Trauma Incident Cubes Analysis .................................................................. 248

Ankit Srivastava, Lisa Ferrigno, Stephen Kaminski, Xifeng Yan, and Jianwen Su

Session: Health Text Analytics II

Mining Association Rules for Neurobehavioral and Motor Disorders in Children Diagnosed with Cerebral Palsy ........................................ 258

Chihwen Cheng, Thomas G. Burns, and May D. Wang

Classification of CT Figures in Biomedical Articles Based on Body Segments .................. 264

Zhiyun Xue, Sameer Antani, L. Rodney Long, Dina Demner-Fushman, and George R. Thoma

Poster Sessions

Session: Systems and Human Factors

PASTEL: A Semantic Platform for Assisted Clinical Trial Patient Recruitment ...................... 269

David Damen, Kim Luyckx, Geert Hellebaut, and Tim Van Den Bulcke

Secure Access Control for Health Information Sharing Systems ........................................ 277

Suhair Alshehri and Rajendra K. Raj

A Study of DWT and SVD Based Watermarking Algorithms for Patient Privacy in Medical Images .................................................................. 287

Sachin Mehta, Rajarathnam Nallusamy, Ranjeet Vinayak Marawar, and Balakrishnan Prabhakaran
Privacy-Centric Access Control for Distributed Heterogeneous Medical Information Systems ................................................................. 297

Atif Khan and Ian McKillop

Evaluation and Enhancement of an Intraoperative Insulin Infusion Protocol via In-Silico Simulation ................................................................. 307

Benjamin A. Kohl, Sanjian Chen, Margaret Mullen-Fortino, and Insup Lee

Using Candidate Exploration and Ranking for Abbreviation Resolution in Clinical Document .................................................................................. 317

Jong-Beom Kim, Heung-Seon Oh, Sang-Soo Nam, and Sung-Hyon Myaeng

Decision Support System for Constantly Monitoring Patients in a Comorbid Condition .......................................................................................... 327

Di Lin, Fabrice Labeau, and Subhra Mohapatra

Monitoring Public Health Concerns Using Twitter Sentiment Classifications ................................................................................................. 335

Xiang Ji, Soon Ae Chun, and James Geller

An Agile Framework to Support Distributed Medical Imaging Scenarios ................................................................................................. 345

Luís A. Bastião Silva, Carlos Costa, and José Luis Oliveira

Querying Complex Federated Clinical Data Using Ontological Mapping and Subsumption Reasoning ................................................................. 351

Licong Cui, Remo Mueller, Satya Sahoo, and Guo-Qiang Zhang

New Horizons for Patient Safety: LIGRA (LIfe Guard for Robotic Surgery Assistance), an Interactive Platform Centralizing Information and Control Robotic Surgery Operating Rooms .......................................................................................................................................................................................... 361

Jean Vaucher, Hannes Bleuler, Elettra Oleari, Angelica Morandi, Monica Verga, and Alberto Sanna

Content Analysis on User-Focused Support Features of Health Support Sites for Geriatric Depression .................................................................................. 367

Jinhui Li, Yin Leng Theng, Schubert Foo, and Owen Noel Newton Fernando

Session: Analytics and Human Factors

Image-Based Fall Detection with Human Posture Sequence Modeling ................................................................................................. 376

Xiaoxiao Dai, Meng Wu, Bradley Davidson, Mohammad Mahoor, and Jun Zhang

A Microscopic Image Classification Method Using Shearlet Transform ................................................................................................. 382

Hadi Rezaeilouyeh, Mohammad H. Mahoor, S. Mohammad Mavadati, and Jun Jason Zhang

Multiple Temporal Axes for Visualising the Behaviour of Elders Living Alone ................................................................................................. 387

Jose M. Juarez, Jose M. Ochotorena, Manuel Campos, and Carlo Combi

Clinical Schedule Management Using Similarity-Based Mining Methods ................................................................................................. 396

Haruko Iwata, Shusaku Tsumoto, and Shoji Hirano
Characterizing the Performance and Behaviors of Runners Using Twitter ..............................................406

Qian He, Emmanuel Agu, Diane Strong, Bengisu Tulu, and Peder Pedersen

Predicting Readmission Risk with Institution Specific Prediction Models .................................................415

Shipeng Yu, Alexander van Esbroeck, Faisal Farooq, Glenn Fung, Vikram Anand, and Balaji Krishnapuram

Estimating Distortion Parameters in Simulated Prosthetic Vision ............................................................421

Parvathi Chundi, Mahadevan Subramaniam, Abhilash Muthuraj, and Eyal Margalit

Faulty and Missing Body Sensor Data Analysis ............................................................................................431

Duk-Jin Kim and B. Prabhakaran

Exploiting External Data for Training a Cancer Clause Classifier ............................................................439

Sangsoo Nam and Sung-Hyon Myaeng

Tell Me What I Don’t Know--Making the Most of Social Health Forums ...................................................447

Jerry Rolia, Wen Yao, Sujoy Basu, Wei-Nchih Lee, Sharad Singhal, Akhil Kumar, and Sharat R. Sabbella

Modeling Meaningful Use as Utility in Emergency Medical Services .......................................................455

Steven R. Haynes, Thomas E. Winkler, and Frank E. Ritter

Using Nomograms to Reduce Harm from Clinical Calculations .................................................................461

Harold Thimbleby and David Williams

Non-referred Extended Abstracts

A Cooperative Localization Technique for Tracking in Hospitals and Nursing Homes ..........................................................471

Denis Rodionov, Kirill Bushminkin, and George Kolev

MPI Parallelization of Innovative DPD Thermostats ..................................................................................476

N. Goga, H. Berendsen, Svetlana Baoukina, S.A. Moga, G. Dragoi, A. Hadar, and B. Paviloiu

StressFree--A Tool for Stress Determination and Treatment through Computer Music Generation .........................477

Alexandra Todiruta, Maria Goga, Lucian Pestritu, Nicolae Goga, and Luminita Ciobanu

Questor: Medical Report Search Engine ..................................................................................................478

Andrei Vasilateanu, Nicolae Goga, Florica Moldoveanu, Alin Moldoveanu, and Cristian Taslitchi

Factors Related to Eating Habits of First-Year University Students ...........................................................479

Masashi Sugano and Aya Akasaka

ViM: Vital Signs in Music Creatively Facilitating Effective Long-Term Wellbeing Self-Management .................480

Yunqiu Li and Harold Thimbleby
Visualization of Privacy Filters for Sharing Sensor-Based Health Data ................................................................. 481
Edward L. Klein and Jesse M. Heines

A Service Oriented Framework to Assess the Quality of Electronic Health Data for Clinical Research ................................................................. 482
Naresh Sundar Rajan, Ramkiran Gouripeddi, and Julio C. Facelli

Using Social Network Analysis to Identify Key Players within Clinical Teams for Improving Pain Management ................................................................. 483
Prasanna Desikan, Nilanjana Banerji, Stacey Ferguson, and Heather Britt

Can NAO Robot Improve Eye-Gaze Attention of Children with High Functioning Autism? ................................................................. 484
Huanghao Feng, Anibal Gutierrez, Jun Zhang, and Mohammad H. Mahoor

Improving Online Clinical Trial Search Efficiency Using Natural Language Processing and Biomedical Ontology Mapping Approach ................................................................. 485
Duo (Helen) Wei and Tiara Campbell

Dynamic Disease Forecast Network Using Family Medical History ................................................................. 486
Rajeev Agrawal, Muhammad Suleiman, Cameron Seay, and Clay Gloster

Workshop Papers

International Workshop on Data Mining for Healthcare (DMH 2013)

Removing Confounding Factors via Constraint Based Clustering: An Application to Finding Homogeneous Groups of Multiple Sclerosis Patients ................................................................. 487
Jingjing Liu, Carla E. Brodley, Brian C. Healy, and Tanuja Chitnis

Perturbed Gibbs Samplers for Generating Large-Scale Privacy-Safe Synthetic Health Data ................................................................. 493
Yubin Park, Joydeep Ghosh, and Mallikarjun Shankar

A Novel Approach to Uncover Health Care Frauds through Spectral Analysis ................................................................. 499
Song Chen and Artya Gangopadhyay

Towards the Discovery of Diseases Related by Genes Using Vertex Similarity Measures ................................................................. 505

Using Structured EHR Data and SVM to Support ICD-9-CM Coding ................................................................. 511
J.C. Ferrão, F. Janela, J.C. Ferrão, and H.M.G. Martins

Automatic Patient Search Using Bernoulli Model ................................................................. 517
Yingying Gu, Christopher Kallas, Jun Zhang, James Marx, and Judy Tjoe

Early Diagnosis and Its Benefits in Sepsis Blood Purification Treatment ................................................................. 523
Mohamed Ghalwash, Vladan Radosavljevic, and Zoran Obradovic
Impact of Density of Lab Data in EHR for Prediction of Potentially Preventable Events

Chandrima Sarkar and Jaideep Srivastava

First Workshop on Mobile Cloud Computing in Healthcare (WMCCH 2013)
Improving Computational Efficiency for Personalized Medical Applications in Mobile Cloud Computing Environment

George Mathew and Zoran Obradovic

Finding Needles in a Haystack: Reducing False Alarm Rate Using Telemedicine Mobile Cloud

Qiong Gui, Xiaoliang Wang, Bingwei Liu, Zhanpeng Jin, and Yu Chen

Mobile Application Concept Development for Remote Patient Monitoring

Ljilja Kascak, Claudia B. Rébola, Richard Braunstein, and Jon Sanford

Workshop on Hospital Readmission Prediction and Clinical Risk Management (HRPCRM 2013)
A Predictive Model to Identify Patients at Risk of Unplanned 30-Day Acute Care Hospital Readmission

Klaus Lemke

Temporal Evaluation of Risk Factors for Acute Myocardial Infarction Readmissions

Gregor Stiglic, Adam Davey, and Zoran Obradovic

Predictors of Readmission in Heart Failure Patients Vary by Cause of Readmission: Hospital-Level Cause-Specific Readmission Rates Show No Correlation

Alex Bottle, Paul Aylin, and Derek Bell

Why Majority of Readmission Risk Assessment Tools Fail in Practice

Matthew W. Tanzer and Eric M. Heil

Rethinking Automation for Care Transitions

Matthew W. Tanzer and Eric M. Heil

Author Index