Joint Embedding of Sequential Data and Knowledge Graphs with application to Predictive Analytics in Healthcare

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OBJECTIVES

1. To develop methodologies that can learn representations simultaneously from heterogeneous clinical events in the EHR data and the medical knowledge graphs for patient outcome prediction with enhanced interpretability.
2. To develop an interpretable framework to jointly infer the correspondence among different modalities in the heterogeneous EHR data and generate high-throughput phenotype candidates.

HIGHLIGHTS

Computational Phenotyping from EHR Data and Diagnosis-Medication Correspondence Recovery
- Developed frameworks to:
  a) explicitly model the hidden interactions between diagnoses and medications in EHR data [1].
  b) discover phenotypes and learn patient representations from varying-length temporal EHR data [2].
- Obtained more interpretable phenotypes and diagnosis-medication correspondence and achieved higher prediction accuracy.

Representation Learning from EHR Data and Medical Knowledge Graph
- Developed a unified framework to learn medical concept embeddings from both EHR data and medical ontologies [3].
- Explicitly handle the inconsistency between EHR data and the medical ontologies, resulting in enhanced interpretability and improved prediction accuracy.

SELECTED PUBLICATIONS