Application of Mining Large Data Sets of Patient Data to Improve Quality and Reduce Cost of Care

Sriram Krishnan, KPMG Analytics

Abstract
Healthcare is going through a massive change today, with a movement from traditional fee-for-service to outcomes-based medicine. This transformation has been accelerated with the passage of the Patient Protection and Affordable Care Act (PPACA) in 2010. In this new environment, it is critical that healthcare providers are able to improve clinical and operational performance with the goal of improving quality of care while reducing costs. To do so, it is necessary to identify ways to optimize delivery of care. At the same time, the PPACA as well as the Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009, has led to an explosion in the availability of patient data. This in turn has provided opportunities to develop solutions which mine this data to improve quality and reduce the cost of care, by leveraging data over very large groups of patients. This talk will explore the challenges and opportunities which can be gained by mining patient data from millions of patients for improving the delivery of care, and explore the future by incorporating emerging sources of data, including genomics, proteomics, and other individualized patient data.

Biography
Krishnan is an experienced executive with 18 years of experience in medical ultrasound, healthcare IT, data integration and clinical informatics. He is well recognized in the field of healthcare IT, data mining, and predictive models, with over 28 patents and 30 papers, as well as several invited talks at major conferences on healthcare analytics and a best paper award at the ICML-A. He has deep experience in working with clinical and claims data, and working with healthcare providers to extract and mine their data in a privacy-preserving fashion to help address clients address critical questions in healthcare. In addition, Dr. Krishnan has worked with mining genomic information, and is a co-inventor on a novel gene sequence that can be used to help predict hypoxia in lung cancer patients. He has experience both in product development and delivering analytics solutions to healthcare clients.
User Experience of Machine Learning in Healthcare

Allison Gillmore, One Medical

Abstract
Machine learning algorithms produce user experiences that strongly influence how their results are received, used (or not), and valued (or not). The user experience of an algorithm can guide, influence, and support. It can also mislead, confuse, or frustrate. As machine learning is increasingly incorporated into healthcare products, it is becoming critical for data scientists applying these algorithms to understand what makes the difference. Drawing on real-life examples from healthcare products, principles of behavioral economics, and the interactive machine learning literature, I will propose several best practices for deploying machine learning algorithms with effective user experiences.

Biography
Allison Gilmore is a Senior Healthcare Data Scientist with the Clinical Quality and Value team at One Medical Group, whose mission is to build a world-class primary care system that delivers the highest-quality care and service affordably. Before joining One Medical, Allison led the healthcare data science practice at Ayasdi, a machine learning software company. She holds a Ph.D. in mathematics from Columbia University and an M.Phil. in sociology from Oxford University. Her technical research interests include machine learning, graph analytics, and geometric and topological data analysis.
Clinical Data Science: Opportunities and Examples

Gyorgy Simon, University of Minnesota

Abstract
In this talk, we will first attempt to define what clinical data science is and how it differs from data science in other industries. We will review the opportunities for data science in clinical research informatics and clinical practice, giving some concrete examples from my research at the University of Minnesota and Mayo Clinic. Finally, we will look at where the trajectory of clinical data science leads us.

Biography
Gyorgy J. Simon, PhD, is an Assistant Professor in the Department of Medicine and a core faculty in the Institute for Health Informatics at the University of Minnesota. Prior to joining the University of Minnesota, he was an Associate Consultant in the Department of Health Sciences Research at Mayo Clinic with a focus on clinical data science in the Robert D. and Patricia E. Kern Center for the Science of Health Care Delivery. His background is in computer science and statistics and his current research interest primarily focuses on developing novel large-scale data mining approaches towards discovering clinical knowledge from electronic health records, image and genomic data, and integrating this knowledge into clinical decision support for increasingly personalized treatments. Dr. Simon is the principal investigator or co-investigator on several extramural grants from NSF and NIH addressing computational issues in the application of data science to health care.
Industry Track 2

How Do We Treat Patients like Valued Customers?

Sanjay Sarma, Prosperata

Abstract
The notion of treating patients like valued customers in healthcare involves:

- a fundamental transformation of healthcare from episodic, reactive care to a highly advanced system that leverages genetic, psycho-behavioral, social, clinical and environmental data and insights through advanced analysis, predictive algorithmic applications, and artificial intelligence
- that, combined with the support of health system and healthcare payer leadership, organizational and cultural transformations
- creates a new futuristic system that predicts and prevents disease while providing necessary care
- by empowering patients with engaging experiences that motivate and inspire dynamic collaboration across the healthcare ecosystem
- that dramatically improve individual and societal health outcomes affordably and equitably.
- The responsibility is shared equally between patients and consumers, providers and health insurers, policy makers and technology vendors.

First, providers and payers must collaborate effectively to unify the experience for patients. Providers must share data from EMRs and other relevant applications to inform payers of the health status of their members. Payers must also share data on coverages levels, care approvals, and expected reimbursements, bonuses and penalties.

Second, EMR and other companies that store patient-level data must provide open APIs to facilitate data sharing and collaboration. Appropriate incentive structures and regulations must be in place to make this happen.

Most importantly, patients must take charge by demanding access to the information and resources that will inspire them towards healthy behaviors and wellness.

We are currently at a critical convergence point of forces in healthcare that is driven by rapid advancements in data sciences and technology, massive economic challenges to the system and a combination of individual and societal forces. The time to make this vision a reality is now, and the opportunity has never been greater.
Biography
Sarma, co-founder of Prosperata, is an executive consultant, entrepreneur and thought leader in healthcare technology. His passion lies in using advanced analytics, consumer-driven technologies and industry-wide collaboration to transform the patient experience. Sanjay has led enterprise-wide information management strategic initiatives for leading health systems, integrated delivery networks and academic medical centers. He has also worked on transformational initiatives to adopt customer-centric processes and technologies for Fortune 500 healthcare companies. His background includes IT strategic planning, business analysis, clinical analytics, and data governance. Sanjay is widely recognized for his ability to analyze complex product and market dynamics to provide valuable insights that impact patient experiences, healthcare outcomes and costs. Sanjay has previously worked for Deloitte Health Innovation, IBM Advanced Analytics, and Allscripts at Northwell Health. He holds a Master's in Public Health from the University of Illinois at Chicago and a dual Bachelor's in Chemistry and Classics from the University of Virginia.

Accepted Papers
11:20 - 11:35
Personalized Recommendation in Online Health Communities with Heterogeneous Network Mining
Christopher Yang

11:35 - 11:50
Big-Data Based Decision-Support Systems to Improve Clinicians™ Cognition
Don Roosan

11:50 - 12:05
Improvements on the Effectiveness and Scalibility of CMS Referral Analytics System
Xin Wang

12:05 - 12:20
A Comprehensive Informatics Framework to Increase Breast Cancer Risk Assessment and Chemoprevention in the Primary Care Setting
Joseph Finkelstein

12:20 - 12:35
Supporting Patient Healing through ICUsmartCARE: Technologies that Enable Increased Family Presence, Communication, and Information Flow
Anthony Faiola