Neural Information Retrieval for Biomedical Question-Answering

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Introduction

Rapid growth of the biomedical literature

- Almost 1 million articles are indexed every year by MEDLINE/Pubmed

Introduction

Rapid growth

- Almost 1 r ar by MEDLINE/

Typical biomedical retrieval system

INPUT: Keyword based queries

OUTPUT: Ranked list of articles

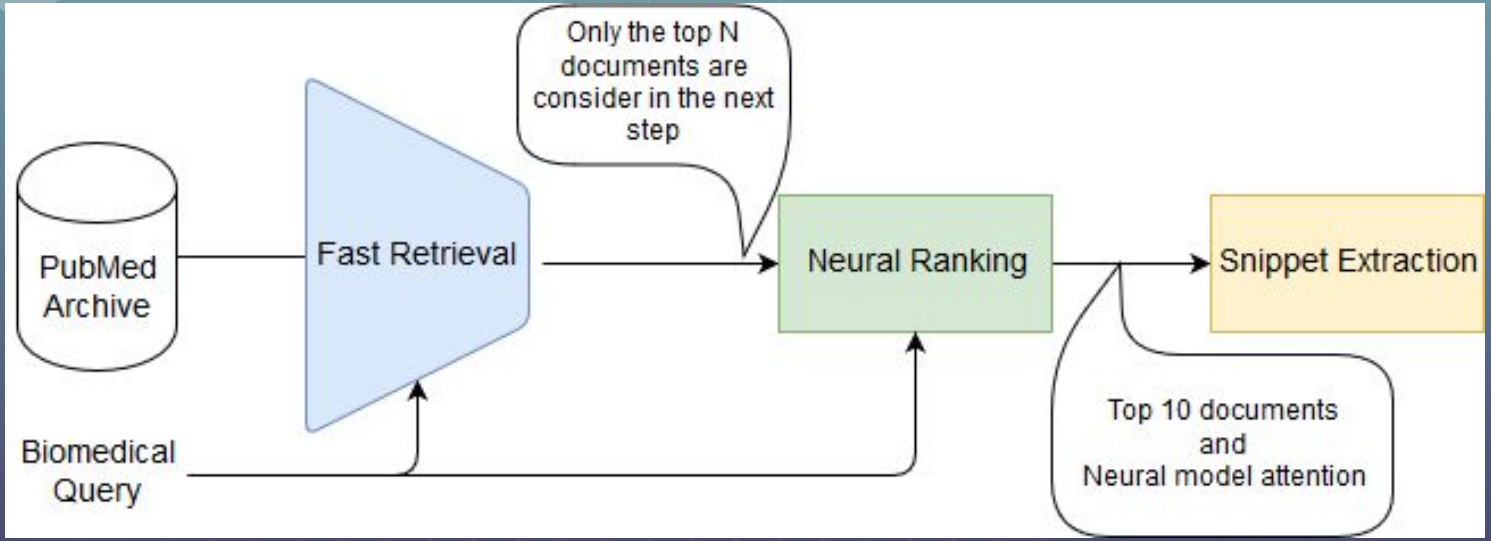
~~Typical~~ biomedical retrieval system

Ideal

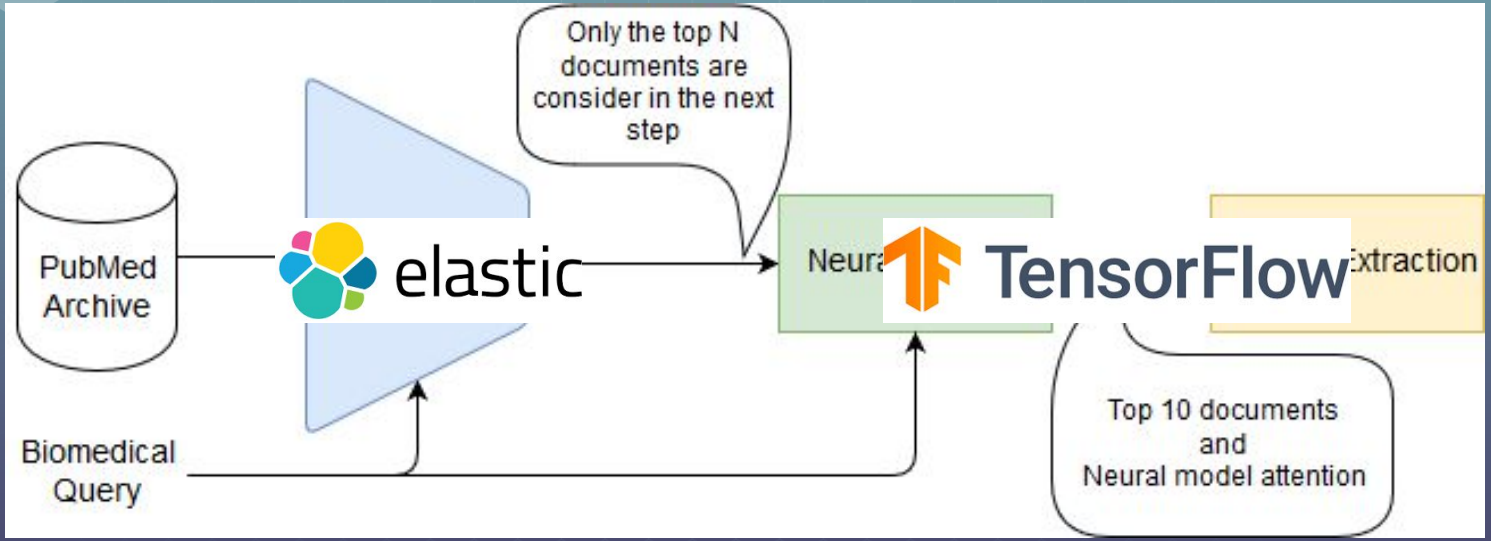
INPUT: Natural language questions

OUTPUT: Ranked list of articles with relevant information highlighted

Biomedical IR system

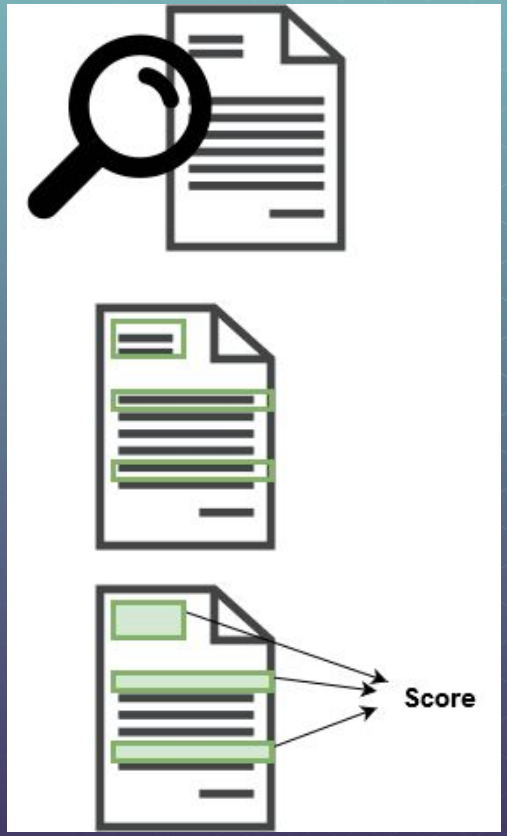


Biomedical IR system




PERCEPTRONS ARE TOO LINEAR
WE MUST GO DEEPER

Neural ranking model

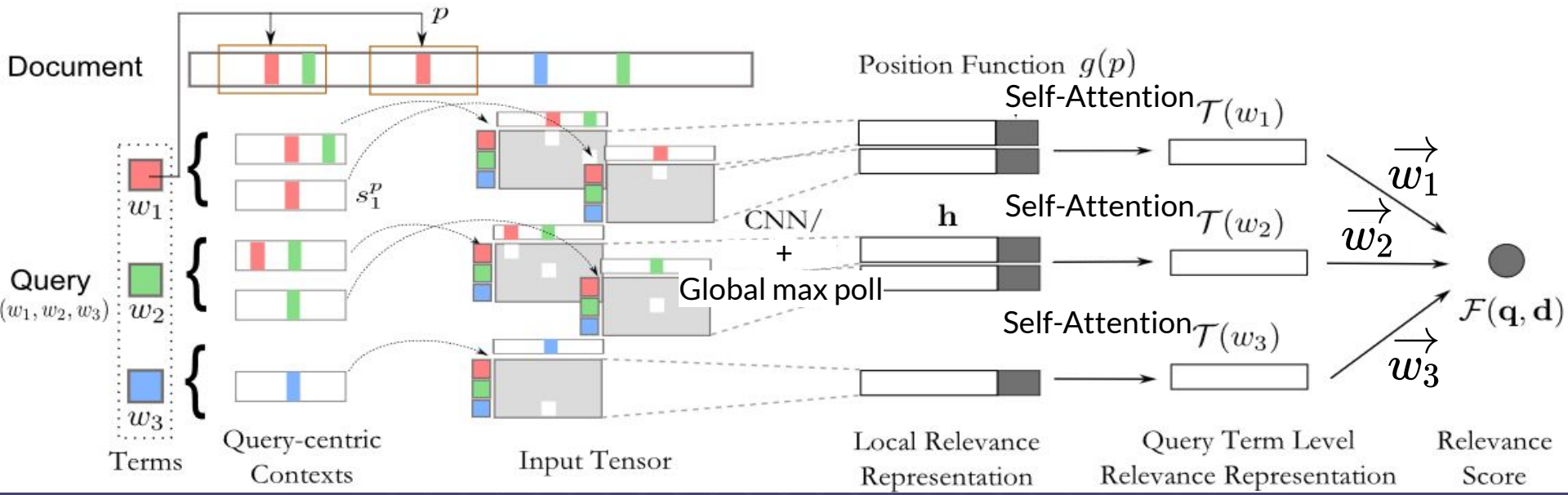


Detection Network

Measurement Network

Aggregation Network

Attn-BioDeepRank



This image is from the original DeepRank [1] model.

Comparing with BioASQ 7b systems document retrieval task

- Top score at the first batch
- Close to the top in the remaining batches

Biomedical Search

Which enzyme is inhibited by Imetelstat?

Other Example | Search

Attention levels of the tokenized query: enzyme inhibited imetelstat

Document Score: 5.607

PMID: 25627551

The telomerase inhibitor imetelstat alone, and in combination with trastuzumab, decreases the cancer stem cell population and self-renewal of HER2+ breast cancer cells.

the telomerase inhibitor imetelstat alone and in combination with trastuzumab decreases the cancer stem cell population and self renewal of her2 breast cancer cells cancer stem cells cscs are thought to be responsible for tumor progression metastasis and recurrence her2 overexpression is associated with increased cscs which may explain the aggressive phenotype and increased likelihood of recurrence for her2 breast cancers telomerase is reactivated in tumor cells including cscs but has limited activity in normal tissues providing potential for telomerase inhibition in anti cancer therapy the purpose of this study was to investigate the effects of a telomerase antagonistic oligonucleotide imetelstat grn163l on csc and non csc populations of her2 breast cancer cell lines the effects of imetelstat on csc populations of her2 breast cancer cells were measured by aldh activity and cd44 24 expression by flow cytometry as well as mammosphere assays for functionality combination studies in vitro and in vivo were utilized to test for synergism between imetelstat and trastuzumab imetelstat inhibited telomerase activity in both subpopulations moreover imetelstat alone and in combination with trastuzumab reduced the csc fraction and inhibited csc functional ability as shown by decreased

Hope you enjoy

Thanks

References

[1] L. Pang, Y. Lan, J. Guo, J. Xu, J. Xu, and X. Cheng, “DeepRank”, in Proceedings of the 2017 ACM on Conference on Information and Knowledge Management - CIKM ’17, New York, New York, USA: ACM Press, 2017, pp. 257–266, isbn: 9781450349185. doi: 10.1145/3132847.3132914.