

Med-KG: A General-Purpose Knowledge Graph for Understanding Clinical Interactions

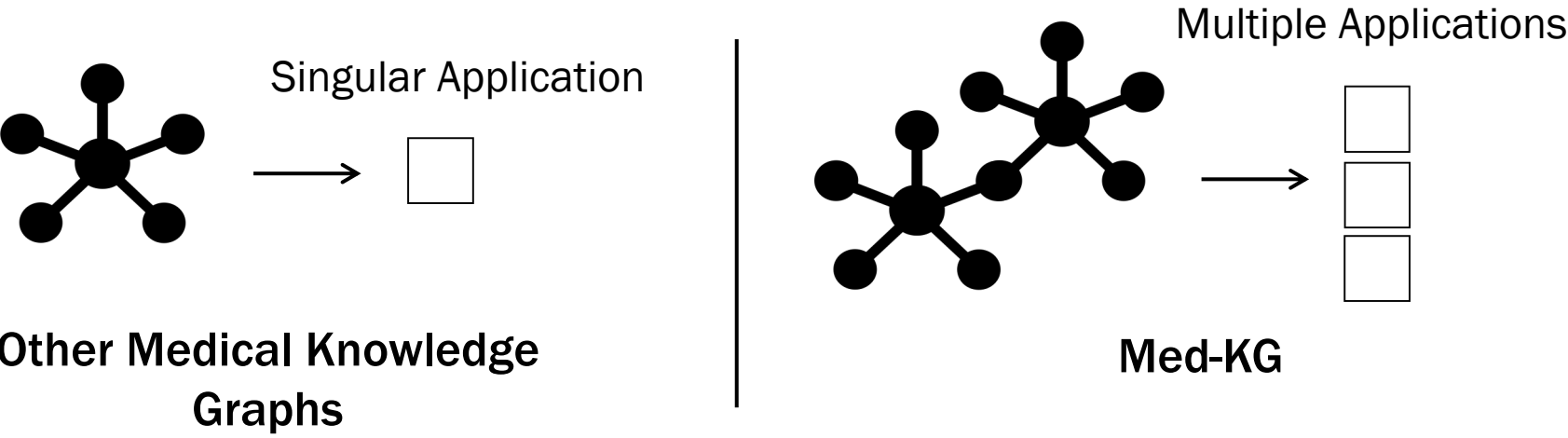


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Bridging structured knowledge and language understanding for broad clinical insights using Knowledge Graphs & Large Language Models

Motivation

MIMIC-IV contains rich, multimodal data (e.g., notes, labs, prescriptions) that is decentralized across multiple files → knowledge graph enables structure



Data

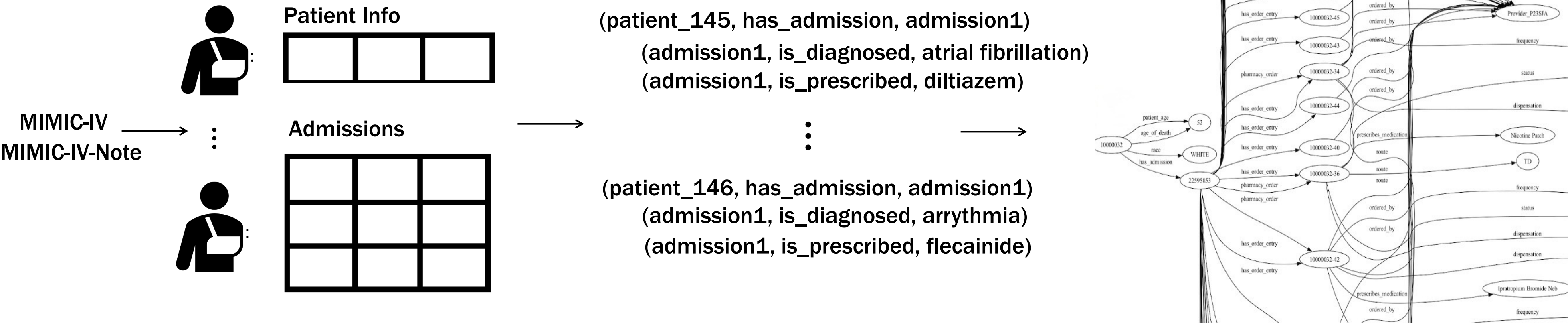
Incorporating tabular, textual and image data

MIMIC-IV	MIMIC-IV-Note
<div><div>admissions.csv.gz</div><div>d_hcpcs.csv.gz</div><div>d_icd_diagnoses.csv.gz</div><div>d_icd_procedures.csv.gz</div><div>d_labitems.csv.gz</div><div>diagnoses_icd.csv.gz</div><div>drgcodes.csv.gz</div><div>emar.csv.gz</div><div>emar_detail.csv.gz</div><div>hcupsevents.csv.gz</div><div>labevents.csv.gz</div></div>	<div><div>microbiologyevents.csv.gz</div><div>omr.csv.gz</div><div>patients.csv.gz</div><div>pharmacy.csv.gz</div><div>poe.csv.gz</div><div>poe_detail.csv.gz</div><div>prescriptions.csv.gz</div><div>procedures_icd.csv.gz</div><div>provider.csv.gz</div><div>services.csv.gz</div><div>transfers.csv.gz</div></div>
	<div><div>discharge.csv.gz</div><div>discharge_detail.csv.gz</div><div>radiology.csv.gz</div><div>radiology_detail.csv.gz</div></div>

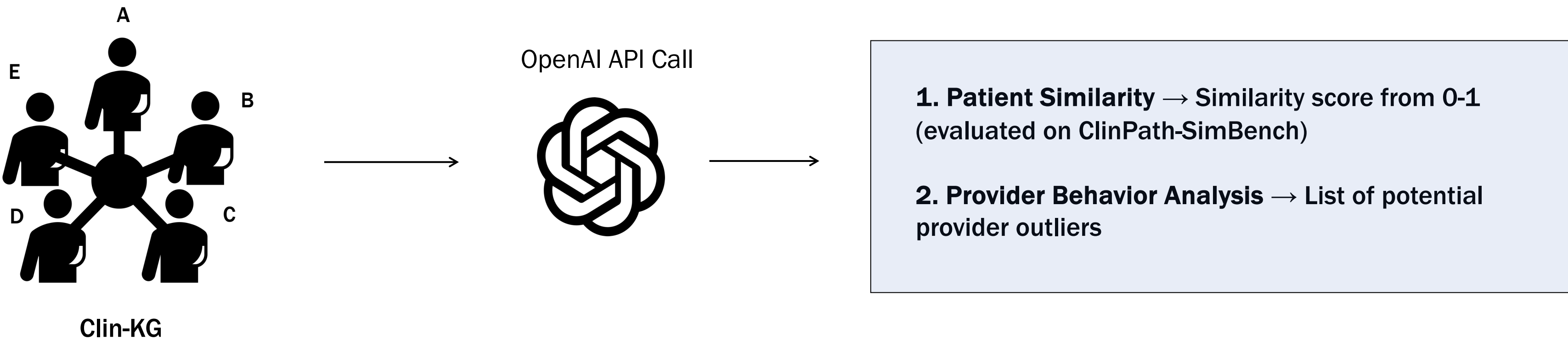
Method

ClinPath: Knowledge Graphs with LLM Reasoning For Understanding Clinical Interactions

1) Clin-KG Generation



2) LLM Reasoning: Patient Similarity and Provider Behavior Analysis



Applications

- Patient Similarity Analysis**
How to identify similar patients to provide clinical decision-making support?
Are there differences in treatment among similar patients?
- Provider**
Are there anomalies in provider behavior (overprescribing, upcoding, etc.)?
How to quantify provider success rate?
- Answer Clinical Research Questions**
What types of physician order entries are discontinued?
What types of admissions result in inter-hospital transfers?

Future Work

- Expand Tasks**
- More Quantitative Evaluations**
- Mental Health Data: NIMH Archive**

Acknowledgements

Thank you to Professor Adam Wierman for his support on this project through the Caltech CS 145 class.