UTHealth
The University of Texas Health Science Center at Houston
School of Biomedical Informatics

DSICCR Tuesday Seminar Series

March 7th, 12pm-1pm, Webcast Click Here

Graduate Training in Data Science – A Personal Experience

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Biomedical research encompasses scientific investigations that span from small molecule drugs, to subcellular and cellular functions, to tissue and organs, and to population health. Combined with high throughput technology and other methodology advancements, cross-scale biomedical research generates a vast amount of data at an alarming rate. These data need to be analyzed at various scales to gain a deeper understanding of disease mechanisms and to develop better therapeutics. This presentation focuses on applying data science and AI approaches to multiple-scale, data-driven research in biomedicine for disease analysis, prediction and interpretation. At the patient level, I applied explainable AI methods to predict disease risk and identify factors highly relevant to cancer development using individual-level clinical data. At the cellular level, I designed a Transformer-based contrastive cell-name-gene-expression learning framework to align cell names and gene expression patterns. This novel algorithm enables zero-shot cell type prediction for cells with single-cell RNA-Seq data but lacking training samples. As one of the major contributors, I worked with our team to develop two award-winning NLP systems to extract knowledge from biomedical literature to analyze novel relationships among genes, drugs and other biomedical entities. These projects not only helped me to gain extensive experience in data science and AI methodology design, development, and deployment, but also offered novel insight into disease risk interpretation and robust tools to understand disease mechanisms.

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