A Multi-grained Dataset for News Event Triggered Knowledge Update

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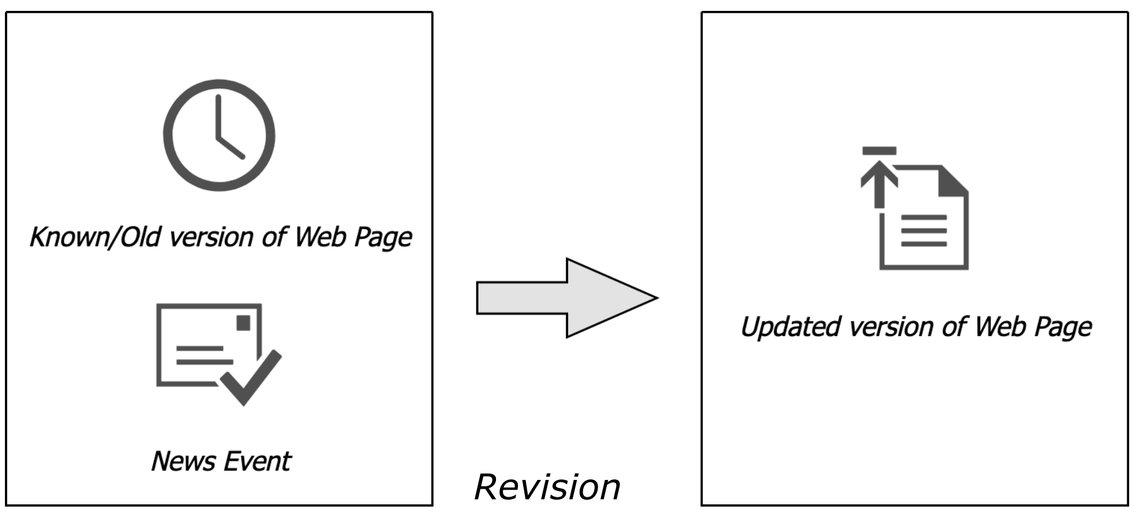
https://github.com/hhhuang/NetKu

ABSTRACT

- The world rapidly changes and new information emerges every second.
- Keep the knowledge up-to-date is not a trivial task
  - Articles from Wikipedia are collected and aligned with multiple language units.
  - Given an existing article about a topic with a news event about the topic, aims to generate an updated article according to the known information and new occurred event.
- We create the news-triggered dataset and baselines for knowledge update generation task with three fine-grained levels.

DATASET OVERVIEW

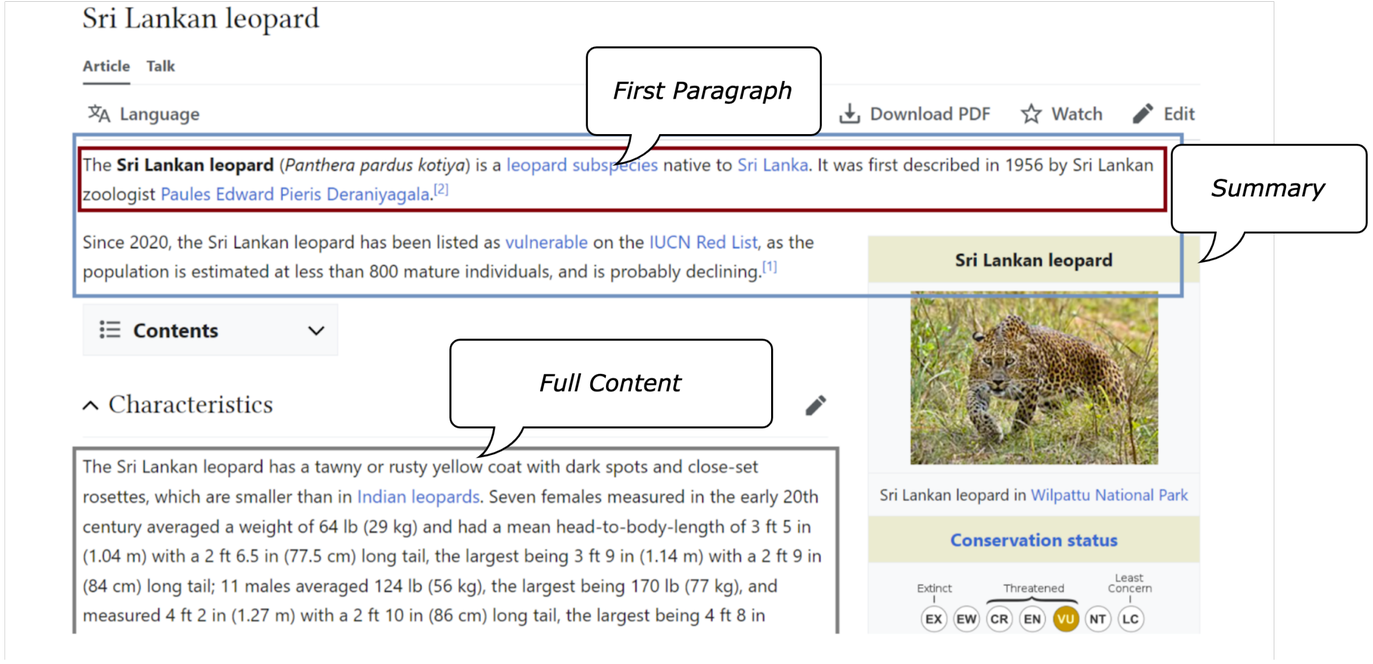


DATASET CONSTRUCTION

- Parsing contents from the Wikipedia and crawling raw news from external website:
  - Daily news and the topic related to news ranging from 2006 to 2022 in the portal of Wikipedia Current Events.
  - Collect relevant topics linked from Wikipedia-Current Events: Retrieve and parse raw news from Internet Archive Wayback Machine by given cited news urls from Wikipedia Current Events.
- Data Alignment $(x_i \oplus e_i \rightarrow y_i)$
  - Align news event e_i listed on the portal of Wikipedia Current Events at time i with the version of the Wikipedia page before and after time t_i, representing in x_i and y_i.
  - Irrelevant edits problems between x_i and y_i : We restrict the time window of one week between (e_i, y_i).
- Data Filtering: Reduce the sentence-level bias
  - Remove the duplicated instances and sentences appeared in WCEP-10 dataset.
  - Keep the instances with existing x_i and English language summary.

LEVELS OF KNOWLEDGE FACTS

- First Paragraph: Generate the updated first paragraph y given the first paragraph of the previous version and the triggered news event e.
- Summary: Generate the updated summary y given the summary of the previous version and the triggered news event e.
- Full content: Generate the updated full content y given the full content of the previous version and the triggered news event e.



IMPLEMENTATION

- Crawl and parse the web-page contents, further merged with the portal of Wikipedia Current Events.
- Align the news triggered event and Wikipedia page contents between versions.
- Running data filtering to reduce bias.
- Apply lexical overlapping calculation to obtain basic baseline.
- We conduct the SOTA pre-trained model PRIMERA to produce inference and fine-tune with our data.
- Evaluate the experiments results with multiple metrics (recall-based, precision-based, sentence similarity).
- Given a news event e and a related knowledge fact x, aims to generate an update knowledge fact y.

$$y' = \arg\max_{y} Pr(y|x, e)$$

Method	ROUGE-1	ROUGE-2	ROUGE-L	BLEU-1	BLEU-2	BLEU-3	BLEU-4	METEOR	BS
Generating the First Paragraph									
Original x	0.9560	0.9520	0.9559	0.5536	0.5936	0.5743	0.5478	0.7193	0.988
Concatenation of x and e	0.9613	0.9537	0.9608	0.5540	0.5941	0.5747	0.5482	0.7144	0.956
PRIMERA w/o fine-tuning	0.4534	0.3713	0.4422	0.5705	0.4679	0.4237	0.3992	0.5517	0.910
PRIMERA (fine-tuned)	0.9601	0.9585	0.9599	0.8454	0.9098	0.8905	0.8600	0.8519	0.990
Generating the Summary									
Original x	0.9467	0.9371	0.9466	0.7786	0.8758	0.8557	0.8186	0.7629	0.985
Concatenation of x and e	0.9505	0.9391	0.9499	0.5608	0.6398	0.6230	0.5920	0.6592	0.962
PRIMERA w/o fine-tuning	0.3554	0.2790	0.3469	0.6383	0.5343	0.4783	0.4467	0.5689	0.902
PRIMERA (fine-tuned)	0.9565	0.9525	0.9564	0.7854	0.8904	0.8780	0.8480	0.7743	0.989
Generating the Full Content									
Original x	0.9117	0.8883	0.9115	0.4496	0.7172	0.7634	0.7351	0.3447	0.979
Concatenation of x and e	0.9173	0.8918	0.9166	0.4184	0.6800	0.7263	0.6996	0.3259	0.979
PRIMERA w/o fine-tuning	0.0695	0.0372	0.0676	0.8256	0.6961	0.6007	0.5411	0.6101	0.870
PRIMERA (fine-tuned)	0.5185	0.4705	0.5179	0.5999	0.7785	0.7899	0.7641	0.4942	0.966

Table 3: Results of the experiments at the levels of the first paragraph, the summary, and the full content.

- Model learns what remains unchanged in the updated first paragraph generation.