

## Editorial Preface

# The Rise of Telehealth, Streaming, and Thick Data Analytics

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We are delighted to continue our efforts at IJEACH to create a new forum for exchange of information and publishing the excellent research work of scholars on all aspects of the emerging trends in the digitization and automation of healthcare. The recent novel virus (COVID-19) pandemic has changed our perception on the future healthcare systems. There is an urgent need for accommodating more effective telehealth to deliver care at a distance. Generally, telehealth encompasses both provider-to-patient and provider-to-provider communications, and can take place synchronously (telephone and video), asynchronously (patient portal messages, e-consults), and through virtual agents (chatbots) and wearable devices (Wosik, Jedrek, Marat Fudim, Blake Cameron, Ziad F. Gellad, Alex Cho, Donna Phinney, Simon Curtis et al., 2020). However, the critical need for social distancing among physicians and patients continues to disrupt the practice of medicine and the delivery of healthcare pushing for new forms of care delivery and integration. We are witnessing tsunami of growth in applications that integrate virtual visits with various forms of remote patient monitoring (RPM) as well as significant growth in mHealth and personal emergency response systems' (PERS) applications. Furthermore in shifting towards more virtualized care, there is a greater need to accommodate the data collected from RPM by the provider infrastructure and the use streaming analytics to provide real-time insight into the decision-making toolbox. However, event stream processing, which automatically processes & analyzes large scale real-time information and in-motion data, requires the integration of the provider practice data such as the community of practice (CoP) conversations and the learning process around any clinical case which always points to new insights and understanding. This brings on to the table the need for incorporating more qualitative data such as the CoP insights into the event streams analytics. This addition is generally called Thick Data analytics (Fiaidhi, Jinan, 2020), in which more weight are given to on the qualitative data around any quantitative data such of those collected from the RPM to provide the context that enables the clinicians to understand the clinical case and arrive at important decisions. Based on thick data analytics, one can understand the quirks of patient case to predict how this case can progress in the future. Without this understanding, quantitative patterns alone may suggest a black box open for wild interpretations. This trend will demonstrate the benefit of integrated healthcare services. The trauma resulting from the COVID-19 crisis will lead to a clear growth opportunity for one-stop virtual visit and RPM streaming solutions that have the power of incorporating the care team qualitative assessments. Growth in the telehealth space with these added value capabilities will be sustained beyond the COVID-19 pandemic for the developers and venders who can deliver:

- Patient-Centered and User-Friendly sensors and remote diagnostic equipment with reliable and positive patient outcomes.
- Usable smart digital health applications that uses artificial intelligence (AI) and machine learning (ML) along with Interactive Virtual Assistants (IVAs) and robotics to provide wide spread virtual care.
- Deployments of thick data analytics that can help clinicians learn more in-depth insights about clinical case progression among the local community as well as among the diverse patient populations.
- Integration of streaming analytics to provide real-time analytics indicating to possible patterns that might trigger intervention or treatment
- Adherence to cybersecurity and virtual care safeguards through enforcing the privacy regulations and avoiding possible data breaches.

Figure 1 illustrates the main new contributors to virtual care.

## IN THIS ISSUE

In this issue, we have received twenty one submissions in which reviewers accepted only four papers. The first regular paper is entitled “Prediction of Heart Cancer Data Using Hybrid Optimization

Figure 1. Major components for enforcing successful virtual care



and Machine Learning Techniques” by Kalpdrum Passi, Prayushi Patel (Laurentian University) and Chakresh Kumar Jain (Jaypee Institute of Information Technology) This paper investigated the prediction of heart cancer using the UCI heart disease dataset. The analysis conducted in this paper shows that the hybrid Particle Swarm Optimization with Grey Wolf Optimization (HPSOGWO) gives the best performance for Switzerland and Hungarian datasets with accuracy of 99.86%, 93% for Hungarian dataset and for the Cleveland dataset, the accuracy of 96%.

The second paper is entitled “The Effects of Taping on Muscle Activity and Throwing Velocity in Fatigued Baseball Players” by Kara-Lyn R. Harrison (University of Manitoba), Paolo Sanzo, Carlos Zerpa and Taryn Klarner (the last three authors are from Lakehead University). The purpose of this pilot study was to investigate the effect of taping (Kinesio Tape® and no tape) on the velocity of an overhead baseball throw and muscle activation of the supraspinatus, infraspinatus, and pectoralis major muscles in baseball players after muscle fatigue was induced. The muscle activation measured using surface EMG findings in the current pilot study was not significantly different between taping conditions (Kinesio Tape® and no tape) in the supraspinatus, infraspinatus, and pectoralis major muscles in the three phases on an overhead baseball throw. The results of this pilot study found that the application of tape to the shoulder did not have an effect on throwing velocity when completing an overhead baseball throw. More research is required, however, due to the limited sample size and challenges with recruitment due to the onset of the COVID-19 pandemic during the data collection and recruitment phase of the current pilot study.

The third article is entitled “The Immediate Effects of Tai Chi via a Video Platform Delivery on the Postural Stability of Healthy Young Adults” by Zachary A. M. Cordingley, Paolo Sanzo and Carlos Zerpa (all authors are from Lakehead University). The aim of this study was to investigate the effects of a single Tai Chi session on the postural stability of healthy young adults. The findings of this study suggest that a single Tai Chi intervention may improve postural stability by reducing MSV when visual sensory input is removed; however, the biomechanical mechanisms behind the decrease remain unknown.

The fourth paper is entitled “Detection and Segmentation of Medical Images Using Generic Algorithms” by Hardev Mukeshbhai Khandhar, Chintan M Bhatt (both from Charotar University of Science and Technology) and Simon Fong (from University of Macau). In this paper semantic segmentation of medical images has been employed to analyze the synthetic features of an area of interest. The authors applied several image segmentation techniques for segmenting neuroendocrine tumor with high accuracy.

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