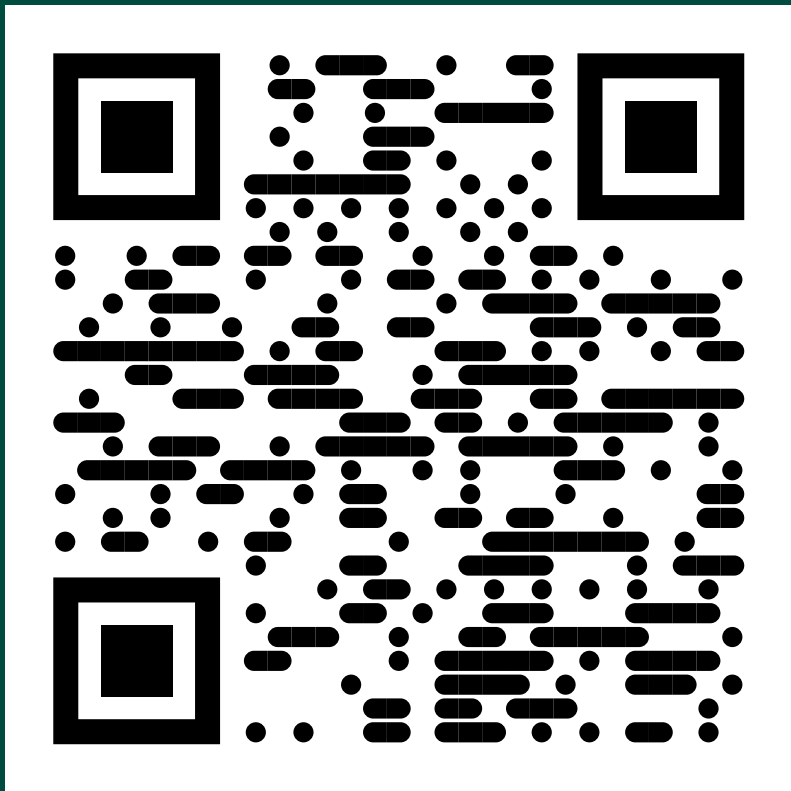


UvA

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Paper:



Code & data:



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Zero-shot Query Contextualization for Conversational Search

Motivation

Data Scarcity is an important issue on Conversational Search:

- Limited conversational datasets (number and size)
- Conversations constructed according to expert guidelines – exhibiting specific characteristics

Can we rely on supervision from the *ad-hoc ranking task*?

Method

Zero-shot Conversational Contextualization ($ZeCo^2$), uses a **token-level** dense retriever (ColBERT) to:

(a) *contextualize* the last user question with the conversation history

(b) *score* documents only based on tokens from the **last question**.

Results & Analysis

base-retriever	variant	zero-shot	CAST'19		CAST'20		CAST'21	
			NDCG@3	R@100	NDCG@3	R@100	NDCG@3	R@100
ColBERT	last-turn ^a	✓	0.214	0.157	0.155	0.124	0.140	0.154
	all-history ^b	✓	0.190	0.165	0.150	0.166	0.237	0.265
	ZeCo² (ours)	✓	0.238 ^b	0.216 ^{a,b,c}	0.176 ^b	0.200 ^{a,b,c}	0.234 ^a	0.267 ^a
	human		0.430	0.363	0.443	0.408	0.431	0.403
ConvDR	zero-shot ^c	✓	0.247	0.183	0.150	0.150	–	–
	few-shot		0.466	0.362	0.340	0.345	0.361	0.376
	human		0.461	0.389	0.422	0.454	0.548	0.451

$turn_3$	tell me about $\underbrace{\text{lung cancer}}_{\text{Resolution (R)}}$.
$turn_4$	what are $\underbrace{\text{its}}_{\text{Anaphora (A)}}$ symptoms?
$sim(\vec{A}_{last_turn}, \vec{R})$	0.13
$sim(\vec{A}_{ZeCo^2}, \vec{R})$	0.47
$\Delta sim(\vec{A} \rightarrow \vec{R})$	0.34
$\Delta Recall$	+0.24

Take-aways

- $ZeCo^2$ improves zero-shot performance for conversational search (Recall gains 35 – 75%)
- Contextualization introduces a **bias towards salient terms from conversation history** (eg. anaphora embeddings go closer to resolutions).

Conversational Queries

$turn_1$ what is throat cancer?
 $turn_2$ is it treatable?
 $turn_3$ tell me about lung cancer.
 $turn_4$ what are its symptoms?

