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University of Pittsburgh School of Medicine, USA

Predictive modeling and its applications in healthcare

Now, more than ever, Electronic Health Records (EHRs) are generated in large quantities and in diverse contents. This explosion of information has naturally enabled powerful patient data analyses to potentially improve healthcare. This talk will review several on-going research projects focusing on predictive modeling from structured and unstructured EHR data and real-time production systems deployed at hospitals that we have developed in the Department of Biomedical Informatics, University of Pittsburgh (Pitt). We have developed Bayesian networks and utilized machine learning methods in conjunction with natural language processing to predict 30-day hospital readmissions, detect infectious diseases from emergency department visits, classify the severity of psychiatric reports; we will also report our pilot study on infant mortality predictive modeling based on various EHR data and non-EHR information. We have developed several production systems deployed at the University of Pittsburgh Medical Center (UPMC) that provide daily influenza surveillance reports, real-time laboratory reporting and event-driven based 30-day readmission risk prediction; we also developed a national retail data monitor system at Pitt, that monitors over-the-counter medicine sales on a daily basis from 30,000+ retail stores in the US. I will demonstrate one of our currently deployed production systems, the System for Hospital Adaptive Readmission Prediction and Management (SHARP). This is integrated into the EHR system in place at the Children's Hospital of Pittsburgh of UPMC and demonstrates how the research we have developed can translate directly into practice.

Biography

Fuchiang Tsui has received his PhD in Electrical Engineering, Premed training and Postdoctoral training in Biomedical Informatics at the University of Pittsburgh, USA. He is the Director of the Tsui Laboratory. He has published more than 100 peer-reviewed papers and has been working in healthcare analytics for more than 20 years. His research interests include clinical informatics, population informatics, machine learning, data mining, natural language processing, mobile healthcare, data warehouse and large real-time production systems.

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