



ifis

Institut für Informationssysteme
Technische Universität Braunschweig

Ranking Narrative Query Graphs for Biomedical Document Retrieval

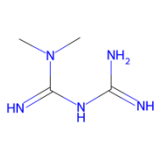
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Narrative Service

Metformin [Suggest a drug](#) [Search History](#)



Metformin
Molecular Formula: C₄H₁₁N₅
Molecular Mass: 129.17
AlogP*: -1.03
LogP*: -0.92
Acid pK_a: -
Basic pK_a: 12.33
LogD pH 7.4*: -5.62
* = computed value
InChI: 1S/C4H11N5/c1-9(2/4(7/8-3(5/6)/1-2H3,(H5,5,6,7,8))
See ChEMBL: [CHEMBL1431](#)
Structure Search: [PubPharm](#)



Overview	
Drug	
DTD Network	
Keywords	
Indications	1256
Administration	77
Target Interactions	1288
Lab Methods	174
Species	430
HealthStatus	64
Drug Associations	1435
Drug Interactions	239
Adverse Effects	757
Tissue	90
Recent Papers	10

Indications (Study Phase via [clinicaltrials.gov](#))

Diabetes Mellitus **4981** **IV** Diabetes Mellitus, Type 2 **4579** **IV** New
Obesity **698** **IV** Syndrome **645** **IV** Diabetes, Gestational **321** **IV**
Death **271** **?** Acidosis, Lactic **256** **IV** Weight Loss **248** **I**
Hyperglycemia **213** **IV** Weight Gain **203** **IV** Myotonic Dystrophy
Metabolic Diseases **173** **IV** Colorectal Neoplasms **169** **III** Metab

Administration

Delayed-Action Preparations **246** Tablets **217** Injections **215** Administration, Oral **198** Transdermal **198** Myelogram **198** Capsules **198**
Dosage Forms **45** Injections, Intraperitoneal **44** Liposomes **37** modified release tablets **33** Microspheres **30** granulate **28**
Injections, Subcutaneous **27** Drug Delivery Systems **25** Powders **23** mucoadhesive preparations **20** Micelles **18** pellets **18** microneedle **14**
Pharmaceutical Vehicles **13** Emulsions **13** Suspensions **11** Insulin Infusion Systems **10** Injections, Intravenous **9** Suppositories **9** Spray **8**

Narrative Service [?](#) Last updated: 2024.11.21 Search Drug Overviews Long COVID Overview Help Impressum  

[PubPharm](#)

If you want to cite our system or are interested in more information, see [10.1007/s00799-023-00356-3](#)

Query Builder [Keyword Search](#)

Metformin Browse treats Diabetes Mellitus Browse **Add** **Search**

[Search History](#)

How to Search: [?](#)

Example Queries

Data Source:
☒ PubMed ([Help](#))
☐ LitCovid ([Help](#))
☐ Long Covid ([Help](#))
☐ Covid 19 Pre-Prints
☐ via ZBMED ([Help](#))

Results by year:



Visualization by:
☒ Substitution
☐ MeSH-Taxonomy

Classifications:
☐ Pharm. Technology


Filter by type:
☐ Systematic Review

Results: [?](#)


Latest Publications First

Search in result titles:

[7164 Documents](#)



Gestational diabetes mellitus: relationship of adverse outcomes with severity of disease.
in: The journal of maternal-fetal & neonatal medicine : the official journal of the European Association of Perinatal Medicine, the Federation of Asia and Oceania Perinatal Societies, the International Society of Perinatal Obstetricians, Vol. 37 No. 1 (Dec 2024) | 12/2024
by: Karkia, R | Giachino, T | Hii, F | Bradshaw, C | Ramadan, G | 1+
PMID: [38844413](#)



Provenance



Document Graphs

[View Paper](#)[Open in a new tab](#)

☒ All

☒ Disease

☒ Drug

☒ Gene

☒ HealthStatus

☒ Method

☒ Species

Gestational diabetes mellitus: relationship of adverse outcomes with severity of disease.

Karkia, R | Giacchino, T | Hii, F | Bradshaw, C | Ramadan, G | Akolekar, R

The journal of maternal-fetal & neonatal medicine : the official journal of the European Association of Perinatal Medicine, the Federation of Asia and Oceania Perinatal Societies, the International Society of Perinatal Obstetricians, Vol. 37 No. 1 (Dec 2024)

12/2024

AIMS: To derive accurate estimates of **risk** of maternal and neonatal complications in **women** with **gestational diabetes mellitus (GDM)** and to investigate the association of the effect size of these **risks** on subgroups of **GDM** managed with **dietary modification**, **metformin** and **insulin therapy**. METHODS: This was a large retrospective **cohort study** undertaken at a large maternity unit in the United Kingdom between January 2010 and June 2022. We included singleton pregnancies that booked at our unit at 11-13 weeks' gestation. The rates of maternal and neonatal complications in pregnancies with **GDM** that were managed by a multidisciplinary team (MDT) in the specialist high-risk clinic were compared to those in non-**diabetic** pregnancies. We stratified pregnancies with **GDM** into those that were managed with diet, **metformin** and **insulin** to pregnancies without **diabetes**. **Logistic regression analysis** was carried out to determine **risks** of **pregnancy complications** in pregnancies with **GDM** and its treatment subgroups. **Risks** were expressed as absolute **risks (AR)** and **odds ratio (OR)** (95% **confidence intervals (CI)**). Forest plots were used to graphically demonstrate **risks**. RESULTS: The study population included 51,211 singleton pregnancies including 2089 (4.1%) with **GDM** and 49,122 (95.9%) controls without **diabetes**. In pregnancies with **GDM**, there were 1247 (59.7%) pregnancies managed with diet, 451 (21.6%) with **metformin** and 391 (18.7%) who required **insulin** for maintaining euglycaemia. Pregnancies with **GDM** had higher maternal age, **body mass index (BMI)**, higher rates of Afro-Caribbean and South Asian racial origin and higher rates of chronic **hypertension**. In pregnancies with **GDM** compared to non-**diabetic** controls, there was an increased rate of **preterm delivery**, delivery of LGA **neonate**, **polyhydramnios**, **preeclampsia**, need for IOL, elective and **emergency CS** and PPH whereas the rate of delivery of SGA **neonates** and likelihood of an unassisted **vaginal delivery**

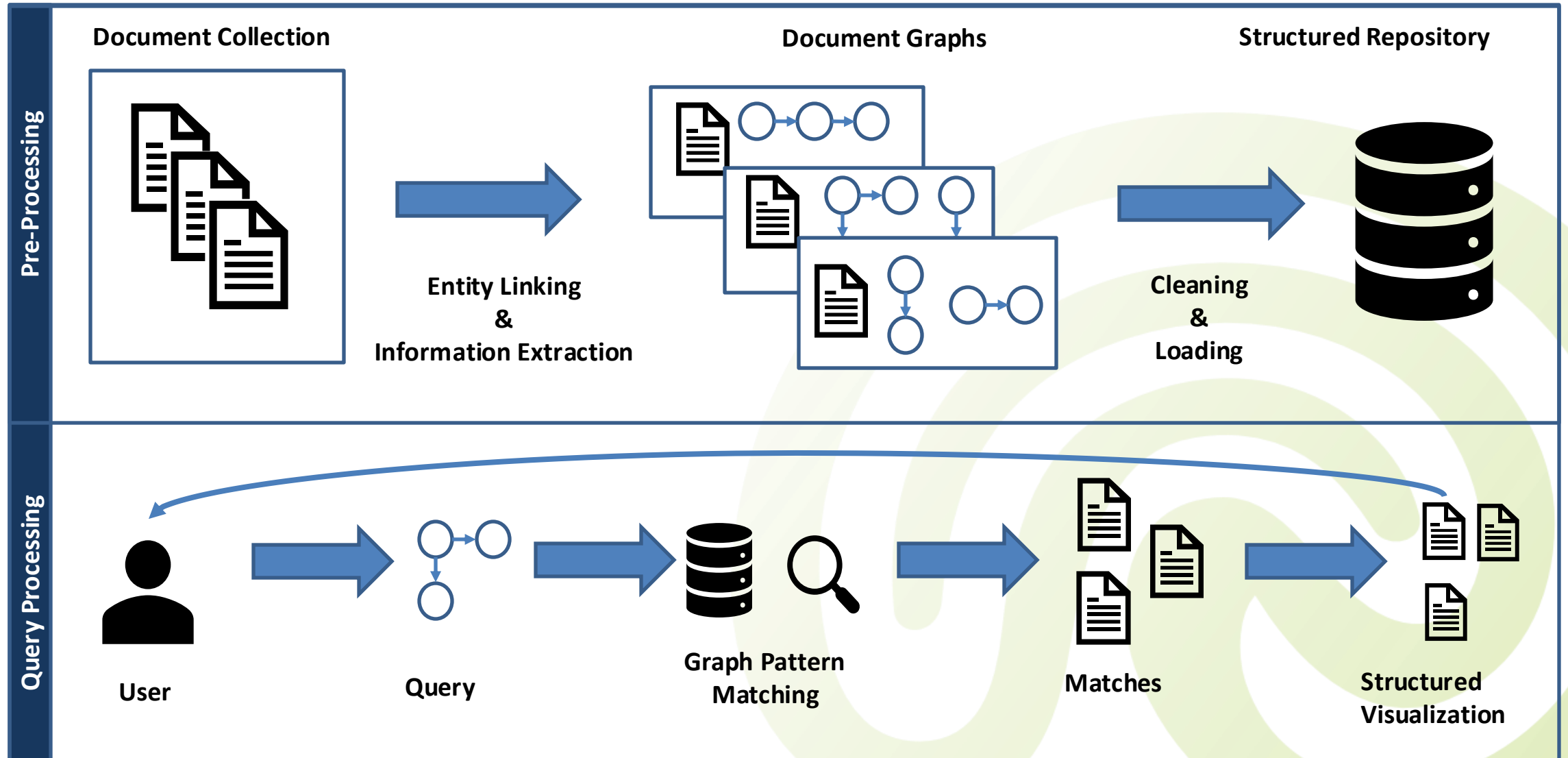
Ranking Narrative Query Graphs



<https://github.com/HermannKroll/RankingNarrativeQueryGraphs/>



Discovery System



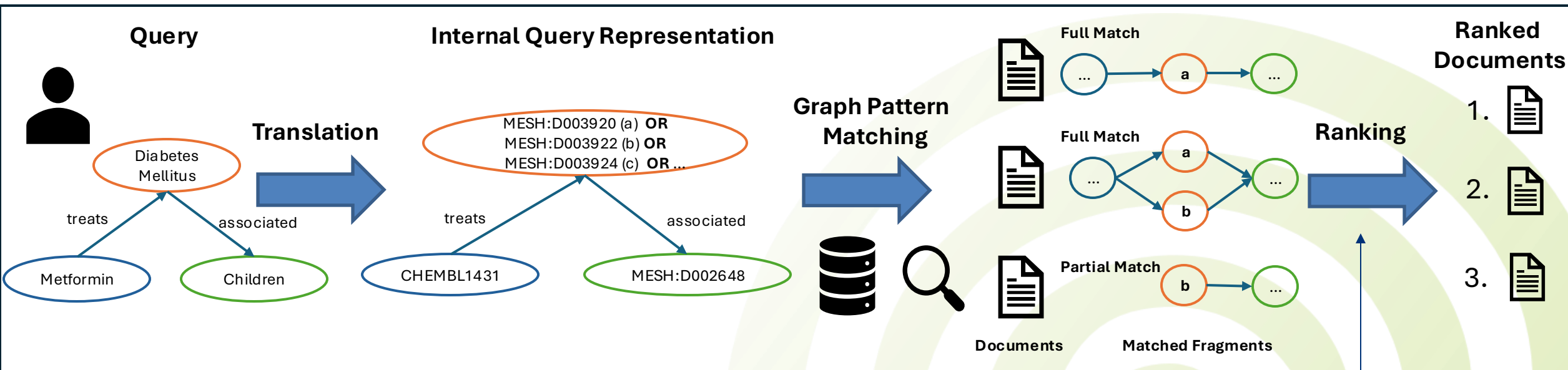


Research Questions

- Problem: graph-based retrieval matches queries isomorphically
 - i.e., all correct answers show the same level of relevance
- Research Question:
 - So, how can graph-based document representations be effectively ranked for document retrieval purposes

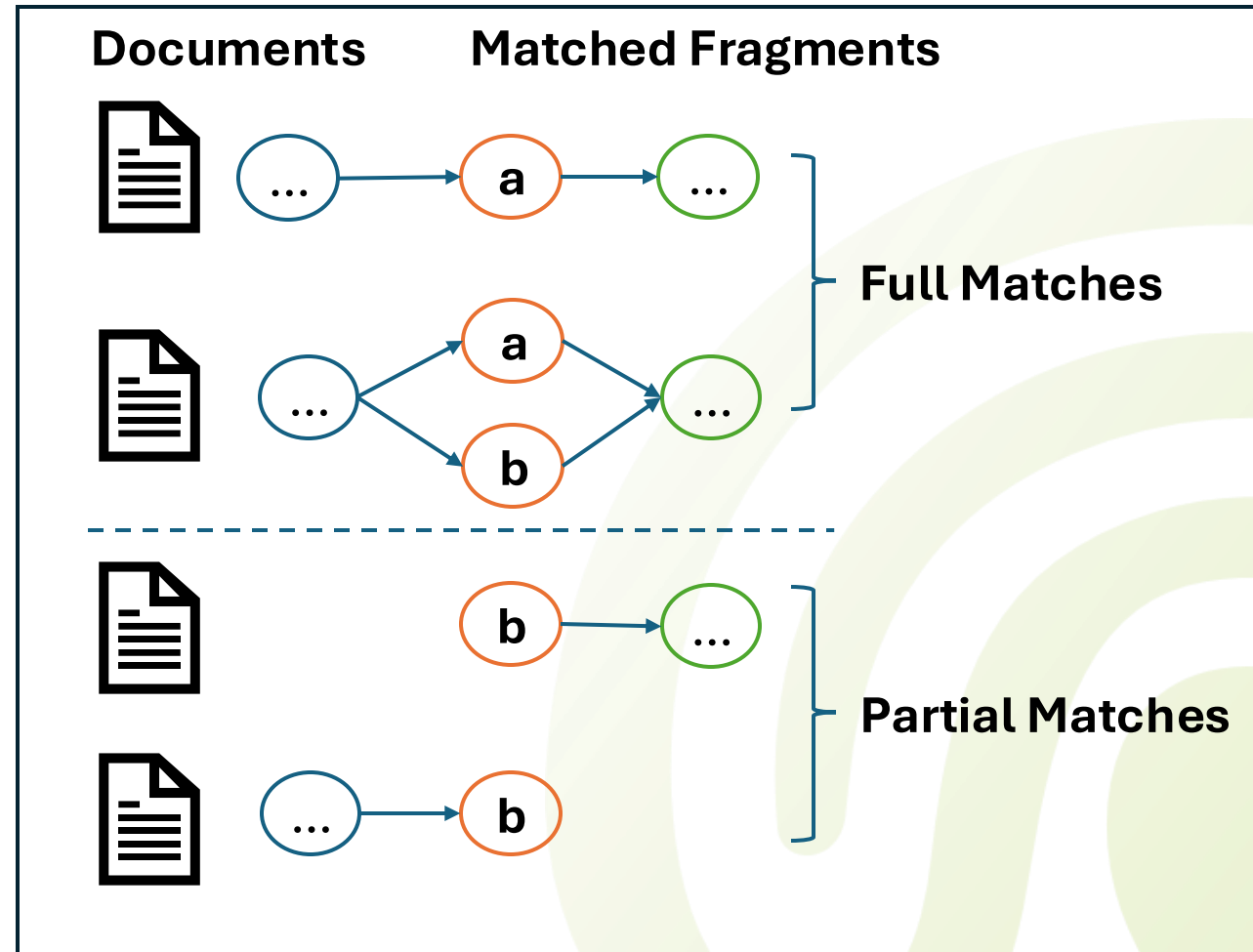


Method Design





Partial Matching



Evaluation





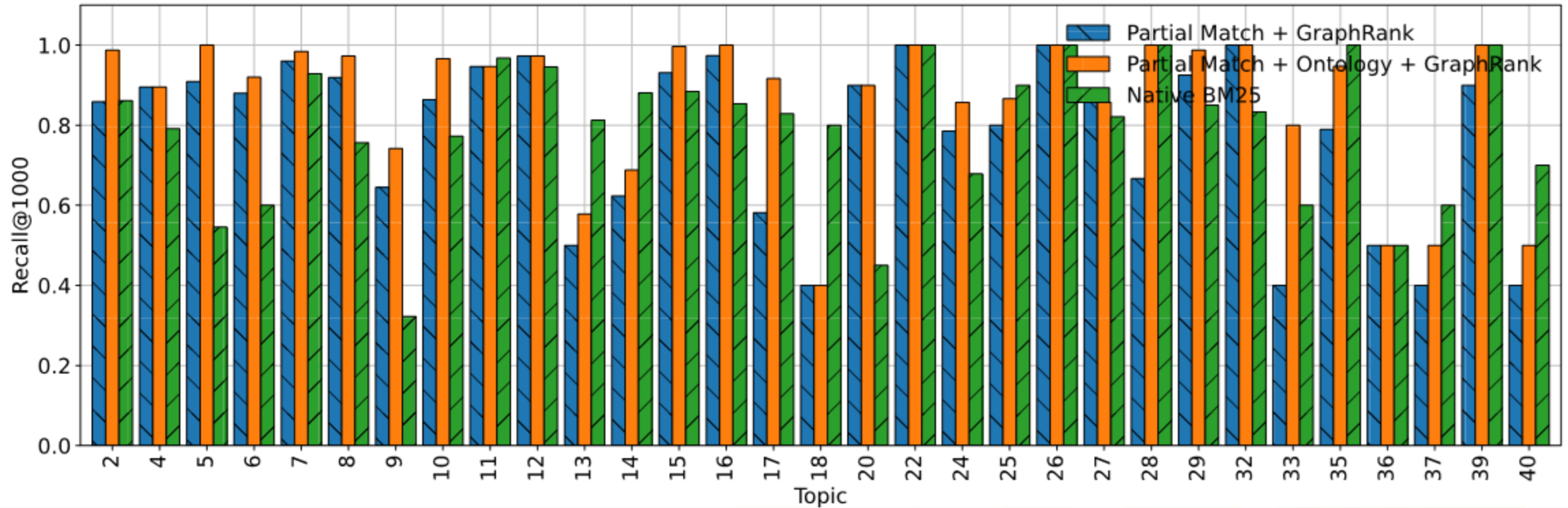
Evaluation on PM2020

Ranking Method	Recall@1000	nDCG@10	nDCG@20	nDCG@100	P@10	P@20	P@100
Old System [11]	0.31	0.37	0.37	0.36	0.42	0.38	0.21
Full Match	0.31	0.37	0.37	0.36	0.42	0.38	0.22
+ GraphRank	0.31	0.42	0.41	0.38	0.45	0.40	0.22
+ BM25	0.31	0.46	0.43	0.40	0.45	0.39	0.22
+ Ontology	0.45	0.33	0.33	0.37	0.41	0.36	0.24
+ Ontology + GraphRank	0.45	0.44	0.43	0.43	0.48	0.42	0.25
+ Ontology + BM25	0.45	0.47	0.46	0.45	0.47	0.42	0.25
Partial Match	0.78	0.40	0.42	0.48	0.46	0.42	0.29
+ GraphRank	0.78	0.50	0.49	0.50	0.55	0.47	0.28
+ BM25	0.78	0.53	0.52	0.55	0.53	0.47	0.30
+ Ontology	0.86	0.33	0.34	0.44	0.41	0.36	0.28
+ Ontology + GraphRank	0.86	0.47	0.48	0.51	0.52	0.47	0.29
+ Ontology + BM25	0.86	0.50	0.51	0.55	0.51	0.47	0.30
Native BM25 (Baseline)	0.79	0.48	0.46	0.49	0.48	0.42	0.28

concept-centric information needs (good graph representation)

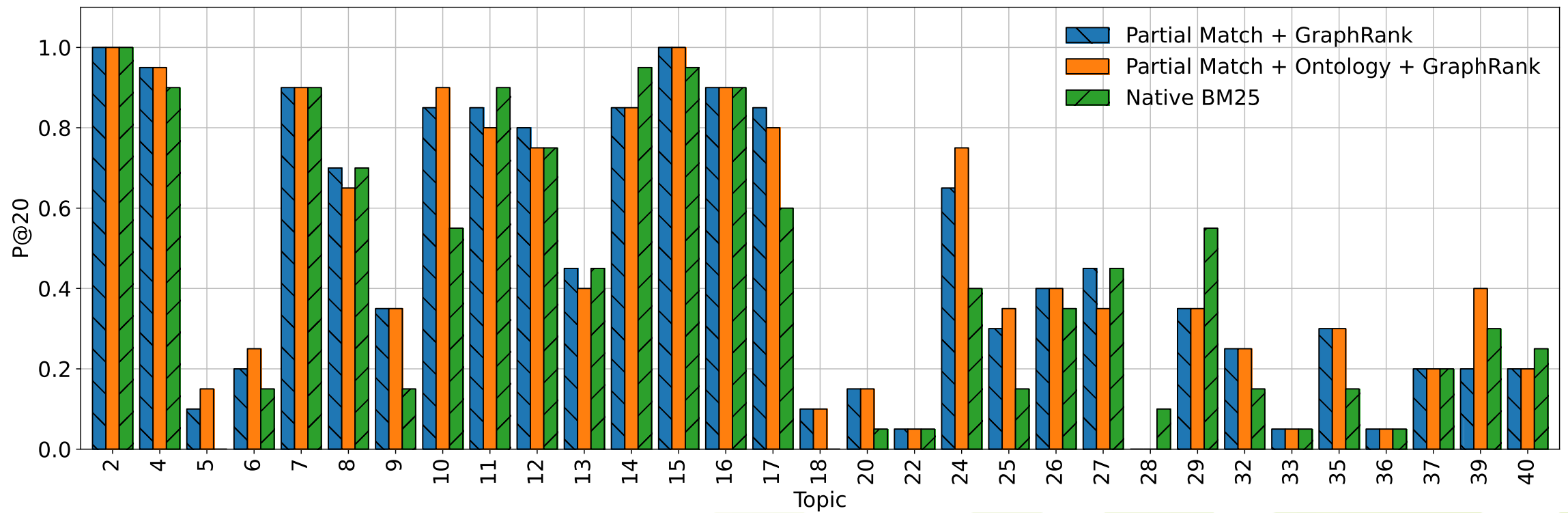


Evaluation on PM2020





Evaluation on PM2020





Limitations shown on TREC COVID

Strategy	Recall@1000	nDCG@10	nDCG@20	P@10	P@20
TREC COVID 2020 - Topics (25/50) - Abstracts					
Partial Match	0.26	0.54	0.51	0.61	0.57
+ GraphRank	0.26	0.61	0.59	0.68	0.64
Native BM25 (Baseline)	0.47	0.71	0.68	0.79	0.75
TREC COVID 2020 - Topics (25/50) - Fulltexts					
Partial Match	0.39	0.52	0.49	0.58	0.54
+ GraphRank	0.39	0.58	0.56	0.64	0.63
Native BM25 (Baseline)	0.48	0.71	0.70	0.80	0.78

25 of 50 topics could not be translated to query graphs because they were either not concept-interaction centric or concepts were missing, e.g. school closings during COVID



Conclusion

- “If queries were **concept-centric** and the system knew those concepts, our methods outperformed BM25. However, not all information needs could be translated successfully because concepts were missing or lack of expressiveness.”
~ claimed by our paper
- Briefly, our **graph-based ranking methods ...**
 - Improve retrieval for an existing discovery system (precision and recall)
 - Is open source + technical report available on arXiv 😊



Thank You!



FACHINFORMATIONSDIENST
PHARMAZIE
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<https://github.com/HermannKroll/RankingNarrativeQueryGraphs/>

