

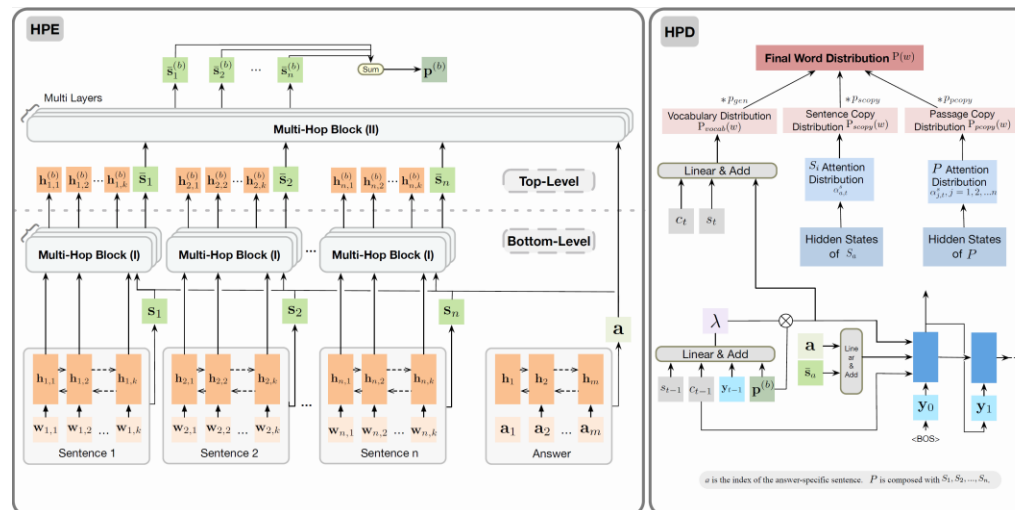
HACAN: a hierarchical answer-aware and context-aware network for question generation

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Problems & Ideas

- In educational settings, teachers often need to formulate some reading comprehension questions for a passage instead of a single sentence.
 - how to construct and exploit the passage-level representation for generating questions.
- Ideas:
 - HPE aims to generate a better answer-aware and context-aware passage-level representation. Meanwhile, HPD is composed of a passage-aware decoder and a three-way copy mechanism to determine how much passage-level information needed during decoding and copies rare words from the answer-specific sentence or the passage.



The structure of the proposed model, which mainly consists of two parts: HPE and HPD.

Main Contributions

- Contributions:
 - A hierarchical answer-aware and context-aware network is proposed that focuses on how to construct and exploit the passage-level representation.
 - The hierarchical passage encoder uses a two-level architecture with multi-hop reasoning to construct an answer-aware and context-aware passage-level representation.
 - The passage-aware decoder is able to determine how much passage-level representation to use.
 - Extensive experimental results and case studies demonstrate that the hierarchical answer-aware and content-aware network proposed in this paper can effectively utilize passages for generating questions.

Passage: Sentence 1: The Victoria and Albert museum (often abbreviated as the V&A), London, is the world 's largest museum of decorative arts and design , housing a permanent collection of over 4.5 million objects . Sentence 2: <i>It was founded in 1852 and named after Queen Victoria and Prince Albert .</i> Sentence 3: <i>The V&A is located in the Brompton district of the royal borough of Kensington and Chelsea, in an area that has become known as "Albertopolis" because of its association with Prince Albert, the Albert memorial and the major cultural institutions with which he was associated.</i> Sentence 4: These include the natural history museum, the science museum and the royal Albert hall. Sentence 5: The museum is a non-departmental public body sponsored by the department for culture, media and sport. Sentence 6: Like other national British museums, entrance to the museum has been free since 2001 .
Answer 1: <i>1852</i> Ground Truth: In what year was the Victoria and Albert museum founded? Ours: When was the museum founded ?
Answer 2: <i>royal borough of Kensington and Chelsea</i> Ground Truth: In which London borough is the Victoria and Albert museum located ? Ours: What is the name of the museum located in the royal borough of Kensington?

Methods	BLEU-1	BLEU-2	BLEU-3	BLEU-4	METEOR	ROUGE-L
(1) Seq2Seq [5]	34.01	14.76	7.16	3.93	10.11	31.01
(2) Transformers [41]	17.21	8.64	4.93	2.84	6.45	18.35
(3) Seq2Seq + Attention + Copy [6]	43.20	24.98	16.23	11.64	16.38	39.85
(4) AFPAM [37]	43.02	28.14	20.51	15.64	-	-
(5) AFPAM + Min Loss [42]	42.03	27.61	20.27	15.48	19.61	-
(6) Seq2Seq+GAN+z+c [43]	44.42	26.03	17.6	13.36	17.70	40.42
(7) w/o answer-aware and context-aware attention	54.96	32.60	20.36	12.94	16.19	43.02
(8) w/o answer-aware attention	56.67	33.70	20.86	13.21	16.56	43.25
(9) w/o context-aware attention	56.54	33.53	20.87	13.32	16.58	43.31
(10) w/o passage-aware decoder	55.77	33.27	20.90	13.51	16.46	43.46
(11) w/o three-way copy mechanism	54.87	32.89	20.84	13.61	16.73	42.79
(12) w/o passage copy mode	55.72	33.57	21.48	14.22	17.11	43.00
(13) Full Model (1-hop)	54.46	32.10	19.95	12.80	17.09	42.79
(14) Full Model (2-hop)	57.18	34.00	21.06	13.27	16.43	43.71
(15) Full Model (3-hop)	57.41	34.57	22.05	14.56	17.67	43.95
(16) Full Model (4-hop)	58.56	34.77	21.72	14.06	17.21	44.25

Experimental results and case studies. Left: the generated questions of HACAN; Right: the experimental results on the SQuAD dataset.