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Graph-Driven Generative Models for Heterogeneous Multi-Task Learning

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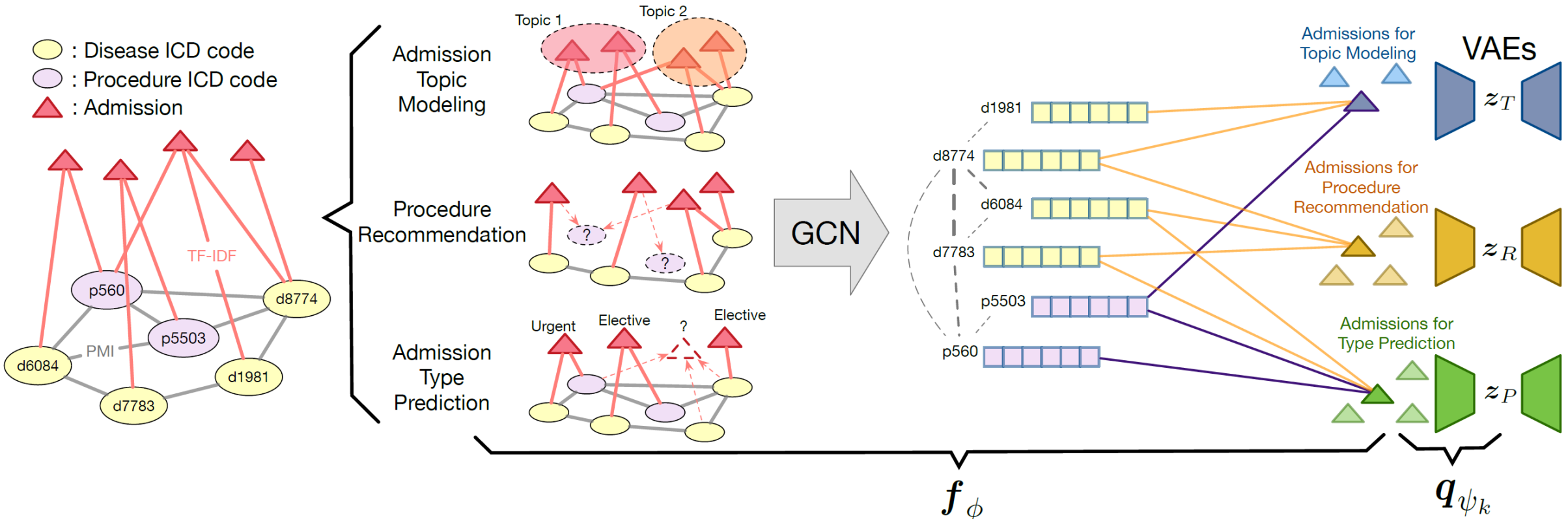
Graph-Driven Variational Autoencoder (VAE)

- Multi-task learning based on VAE with multiple generative processes
- A single graph is built for the shared inference network
- A GCN that embeds nodes and specializes the usage to different tasks
- A universal solution for various healthcare tasks



Task, Graph, and Results

- Task specification

Task	Input	Output
Topic modeling	Disease and proc. ICD codes	Learned topics
Procedure recommendation	Disease ICD codes	Procedure ICD codes
Admission type prediction	Disease and proc. ICD codes	Admission type

- Graph construction
  - Edges between ICD codes: via point-wise mutual information
  - Edges between ICD codes and admissions: via TF-IDF score
- Both the use of graph and multi-task learning help improve performance

Method	Topic Modeling	Procedure Recom.	Admission Pred.
Baseline	13.2	26.2	86.55
GD-VAE (single)	14.2	27.9	86.91
GD-VAE	15.1	29.6	88.01