

2021 IEEE 9th International Conference on Healthcare Informatics (ICHI 2021)

**Victoria, British Columbia, Canada
9 – 12 August 2021**



**IEEE Catalog Number: CFP2144U-POD
ISBN: 978-1-6654-2980-1**

**Copyright © 2021 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:	CFP2144U-POD
ISBN (Print-On-Demand):	978-1-6654-2980-1
ISBN (Online):	978-1-6654-0132-6
ISSN:	2575-2626

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

2021 IEEE 9th International Conference on Healthcare Informatics (ICHI) **ICHI 2021**

Table of Contents

Message from the General Chairs	xviii
Message from the Program Chairs	xx
Organizing Committee	xxii
Program Committee	xxiv
Reviewers	xxvi
Steering Committee	xxviii
Keynotes	xxix
Sponsors	xxxi

Keynote Talks

Building the Foundation of Medical Knowledge Generation	1
<i>Alistair Johnson (Hospital for Sick Children, Canada)</i>	
Designing Tools to Counter Violence and Structural Oppression	2
<i>Sheena Erete (DePaul University, USA)</i>	

Analytics 1 - Learning (1)

Imbalanced EEG Analysis using One-Shot Learning with Siamese Neural Network	4
<i>Munawara Saiyara Munia (University of Texas at Dallas, USA), Seyyed MohammadSaleh Hosseini (University of Texas at Dallas, USA), Mehrdad Nourani (University of Texas at Dallas, USA), Jay Harvey (University of Texas Southwestern Medical Center, USA), and Hina Dave (University of Texas Southwestern Medical Center, USA)</i>	
A Framework To Build A Causal Knowledge Graph for Chronic Diseases and Cancers By Discovering Semantic Associations from Biomedical Literature	13
<i>Ali Daowd (Dalhousie University, Canada), Michael Barrett (Dalhousie University, Canada), Samina Abidi (Dalhousie University, Canada), and Syed Sibte Raza Abidi (Dalhousie University, Canada)</i>	

Self-Supervised Multimodal Domino: in Search of Biomarkers for Alzheimer's Disease .23.....
Alex Fedorov (Georgia Institute of Technology; Center for Translational Research in Neuroimaging and Data Science, USA), Tristan Sylvain (Mila - Quebec AI Institute; Université de Montréal, Canada), Eloy Geenjaer (Center for Translational Research in Neuroimaging and Data Science, USA; Delft University of Technology, the Netherlands), Margaux Luck (Mila - Quebec AI Institute), Lei Wu (Georgia State University; Center for Translational Research in Neuroimaging and Data Science, USA), Thomas P. DeRamus (Georgia State University; Center for Translational Research in Neuroimaging and Data Science, USA), Alex Kirilin (Independent Researcher), Dmitry Bleklov (Independent Researcher), Vince D. Calhoun (Georgia Institute of Technology; Georgia State University; Emory University; Center for Translational Research in Neuroimaging and Data Science, USA), and Sergey M. Plis (Georgia State University; Center for Translational Research in Neuroimaging and Data Science, USA)

Causal Dynamic Bayesian Networks for the Management of Glucose Control in Gestational Diabetes .31.....
Mariana R. Neves (Queen Mary University of London, UK), Bridget J. Daley (Queen Mary University of London, UK), Graham A. Hitman (Queen Mary University of London, UK), Mohammed S. B. Huda (Royal London Hospital, UK), Scott McLachlan (Queen Mary University of London, UK), Sarah Finer (Queen Mary University of London, UK), and William Marsh (Queen Mary University of London, UK)

An Empirical Investigation of PU Learning for Predicting Length of Stay .41.....
Tom Arjannikov (University of Victoria, Canada) and George Tzanetakis (University of Victoria, Canada)

Non-Transfer Deep Learning of Optical Coherence Tomography for Post-hoc Explanation of Macular Disease Classification .48.....
Raisul Arefin (Auburn University, USA), Manar D. Samad (Tennessee State University, USA), Furkan A. Akyelken (Tennessee State University, USA), and Arash Davanian (Vanderbilt University Medical Center, USA)

Analytics 2 - Learning (2)

Exploring Self-Supervised Graph Learning in Literature-Based Discovery .53.....
Juncheng Ding (University of North Texas, USA) and Wei Jin (University of North Texas, USA)

Quantifying Predictive Uncertainty in Medical Image Analysis with Deep Kernel Learning .63.....
Zhiliang Wu (Siemens AG, LMU Munich, Germany), Yinchong Yang (Siemens AG, Germany), Jindong Gu (Siemens AG, LMU Munich, Germany), and Volker Tresp (Siemens AG, LMU Munich, Germany)

Modeling and Evaluation of Clustering Patient Care into Bubbles .73.....
D. M. Hasibul Hasan (The University of Iowa), Alex Rohwer (The University of Iowa), Hankyu Jang (The University of Iowa), Ted Herman (The University of Iowa), Philip M. Polgreen (The University of Iowa), Daniel K. Sewell (The University of Iowa), Bijaya Adhikari (The University of Iowa), and Sriram V. Pemmaraju (The University of Iowa)

CATAN: Chart-Aware Temporal Attention Network for Adverse Outcome Prediction .83.....	
	<i>Zelalem Gero (Emory University, USA) and Joyce C. Ho (Emory University, USA)</i>
Dynamic Inductive Transfer Learning with Decision Support Feedback to Optimize Retina Analysis .93.....	
	<i>Muhammad Zubair Khan (University of Missouri-Kansas City, USA) and Yugyung Lee (University of Missouri-Kansas City, USA)</i>
Development and Validation of ECG Rhythm Classification on a Multitude of Data Sources using Deep Learning .101.....	
	<i>Krishna Prasad V (Cohere Med Inc, India), Nithin Raj K M (Cohere Med Inc, India), Srikanth Muthya (Cohere Med Inc, India), and Renjith S Nair (Cohere Med Inc, India)</i>

Analytics 3 - Learning (3)

Constructed Temporal Features for Longitudinal Classification of Human Ageing Data .106.....	
	<i>Caio Ribeiro (University of Kent, UK) and Alex Freitas (University of Kent, UK)</i>
Development of a Two-State Gaussian Hidden Markov Model for Modelling Dementia Progression in Patients with Mild Cognitive Impairment .113.....	
	<i>Callum Canavan (Seagate Technology, United Kingdom), Liam P. Maguire (Ulster University, United Kingdom), and Magda Bucholc (Ulster University, United Kingdom)</i>
Unsupervised Acute Intracranial Hemorrhage Segmentation with Mixture Models .120.....	
	<i>Kimmo Kärkkäinen (University of California, Los Angeles, USA), Shayan Fazeli (University of California, Los Angeles, USA), and Majid Sarrafzadeh (University of California, Los Angeles, USA)</i>
Deep Staging: An Interpretable Deep Learning Framework for Disease Staging .130.....	
	<i>Liuyi Yao (University at Buffalo, USA), Zijun Yao (IBM Research, USA), Jianying Hu (IBM Research, USA), Jing Gao (Purdue University, USA), and Zhaonan Sun (IBM Research, USA)</i>
Explainable Deep Learning for Readmission Prediction with Tree-GloVe Embedding .138.....	
	<i>Jialiang Jiang (University at Buffalo, USA), Sharon Hewner (University at Buffalo, USA), and Varun Chandola (University at Buffalo, USA)</i>
Neural Medication Extraction: A Comparison of Recent Models in Supervised and Semi-Supervised Learning Settings .148.....	
	<i>Ali Can Kocabiyikoglu (Calystene, France), Jean-Marc Babouchkine (Calystene, France), François Portet (Univ. Grenoble Alpes, France), and Raheel Qader (Lingua Custodia, France)</i>

Analytics 4 - EHR and DSS

Identifying Mentions of Life Stressors in Clinical Notes .153.....	
<i>Shreya Datar (University of Minnesota, USA), Elizabeth A. Lindemann (University of Minnesota, USA), Greg Silverman (University of Minnesota, USA), Reed McEwan (University of Minnesota, USA), Raymond Finzel (University of Minnesota, USA), Michael Kotlyar (University of Minnesota, USA), Genevieve B. Melton (University of Minnesota, USA), and Serguei V. S. Pakhomov (University of Minnesota, USA)</i>	
Interpretable Phenotyping for Electronic Health Records .161.....	
<i>Christine Allen (KenSci Inc., USA), Juhua Hu (University of Washington, USA), Vikas Kumar (KenSci Inc., USA), Muhammad Aurangzeb Ahmad (KenSci Inc., USA), and Ankur Teredesai (University of Washington, USA)</i>	
On the Early Detection of Sepsis in MIMIC-III .171.....	
<i>Manuel Medina (University of Verona, Italy) and Pietro Sala (University of Verona, Italy)</i>	
Identification of Disease-Disease Network Communities in Subpopulations of Patients with Prostate Cancer .181.....	
<i>Ali Jazayeri (Drexel University, USA), Niusha Jafari (Drexel University, USA), Nikita Nikita (Thomas Jefferson University, USA), Christopher C. Yang (Drexel University, USA), and Grace Lu-Yao (Thomas Jefferson University, USA)</i>	
Automatic Assignment of ICD-10 Codes to Diagnostic Texts using Transformers Based Techniques .188.....	
<i>Mihai Horia Popescu (University of Udine, Italy), Kevin Roitero (University of Udine, Italy), Stefano Travasci (University of Udine, Italy), and Vincenzo Della Mea (University of Udine, Italy)</i>	

Analytics 5 - Diagnosis

Quasi Real-Time Contactless Physiological Sensing using Consumer-Grade Cameras .193.....	
<i>David Rivest-Henault (National Research Council of Canada, Canada), Catherine Pagiatakis (National Research Council of Canada, Canada), Richard Bernhardt (National Research Council of Canada, Canada), Thomas Vaughan (National Research Council of Canada, Canada), Bruno Falardeau (National Research Council of Canada, Canada), Michael S. D. Smith (National Research Council of Canada, Canada), and Di Jiang (National Research Council of Canada, Canada)</i>	
Short Window Network for Remote Heart Rate Measurement .200.....	
<i>Kai Zhou (FZI Research Center for Information Technology, Germany), Simon Krause (FZI Research Center for Information Technology, Germany), Timon Blöcher (Dr. Ing. h.c. F. Porsche AG, Germany), and Wilhelm Stork (Karlsruhe Institute of Technology, Germany)</i>	
Psychological Stress Detection in Older Adults with Cognitive Impairment using Photoplethysmography .209.....	
<i>Migyeong Gwak (University of California, Los Angeles, USA), Tyler Davis (University of California, Los Angeles, USA), Majid Sarrafzadeh (University of California, Los Angeles, USA), and Ellen Woo (California State University, Fresno, USA)</i>	

Acute Myocardial Infarction Readmission Risk Prediction Model in Admit and Discharge Patients .214.....
Rupanjali Chaudhuri (Cerner Intelligence, India), Vadim Khotilovich (Cerner Intelligence, USA), Monica Gaur (Cerner Intelligence, India), Chetan KV (Cerner Intelligence, India), and Will Zimmerman (Cerner Intelligence, USA)

(M)SLAe-Net: Multi-Scale Multi-Level Attention Embedded Network for Retinal Vessel Segmentation .219.....
Shreshth Saini (Indian Institute of Technology Jodhpur, India) and Geetika Agrawal (Indian Institute of Technology Jodhpur, India)

Analytics 6 - Healthcare related process

Modelling a Good Delivery of Bad News .224.....
Vered Aharonson (University of the Witwatersrand, Johannesburg, South Africa), Brittany Cocker (University of the Witwatersrand Johannesburg, South Africa), Keren Buisson-Street (University of the Witwatersrand Johannesburg, South Africa), and Danielle Winter (Entelect, Johannesburg, South Africa)

Interactive Range Queries for Healthcare Data Under Differential Privacy .228.....
Asma Alnemari (Taif University, Saudi Arabia), Rajendra K. Raj (Rochester Institute of Technology, USA), Carol J. Romanowski (Rochester Institute of Technology, USA), and Sumita Mishra (Rochester Institute of Technology, USA)

PORT: Pooled Ordered Rectangular Testing for Improved Public Health Screening .238.....
Terrance E. Boulton (University of Colorado, Colorado Springs) and Yanyan Zhuang (University of Colorado, Colorado Springs)

Can Recurrent Models Know More Than we do? .243.....
Noah Lewis (Georgia Tech, USA), Robyn Miller (Georgia State University), Harshvardhan Gazula (Princeton Neuroscience Institute), Md Mahfuzur Rahman (Georgia State University), Armin Iraj (Georgia State University), Vince. D. Calhoun (Georgia State University), and Sergey Plis (Georgia State University)

Analytics 7 - Analytics for pandemic

Statistical Analytics and Regional Representation Learning for COVID-19 Pandemic Understanding .248.....
Shayan Fazeli (University of California, Los Angeles), Babak Moatamed (University of California, Los Angeles), and Majid Sarrafzadeh (University of California, Los Angeles)

Topic-to-Topic Modeling for COVID-19 Mortality .258.....
Jeffrey Humpherys (University of Utah, USA; Salt Lake City Veterans Affairs, USA), Ahmad Halwani (University of Utah, USA; Salt Lake City Veterans Affairs, USA), Barbara E. Jones (University of Utah, USA; Salt Lake City Veterans Affairs, USA), Makoto M. Jones (University of Utah, USA; Salt Lake City Veterans Affairs, USA), Matthew H. Samore (University of Utah, USA; Salt Lake City Veterans Affairs, USA), Sadiqa Mahmood (Health Catalyst, Inc., USA), and Dale Sanders (Health Catalyst, Inc., USA)

"Who can Help me?": Knowledge Infused Matching of Support Seekers and Support Providers During COVID-19 on Reddit .265.....
Manas Gaur (University of South Carolina, USA), Kaushik Roy (University of South Carolina, USA), Aditya Sharma (LNMIIT, India), Biplav Srivastava (University of South Carolina, USA), and Amit Sheth (University of South Carolina, USA)

A Decision Guidance System for COVID-19 Comprehensive Mitigation with Pareto-Optimal Health, Cost and Productivity Outcomes .270.....
Anita Tadakamalla (George Mason University, USA), Paul McKerley (George Mason University, USA), Alexander Brodsky (George Mason University, USA), and Amira Roess (George Mason University, USA)

Systems 1 - EHR and care

Secure Health Information Exchange (S-HIE) Protocol with Reduced Round-Trip Count .280.....
Monique Mezher (University of Virginia), Nathan Hellmuth (University of Virginia), and Ahmed Ibrahim (University of Pittsburgh)

Electronic Patient Records as a Substrate for Collaboration for Distributed Care in Low-Resource Contexts .289.....
Saptarshi Purkayastha (Indiana University Purdue University Indianapolis, USA)

An Experiment to Convert Structured Product Labels into Computable Prescribing Information.296
Allen Flynn (University of Michigan, USA), Charlie Huang (University of Michigan, USA), Natalie Lampa (University of Michigan, USA), George Meng (University of Michigan, USA), Nate Gittlen (University of Michigan, USA), Adam Beck (University of Michigan, USA), Brooke Rath (University of Michigan, USA), and Peter Boisvert (University of Michigan, USA)

ASCAPE: An open AI Ecosystem to Support the Quality of Life of Cancer Patients .301.....
Konstantinos Lampropoulos (University of Patras, Greece), Thanos Kosmidis (CareAcross LTD, UK), Serge Autexier (German Research Center for Artificial Intelligence (DFKI), Germany), Miloš Savic (University of Novi Sad, Serbia), Manos Athanatos (Foundation for Research and Technology – Hellas, Greece), Miltiadis Kokkonidis (INTRASOFT International S.A, Luxembourg), Tzortzia Koutsouri (SPHYNX Technology Solutions AG, Switzerland), Anamaria Vizitiu (University of Brasov, Romania), Antonios Valachis (Örebro University, Sweden), and Miriam Quintero Padron (Atos S.A.E, Spain)

Embedding Electronic Health Records to Learn BERT-Based Models for Diagnostic Decision Support .311.....
Rui Tang (Ping An Healthcare Technology, China), Haishen Yao (Ping An Healthcare Technology, China), Zhaowei Zhu (Ping An Healthcare Technology, China), Xingzhi Sun (Ping An Healthcare Technology, China), Gang Hu (Ping An Healthcare Technology, China), Yichong Li (Fuwai Hospital, China), and Guotong Xie (Ping An Healthcare Technology, China)

Systems 2 - Monitoring and assisting

VitalHub: Robust, Non-Touch Multi-User Vital Signs Monitoring using Depth Camera-Aided UWB... 320

Zongxing Xie (Stony Brook University), Bing Zhou (IBM Research), Xi Cheng (Stony Brook University), Elinor Schoenfeld (Stony Brook University), and Fan Ye (Stony Brook University)

A Virtual Assistant Dedicated to Supporting day-to-day Medical Consultations .330.....

Antoine Richard (Université Paris-Dauphine, France; GIE Hopsis Lyon, France), Brice Mayag (Université Paris-Dauphine, France), François Talbot (DSII Bron, Hospices Civils de Lyon, France), Alexis Tsoukias (Université Paris-Dauphine, France), and Yves Meinard (Université Paris-Dauphine, France)

Multi-Task Transfer Learning with Data Augmentation for Recognizing Question Entailment in the Medical Domain .339.....

Mourad Sarrouti (National Institutes of Health, United States), Asma Ben Abacha (National Institutes of Health, United States), and Dina Demner-Fushman (National Institutes of Health, United States)

Using Wi-Fi Infrastructure to Predict Contacts During Pandemics .347.....

Janusz Wojtusiak (George Mason University), Ying Wang (George Mason University), Varalakshmi Vakkalagadda (George Mason University), Farrokh Alemi (George Mason University), and Amira Roess (George Mason University)

Ultra-low Power Beacon-Based Hand Hygiene Assistance System for Hospitals and Care Facilities .357.....

Belmin Alić (Fraunhofer IMS, Germany), Gongbo Chen (Fraunhofer IMS, Germany), Burkhard Heidemann (Fraunhofer IMS, Germany), and Karsten Seidl (Fraunhofer IMS, Germany)

Human Factors 1 - Social media and mobile apps

Exploring Suicidality on Social Media: Qualitative Analysis of Twitter .362.....

I'sis Perry (University of North Carolina Charlotte, USA) and Albert Park (University of North Carolina Charlotte, USA)

Implementing Community-Based Participatory Design and Mixed Methods to Capture and Analyze Mental Models of no/low Literate Users .372.....

Akolade I. Asipade (Auburn University), Jakita O. Thomas (Auburn University), and Yolanda A. Rankin (Florida State University, USA)

Visualizing College Students' Geo-Temporal Context-Varying Significant Phone Call Patterns.381.
Sayanton V. Dibbo (Dartmouth College, USA), Yugyeong Kim (Fordham University, USA), Sudip Vhaduri (Fordham University, USA), and Christian Poellabauer (University of Notre Dame, USA)

Human Factors 2 - Assistance and care

ActiThings: Reminders for Physical Activity Exercises in Daily Lives of Inactive Older Adults .386.....
Jochen Meyer (OFFIS - Institute for Informatics, Germany), Elke Beck (OFFIS - Institute for Informatics, Germany), Kai von Holdt (OFFIS - Institute for Informatics, Germany), Frauke Koppelin (Jade University of Applied Science, Germany), Alexander Pauls (Jade University of Applied Sciences, Germany), and Susanne Boll (OFFIS - Institute for Informatics, Germany)

The Usability and Trustworthiness of Medical Eye Images .396.....
Daniel Diethel (University of Bremen, Germany), Ashley Colley (University of Lapland, Finland), Lisa Dannenberg (University of Bremen, Germany), Muhammad Fawad Jawaid Malik (University of Bremen, Germany), and Johannes Schöning (University of Bremen, Germany)

Towards an Artifact-Supported Performance Management Framework for Collaborative Care Delivery .406.....
Rubina Lakhani (University of Ottawa, Canada), Liam Peyton (University of Ottawa, Canada), and Craig Kuziemy (MacEwan University, Alberta)

Electronic Medical Record Specialty Group Comparison by Multinomial Logistic Regression .415...
Katie Wilkinson (University of Missouri), Kangwon Seo (University of Missouri), Robert Pierce (University of Missouri), Peter Tonellato (University of Missouri), Jung Hyup Kim (University of Missouri), and Danny Myers (Tiger Institute for Health Innovation)

Industry - Track

Machine Learning Approaches for Patient State Prediction in Pediatric ICUs .422.....
Muhammad Aurangzeb Ahmad (University of Washington Bothell, USA), Eduardo Antonio Trujillo Rivera (George Washington University, USA), Murray Pollack (Children's National Medical Center, USA), Carly Eckert (KenSci Inc, USA), Anita Patel (Children's National Medical Center, USA), and Ankur Teredesai (University of Washington Tacoma, USA)

Machine Learning Approaches for Pressure Injury Prediction .427.....
Muhammad Aurangzeb Ahmad (University of Washington Bothell, USA), Barrett Larson (Smith & Nephew, USA), Steve Overman (KenSci Inc, USA), Vikas Kumar (KenSci Inc, USA), Jing Xie (Smith & Nephew, USA), Alan Rossington (Smith & Nephew, UK), Ankur Patel (Smith & Nephew, USA), and Ankur Teredesai (University of Washington Tacoma, USA)

Doctoral Consortium - Track

Towards Wrist-Worn Photoplethysmography Sensing for Medical Applications .432.....
Daniel Ray (Manchester Metropolitan University, UK)

Federated Learning for AI to Improve Patient Care using Wearable and IoMT Sensors .434.....	Arshad Farhad (Keele University, UK), Sandra Woolley (Keele University, UK), and Peter Andras (Keele University, UK)
Predicting Avoidable Emergency Department Visits using the NHAMCS Dataset .435.....	Songzi Liu (Northwestern University), Jingzhi Yu (Northwestern University), and Yuyang Yang (Northwestern University)
Development Process for Self-Adaptive Applications of the Internet of Health Things Based on Movement Patterns .437.....	Evilasio Costa Junior (Federal University of Ceará, Brazil), Rossana Maria de Castro Andrade (Federal University of Ceará, Brazil), and Leonardo Sampaio Rocha (State University of Ceará, Brazil)

Posters and demo

Hospital at Home Program: Barriers to Adoption .439.....	Shabana Kapadia (Fraser Health Authority, Canada), Avi Parush (Queen's University, Canada), Sonya Kung (Simon Fraser University, Canada), and Edoye Porbeni (Fraser Health Authority, Canada)
Designing a Core Competency Framework for U.K. Clinical Informaticians .441.....	Alan Davies (University of Manchester, UK), Julia Mueller (University of Cambridge, UK), Alan Hassey (Faculty of Clinical Informatics, UK), and Georgina Moulton (University of Manchester, UK)
Inconsistencies in Handling Missing Data Across Stages of Prediction Modelling: a Review of Methods used .443.....	Antonia Tsoetanova (University of Manchester, UK), Matthew Sperrin (University of Manchester, UK), Niels Peek (University of Manchester, UK), Iain Buchan (University of Liverpool, UK), Stephanie Hyland (Microsoft Research, UK), and Glen Martin (University of Manchester, UK)
Clinical Data Annotation for Parotid Neoplasia Management .445.....	Pierangelo Veltri (Magna Graecia University of Catanzaro, Italy), Patrizia Vizza (Magna Graecia University of Catanzaro, Italy), Mariagiulia Cristofaro (Magna Graecia University of Catanzaro, Italy), and Elvís Kallaverja (University of Naples Federico II, Italy)
Deep Leakage from Gradients in Multiple-Label Medical Image Classification .447.....	Zheng Li (Stockton University, USA), Mykola Hubchak (Stockton University, USA), and Yingying Zhu (University of Texas at Arlington, USA)

mHealthAtlas - An Expert-Based Multi-Sided Platform for the Evaluation of mHealth Applications 449.....
Nicolas J. Lehmann (Freie Universität Berlin, Germany), Muhammed-Ugur Karagülle (Freie Universität Berlin, Germany), Felix Spielmann (Freie Universität Berlin, Germany), Bianca George (Freie Universität Berlin, Germany), Benjamin Zick (Freie Universität Berlin, Germany), Joel Heuer (Freie Universität Berlin, Germany), Eike Taegener (Freie Universität Berlin, Germany), Abd Alah Fahed (Freie Universität Berlin, Germany), Agnès Voisard (Freie Universität Berlin & Fraunhofer FOKUS, Germany), and Joachim W. Fluhr (Charité - Universitätsmedizin Berlin, Germany)

CoViD-19 - Special track

SARS-CoV-2 Ribosomal Frameshifting Pseudoknot: Detection of Inter-Viral Structural Similarity 451.....
Luke Trinity (University of Victoria), Lance Lansing (University of Victoria), Hosna Jabbari (University of Victoria), and Ulrike Stege (University of Victoria)

Information Exchange in Online Health Communities Discussing COVID-19 461.....
Michal Monselise (Drexel University, USA) and Christopher C. Yang (Drexel University, USA)

In Silico Prediction of COVID-19 test Efficiency with DinoKnot 470.....
Tara Newman (University of Victoria), Hiu Fung Kevin Chang (University of Alberta), and Hosna Jabbari (University of Victoria)

Health Informatics: Clinical Information Systems and Artificial Intelligence to Support Medicine in the CoViD-19 Pandemic 480.....
Carlo Combi (Università di Verona, Italy) and Giuseppe Pozzi (Politecnico di Milano, Italy)

Workshop 1 - HealthNLP2021 - The Fourth International Workshop on Health Natural Language Processing

A HIE-BERT Model for Diagnosis Assistant Based on Chinese Obstetric EMRs 489.....
Kunli Zhang (Zhengzhou University, China), Bin Hu (Zhengzhou University, China), Xu Zhao (Zhengzhou University, China), Yu Song (Zhengzhou University, China), Lei Zhuang (Zhengzhou University, China), and Hongying Zan (Zhengzhou University, China)

Topic Extraction from A Cancer Health Forum 491.....
Samuel Miles (IUPUI, USA), Lixia Yao (Merck & Co., Inc., USA), Weilin Meng (Merck & Co., Inc., USA), Christopher M. Black (Merck & Co., Inc., USA), and Zina Ben Miled (IUPUI, USA; Regenstrief Institute, Inc., USA)

Applying Bayesian Hyperparameter Optimization Towards Accurate and Efficient Topic Modeling in Clinical Notes 493.....
Minghao Li (Sema4), Kyeryoung Lee (Sema4), Zongzhi Liu (Sema4), Meng Ma (Sema4), Qi Pan (Sema4), Rong Chen (Sema4), Eric Schadt (Sema4), and Xiaoyan Wang (Sema4)

Impact of Detecting Clinical Trial Elements in Exploration of COVID-19 Literature .495.....	
	<i>Simon Suster (University of Melbourne, Australia), Karin Verspoor (RMIT University, Australia), Timothy Baldwin (University of Melbourne, Australia), Jey Han Lau (University of Melbourne, Australia), Antonio Jimeno Yepes (University of Melbourne, Australia), David Martinez Iraola (Independent researcher, Australia), and Yulia Otmakhova (University of Melbourne, Australia)</i>
An Empirical Study of using Radiology Reports and Images to Improve ICU-Mortality Prediction .497.....	
	<i>Mingquan Lin (Weill Cornell Medicine, USA), Song Wang (The University of Texas at Austin, USA), Ying Ding (The University of Texas at Austin, USA), Lihui Zhao (Northwestern University, USA), Fei Wang (Weill Cornell Medicine, USA), and Yifan Peng (Weill Cornell Medicine, USA)</i>
Identify Diabetic Retinopathy-Related Clinical Concepts using Transformer-Based Natural Language Processing Methods .499.....	
	<i>Zehao Yu (University of Florida, USA), Xi Yang (University of Florida, USA), Gianna L Sweeting (University of Florida, USA), Yinghan Ma (University of Florida, USA), Skylar E. Stolte (University of Florida, USA), Ruogu Fang (University of Florida, USA), and Yonghui Wu (University of Florida, USA)</i>
Robustly Pre-Trained Neural Model for Direct Temporal Relation Extraction .501.....	
	<i>Hong Guan (Arizona State University, USA), Jianfu Li (The University of Texas Health Science Center, USA), Hua Xu (The University of Texas Health Science Center, USA), and Murthy Devarakonda (Novartis, USA)</i>
Self-Supervised Extractive Text Summarization for Biomedical Literatures .503.....	
	<i>Tianyi Xie (University of North Carolina at Charlotte, USA), Yi Zhen (University of North Carolina at Charlotte, USA), Tianqi Li (The Ohio State University, USA), Chuqin Li (University of North Carolina at Charlotte, USA), and Yaorong Ge (University of North Carolina at Charlotte, USA)</i>
Clinical Trial Information Extraction with BERT .505.....	
	<i>Xiong Liu (Novartis Pharma AG, Basel, Switzerland), Greg L. Hersch (Novartis Pharma AG, Basel, Switzerland), Iya Khalil (Novartis Pharma AG, Basel, Switzerland), and Murthy Devarakonda (Novartis Pharma AG, Basel, Switzerland)</i>
Contrastive Representations Pre-Training for Enhanced Discharge Summary BERT .507.....	
	<i>DaeYeon Won (KAIST, Republic of Korea), YoungJun Lee (KAIST, Republic of Korea), Ho-Jin Choi (KAIST, Republic of Korea), and YuChae Jung (KAIST, Republic of Korea)</i>
Dementia Detection using Transformer-Based Deep Learning and Natural Language Processing Models .509.....	
	<i>Ployphat Saltz (University of Washington, USA), Shih Yin Lin (New York University), Sunny Chieh Cheng (University of Washington, USA), and Dong Si (University of Washington, USA)</i>

Study of Pre-Trained Language Models for Named Entity Recognition in Clinical Trial Eligibility Criteria from Multiple Corpora .511.....
Jianfu Li (University of Texas Health Science Center at Houston, USA), Qiang Wei (University of Texas Health Science Center at Houston, USA), Omid Ghasivand (German National Library of Economics, USA), Miao Chen (Covance by Labcorp, USA), Victor Lobanov (Covance by Labcorp, USA), Chunhua Weng (Columbia University, USA), and Hua Xu (University of Texas Health Science Center at Houston, USA)

Identification of Dietary Supplement Use from Electronic Health Records using Transformer-Based Language Models .513.....
Sicheng Zhou (University of Minnesota, USA), Dalton Schutte (University of Minnesota, USA), Aiwen Xing (Florida State University, USA), Jiyang Chen (University of Minnesota, USA), Julian Wolfson (University of Minnesota, USA), Zhe He (Florida State University, USA), Fang Yu (Arizona State University, USA), and Rui Zhang (University of Minnesota, USA)

A Deep Transfer Learning Method for Medical Question Matching .515.....
Yedan Shen (Harbin Institute of Technology (Shenzhen), China), Xiaowei Huang (Harbin Institute of Technology (Shenzhen), China), Buzhou Tang (Harbin Institute of Technology (Shenzhen); Pengcheng Laboratory, China), Xiaolong Wang (Harbin Institute of Technology (Shenzhen), China), Qingcai Chen (Harbin Institute of Technology (Shenzhen); Pengcheng Laboratory, China), and Yuan Ni (Harbin Institute of Technology (Shenzhen), China)

Developing an Interpretable Etiology Classification Model for Ischemic Stroke Based on Chinese Clinical Practice Guideline .517.....
Xiaowei Xu (Chinese Academy of Medical Sciences, China), Lu Qin (Chinese Academy of Medical Sciences, China), Zixiao Li (Capital Medical University, China), and Jiao Li (Chinese Academy of Medical Sciences, China)

Workshop 2 - Machine Learning in Healthcare Data for Precision Medicine (2021)

Accurate COVID-19 Health Outcome Prediction and Risk Factors Identification Through an Innovative Machine Learning Framework using Longitudinal Electronic Health Records .519.....
Alice Feng (The Harker School, USA)

An Automated Feature Selection and Classification Pipeline to Improve Explainability of Clinical Prediction Models .527.....
Pedro A. Moreno-Sanchez (Seinäjoki University of Applied Sciences, Finland)

Creutzfeldt-Jakob Disease Prediction using Machine Learning Techniques .535.....
Arnav Bhakta (Phillips Academy Andover, USA) and Carolyn Byrne (Midwestern University, USA)

Forecasting Trends of Tuberculosis in India using Artificial Intelligence and Machine Learning .543.....
Jay Dulera (Vivekanand Education Society's Institute of Technology, India), Rohan Ghosalkar (Vivekanand Education Society's Institute of Technology, India), Arnab Bagchi (Vivekanand Education Society's Institute of Technology, India), Khushi Makhijani (Vivekanand Education Society's Institute of Technology, India), and Nupur Giri (Vivekanand Education Society's Institute of Technology, India)

NLP-Based Prediction of Medical Specialties at Hospital Admission using Triage Notes .548.....
Émilien Arnaud (Amiens-Picardy University Hospital, France), Mahmoud Elbattah (Université de Picardie Jules Verne, France), Maxime Gignon (Amiens-Picardy University Hospital, France), and Gilles Dequen (Université de Picardie Jules Verne, France)

Tutorials

Fairness in Healthcare AI .554.....
Muhammad Aurangzeb Ahmad (University of Washington Bothell), Carly Eckert (University of Washington), Christine Allen (KenSci Inc.), Vikas Kumar (KenSci Inc.), Juhua Hu (University of Washington Tacoma, USA), and Ankur Teredesai (University of Washington Tacoma, USA)

Mining Genetic, Transcriptomic and Imaging Data in Parkinson's Disease .556.....
Guglielmo Cerri (University of Verona, Italy), Manuel Tognon (University of Verona, Italy), Andre Altmann (University College London, UK), and Rosalba Giugno (University of Verona, Italy)

Author Index 559......