Proposal of Automatic Storytelling

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Abstract: Automated story generation is the problem of automatically selecting a sequence of events, actions, or words that can be told as a story. Our goal is to monitor overwhelming real-time information on social media and automatically generate a story by selecting related information. We plan to train an event2event RNN model, which can encode events sequence and get target event sequence as story structure. Then, We will train an event2sentence RNN model, which can translates events back into human language. Finally, we collect information on social media and set them as input for these two models to generate a story. We will train the models based on CMU Movie Summary Corpus.

1. Background:

Nowadays, overwhelming real-time information on social media is distracting. So good model to grab information and tell a story under one specific topic is crucial in delivering information to readers. Significant amount of work has been done on automatic storytelling, recurrent neural networks have recently been found to be very effective for natural language processing.

In 2017, Martin et al. decomposed story generation into two steps: story structure modeling and structure-to-surface generation. They use event2event model to construct a story structure, and then use event2sentence to transform the event into natural language. They use wikipedia movie plots dataset to train the event2event model.

In 2018, Xu et al. propose a skeleton-based model, the key idea is to first generate a skeleton and then expand the skeleton to a complete sentence. Their setting assumes story prompts as inputs. The generative module consists of an input-to-skeleton component and a skeleton-to-sentence component. The input-to-skeleton component learns to associate inputs and skeletons, and the skeleton-to-sentence component learns to expand a skeleton to a sentence.

In the same year, Lili Yao el. construct a model which can write a story according to a title. They explore two planning strategies: dynamic schema and

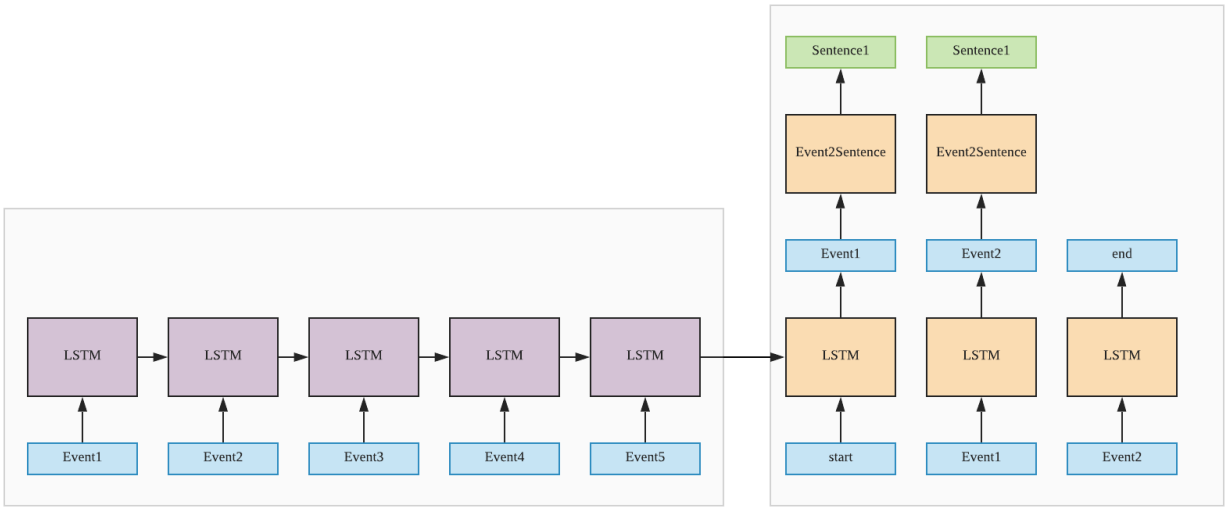
static schema, and show the latter works better. They first generate a static storyline according to the title and then generate story according to storyline.

Our work are mainly inspired by those three papers and especially by Martin's paper.

2. Introduction to the Project:

1. **Goal:** Build a model that collect short messages from social-media and automatically tell story on United States presidential primary election topic.

2. **Method:**
   a. We plan first to train a event2event RNN model, which can encode sentence to event and get target event sequence as story structure. We train a event2sentence RNN model, which can translates events back into natural language.
   b. The input of our model is several separate short twitter news. We first transform short messages into events. we developed a 5-tuple event representations, {t, s, v, o, m}, t is the time, v is the verb, s is the subject of the verb. o is the object of the verb, and m is the modifier. given the several compressed vectors, the attention-based decoder is responsible for imagining a story skeleton.
   c. Then we input transformed events into encoder to get target sequence, the target sequence is the skeleton of our story.
   d. Event2sentence network translates the events back into natural language and presents it to the human reader.

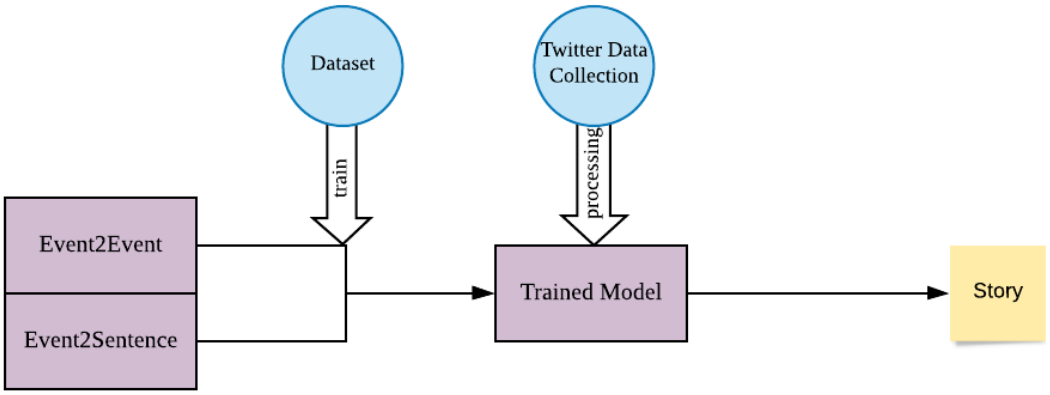


e. To continue story generation, $event_{n+1}$ can be fed back into event2event Build up model LSTM with attention model.

3. **Dataset to train model:** The plot summaries are processed by running through the Stanford CoreNLP pipeline such as, tagging, parsing, named-entity recognition and coreference resolution to get the Event2Event dataset. And Event2Sentence model is trained on parallel corpora of sentences from a story corpus and the corresponding events.

4. **Evaluation:** we use human evaluation/ BLEU score/perplexity method to evaluate and choose the best model. BLEU score is a method for Automatic Evaluation of Machine Translation.Perplexity is a metric which is normally used to evaluate language models, it shows how well the probabilistic model we have trained can predict the data.

5. **New source:** Data mining using API from twitter under specific keywords and accounts, translates them into several events and put new source into encoder and get target events sequence.



3. Introduction to the Dataset:

1. Dataset:

- CMU Movie Summary corpushttp://www.cs.cmu.edu/~ark/personas/

- Dataset contains 42,306 movie plot summaries which are extracted from Wikipedia and metadata extracted from Freebase, including: Movie box office revenue, Genre, Release date, Runtime, Language, Character names, and Aligned information which is about the actors who portray them, including gender and estimated age at the time of the movie's release.

2. Processing Dataset:

- Event2Event Dataset: Clean the preprocessed data such as removing dialogue. Process the all of the plot summaries from above data by running through the Stanford CoreNLP pipeline such as, tagging, parsing, named-entity recognition and coreference resolution to get the Event2Event dataset.

- Event2Sentence Dataset: train model on parallel corpora of sentences from a story corpus and the corresponding events.

4. Plan

1. **First Milestone**: Briefly introduce the Automatic Story Telling.
2. **Second Milestone:** Train the both Event2Event and Event2Sentence Recurrent Neural Network and evaluate them.
3. **Third Milestone:** Collect real-time data on social media and convert to format like our processed data.
4. **Final Project:** The system can monitor social media on a defined topic then, collect the information and convert to suitable data format. Finally, the system selects multiple events and automatically generates a story.

Reference:

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