

Open-Domain QA

- ▶ SQuAD-style QA is very artificial, not really a real application
- ▶ Real QA systems should be able to handle more than just a paragraph of context — theoretically should work over the whole web?

Q: *What was Marie Curie the recipient of?*

Marie Curie was awarded the Nobel Prize in Chemistry and the Nobel Prize in Physics...

Mother Teresa received the Nobel Peace Prize in...

Curie received his doctorate in March 1895...

Skłodowska received accolades for her early work...

Open-Domain QA

- ▶ SQuAD-style QA is very artificial, not really a real application
- ▶ Real QA systems should be able to handle more than just a paragraph of context — theoretically should work over the whole web?
- ▶ This also introduces more complex *distractors* (bad answers) and should require stronger QA systems
- ▶ QA pipeline: given a question:
 - ▶ Retrieve some documents with an IR system
 - ▶ Zero in on the answer in those documents with a QA model

DrQA

- ▶ How often does the retrieved context contain the answer? (uses Lucene)
- ▶ Full retrieval results using a QA model trained on SQuAD: task is much harder

Dataset	Wiki Search	Doc. Retriever	
		plain	+bigrams
SQuAD	62.7	76.1	77.8
CuratedTREC	81.0	85.2	86.0
WebQuestions	73.7	75.5	74.4
WikiMovies	61.7	54.4	70.3

Dataset

SQuAD (*All Wikipedia*)

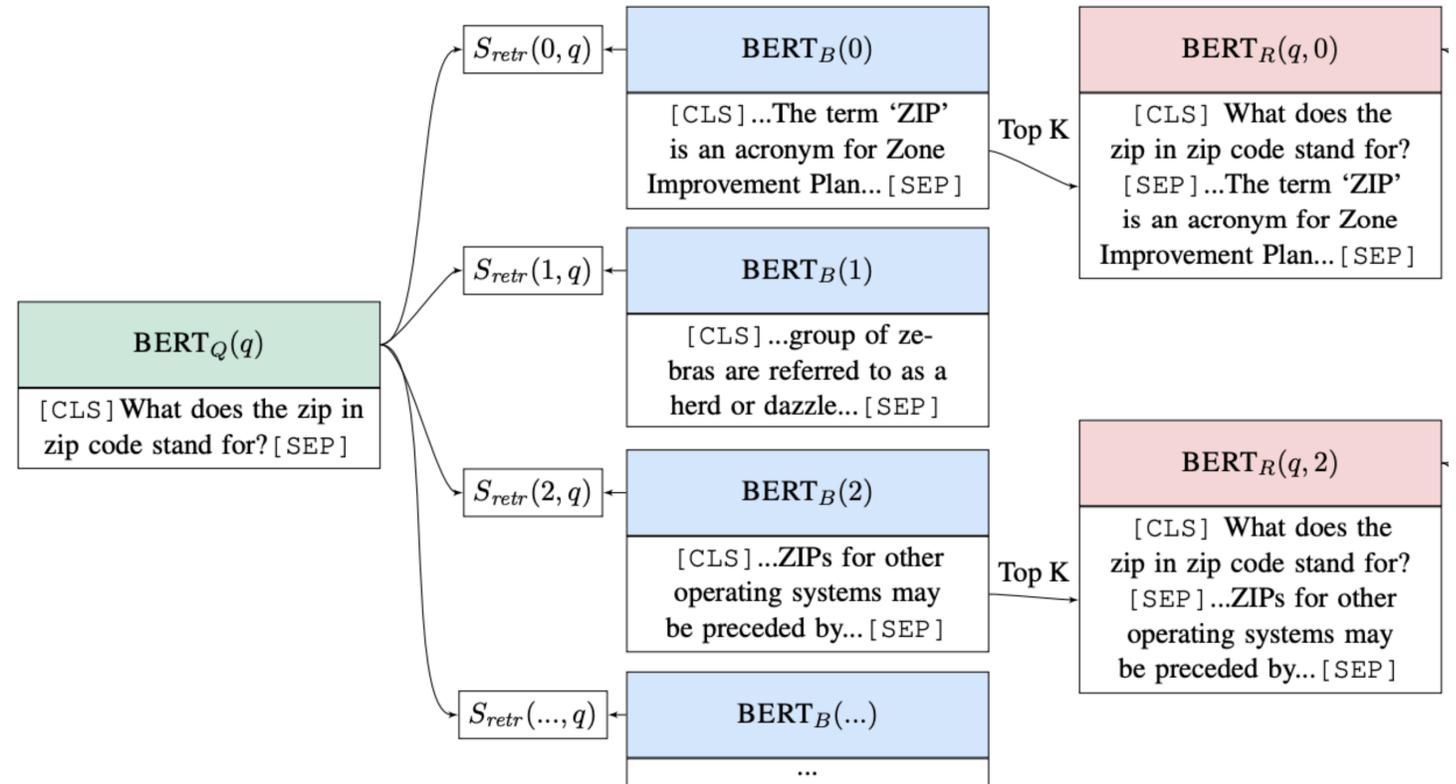
CuratedTREC

WebQuestions

WikiMovies

Retrieval with BERT

- ▶ Can we do better than a simple IR system?
- ▶ Encode the query with BERT, pre-encode all paragraphs with BERT, query is basically nearest neighbors



$$h_q = \mathbf{W}_q \text{BERT}_Q(q)[\text{CLS}]$$

$$h_b = \mathbf{W}_b \text{BERT}_B(b)[\text{CLS}]$$

$$S_{retr}(b, q) = h_q^\top h_b$$

Natural Questions

- ▶ Many SQuAD questions are not suited to the “open” setting because they’re underspecified: *Where did the Super Bowl take place?*

- ▶ Natural Questions: real questions, answerable with Wikipedia

Question:

where is blood pumped after it leaves the right ventricle?

Short Answer:

None

Long Answer:

From the right ventricle , blood is pumped through the semilunar pulmonary valve into the left and right main pulmonary arteries (one for each lung) , which branch into smaller pulmonary arteries that spread throughout the lungs.

- ▶ Questions arose from Google searches, unlike SQuAD questions which were written by people looking at a passage
- ▶ Short answer F1s < 60, long answer F1s <75

Kwiatkowski et al. (2019)