Abstract

Baikal and Donatello – A Prescriptive Analytics Infrastructure for Real-World Data and Precision Medicine

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Abstract:

Health care is in the midst of a digital transformation. The widespread adotpion of electronic health records, cost-effective genomic testing, and digital consumer health products now allow us to capture a detailed picture of an individual's health, outside of traditional health care encounters. Using these data to develop digital therapeutics, analytic models, and real-time clinical decision support has gained significant interest, but harnessing these data to produce actionable information remains a challenge. The use of multiple ontologies, non-standard methods for real-world data collection and analysis, and the lack of secure and scalable computing infrastructure all pose barriers to the routine use of these data. To overcome these challenges, we have developed Baikal, a data analytics infrastructure that is able to acquire high-quality information from these digital health sources and integrate it with long-term outcomes to support biomedical research and the implementation of precision medicine initiatives. Using this infrastructure, which is built on open-source technologies, we have also developed Donatello, a framework that can support computational phenotyping, predictive and prescriptive model training, and the deployment of clinical analytic models within a production enviornment. We have used these platforms to assess real-world data quality, develop computed phenotypes in cardiology and oncology, and implement artifical intelligence methods to identify and predict outcomes in oncology care. The use of such platforms will allow us to scale these approaches and ensure high quality data and analytics to advance precision medicine.

Biography:

Dr. Schulz is an Assistant Professor of Laboratory Medicine at Yale School of Medicine. He received his MD and PhD in Microbiology, Immunology, and Cancer Biology from the University of Minnesota and completed his clinical training in Clinical Pathology and Transfusion Medicine at Yale. He is the Director of the CORE Center for Computational Health and the Medical Director of Data Science for Yale New Haven Health, where he manages the health system's big data infrastructure, with a research focus on the development of real-time clinical predictive and prescriptive algorithms that can be used at the point-of-care.

Publication of speakers:

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