Global Evidence Summit

Automating Study Screening for Systematic Reviews Using a Large Language Model

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Declaration of Conflict of interest

I have no actual or potential conflict of interest in relation to this presentation.

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Collaboration between the **University of Bristol** and **Imperial College London**

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World Cancer Research Fund

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Background

The World Cancer Research Fund has an ongoing research programme called Global Cancer Update Programme (CUP Global) Since 2007

- Provide up-to-date systematic reviews to analyse the evidence linking diet, nutrition and physical activity to the risk of, and survival from, cancer
- From 2023, CUP Global with the University of Bristol start seeking Artificial Intelligence (AI) approaches to increase efficiency and reduce error involved in conducting the systematic reviews

➔Using a Large Language Model (LLM) to (semi-)automate the process of identifying primary studies for different systematic review topics

➔Aim: Provide reliable inclusion/exclusion predictions for each study among all existing topics

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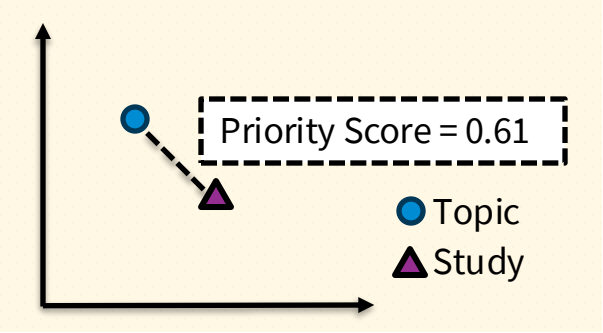
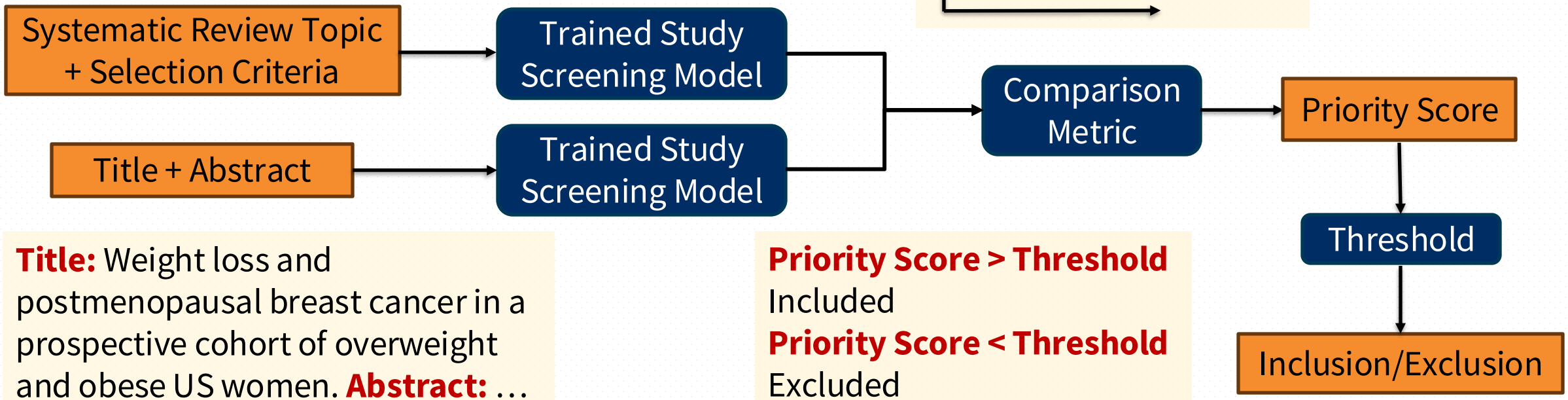
General Study Screening Model

Based on BlueBERT, an LLM pre-trained on general knowledge and biomedical contents

Systematic Review Topic:
Breast Cancer Incidence study
Criteria: including studies …





Title: Weight loss and postmenopausal breast cancer in a prospective cohort of overweight and obese US women. **Abstract:** …

Priority Score > Threshold
Included
Priority Score < Threshold
Excluded

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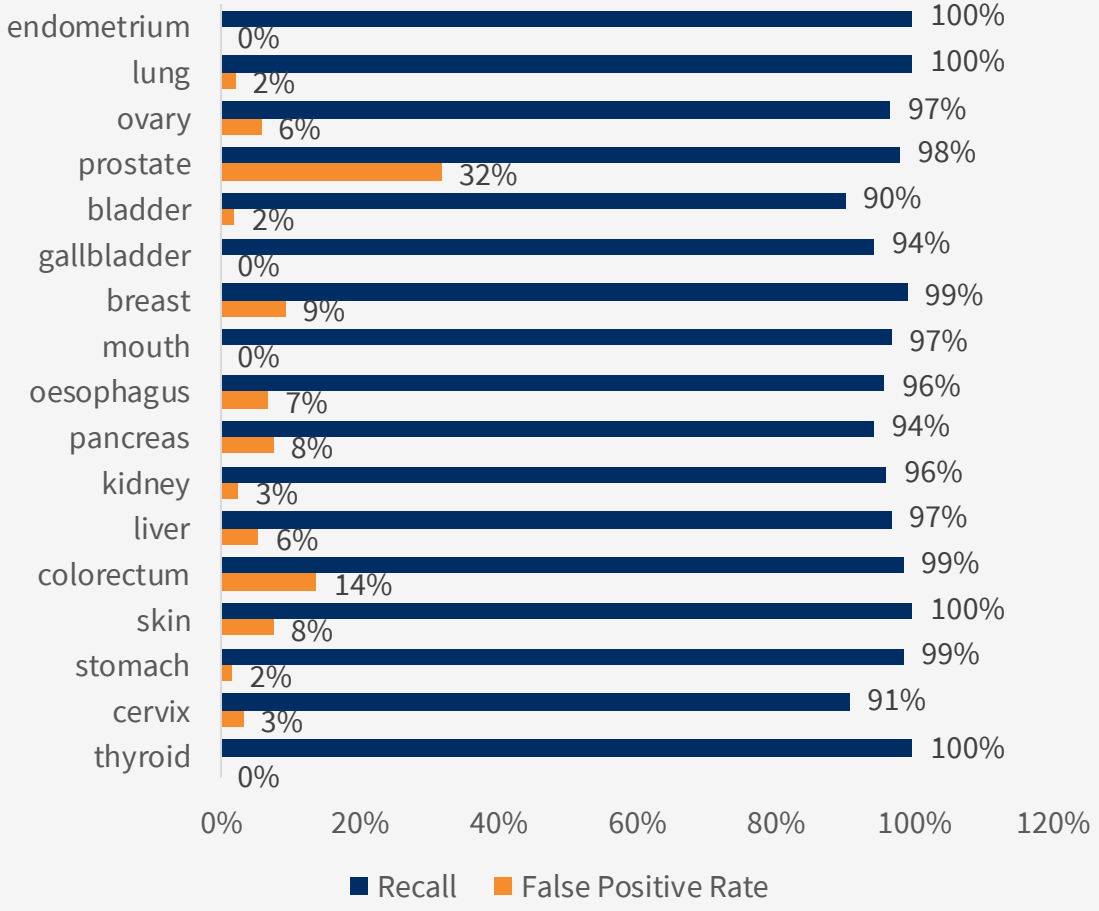
Results on Cancer Incidence Study Screening

- We train and evaluate our general model on 17 cancer incidence review topics
- The primary studies are manually reviewed by the CUP-Global Team
- The model has more than 90% of Recall among all topics on the test set
- In the meanwhile, the false positive rate is under 10% for most of the topics

➔Identify most of the primary studies without including too many false positive studies to review

➔Excluded the studies on title abstract level, whereas humans need to review the full text



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Future Work and Acknowledgement

Ongoing

Analysing and improving our study screening model on a more general domain

Future Work

Automating other processes of systematic review:

- Data extraction
- Risk of bias analysis

University of Bristol team

Core team: Yi Liu, Zhaozhen Xu, Tom Gaunt

Advisor: Louise Millard, Richard Martin, Julian Higgins, Philippa Davies, Maria Sobczyk-Barad

Imperial College London team

Doris Chan, Kostas Tsilidis, Eduardo Seleiro, Lam Teng, Georgios Markozannes

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Open to collaboration! Please contact:

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