CLST
IITG CENTRE FOR LINGUISTIC SCIENCE & TECHNOLOGY

Automatic Event Extraction from Short Stories

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Outline

- Introduction
- Dataset
- Methodology
- Experiments
- Results
- Error Analysis
- Conclusion and Future Work

What is an Event

"It is a specific occurrence at a certain time and place which indicate a change of state."

Realis Events vs. Non-Realis Events

Realis Events

Occurrences

↓

Associated with change

- "He dropped his wallet"
- "It is raining"
- "She finished the exam"

Non-Realis Events

Persistent States

↓

Not associated with change

- "Jorhat is in Assam"
- "He knows the answer"
- "He is a black belt in Karate"

Example of events in short stories

S1: On **hearing** this answer, the spirit **went** again and **suspended** himself on that tree.
S2: They **lived** happily after their **marriage.**
S3: They looked **terrified**.
S4: I do not know.
S5: I will help you download pictures from the internet.

Why Event Detection

(1) Information Retrieval

(2) Question Answering

(3) Summarization; etc

Challenges in Short Stories

- Narrative technique is different
- Longer than News or articles
- Sometimes written in creative style
- Many instances of counter factual events can be found

The challenges encountered in event extraction from short stories is different from other domains such as news articles, bio-medical etc.

What makes short story events difficult?

- Figurative Events

  He **broke** the silence.

- Real events present in an unreal setting

  He **thought** that he had finished the homework.

- Ambiguous assertions

  The **bark** was painful.

Requirement of dataset for short stories

Existing dataset: News and Bio-medical, Literature(Novels) (only one dataset available with 100 stories)(Litbank)

Target: Short stories written in Indian setup

Contributions

- A benchmark dataset, Gatha-200, of 200 short stories annotated for realis events
- A comparison of various baseline neural models for identifying realis events on Gatha-200
- Analysis of prompt-based learning with zero-shot and few-shot settings
- Qualitative error analysis

Raw Dataset Source

Gatha-200 comprises of short stories from:

(1) *Panchtantra;*

(2) *Tenali Rama;*

(3) *Akbar-Birbal Stories;*

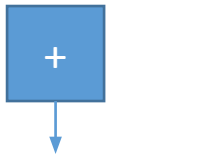
(4) Champak*;*

(5) *Ramayana; and*

(6) Mahabharata.

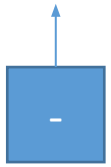
Tagging real events

Polarity



He **went** to the market.

He did not asked me for the help.



Value	Meaning
positive	depicted as taking place
negative	depicted as not taking place

Tagging real events

Tense

past

The girl was **playing** in the garden.

The monkey will eat all the banana.

future

Value
Past
Present
Future

Tagging real events

Genericity

Specific → My son **cried** for the chocolate.

Generic → Children like to eat sweet.

Value	Meaning
specific	singular occurrence at a particular place and time
generic	claim about groups, abstractions

Tagging real events

Modality

Beliefs: Rumors of my *demise* have been exaggerated.

Hypotheticals: If you *leave* today, taking bus is the best option.

Commands: He was ordered to *return* the book.

Threats: Protesters threatened to *block* the road.

Desires: She wants to *go* to her home

Wishes: I wish I could fly in the sky.

Annotation tool (BRAT)

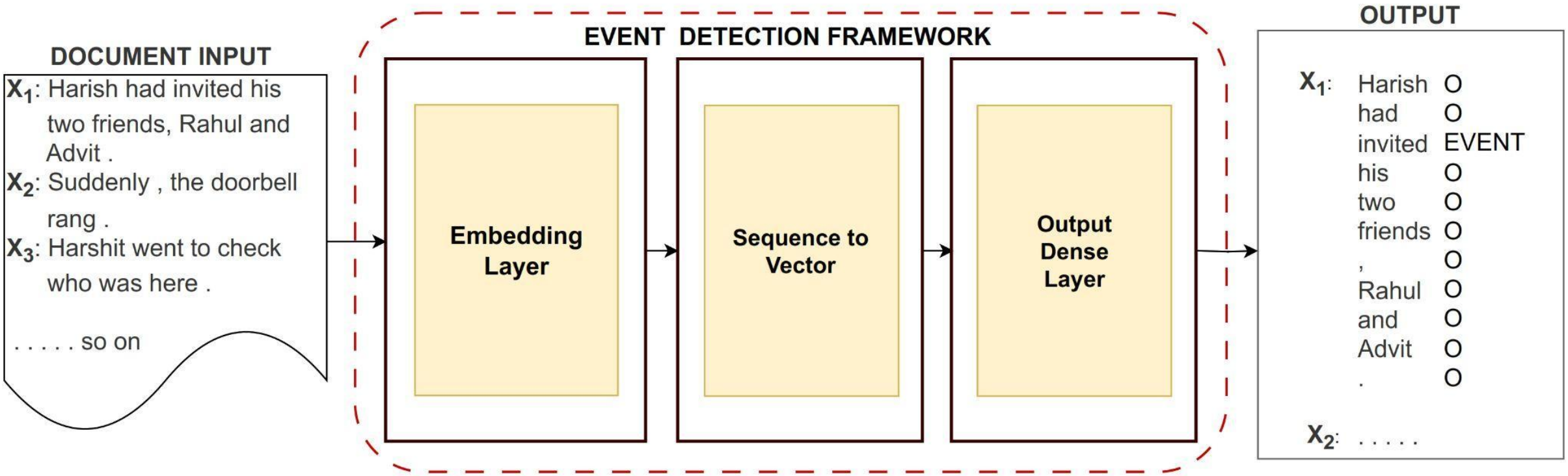
- Open source tool
- Provides an intuitive and fast way to create text-bound and relational annotations.
- Data and configurations on a central web server.
- Present text as it would appear to a reader and maintain annotations close to the text.
- Zero set-up for annotators, leave configurations and server/data maintenance to other staff.

Stenetorp, P., Pyysalo, S., Topić, G., Ohta, T., Ananiadou, S., & Tsujii, J. I. (2012, April). BRAT: a web-based tool for NLP-assisted text annotation. In *Proceedings of the Demonstrations at the 13th Conference of the European Chapter of the Association for Computational Linguistics* (pp. 102-107).

Basic Statistics of the dataset

Statistics	Count
Total words in the dataset	157,287
Total unique words in the dataset	10,558
Total sentences in the dataset	13,861
Average words per story	786
Average sentences per story	69
Average words per sentence	11
Total events in the dataset	13,171
Average events per story	66

Overall Architecture



Experimental Setup

Dataset Split	Train	Validation	Test
No. of stories	120	20	60

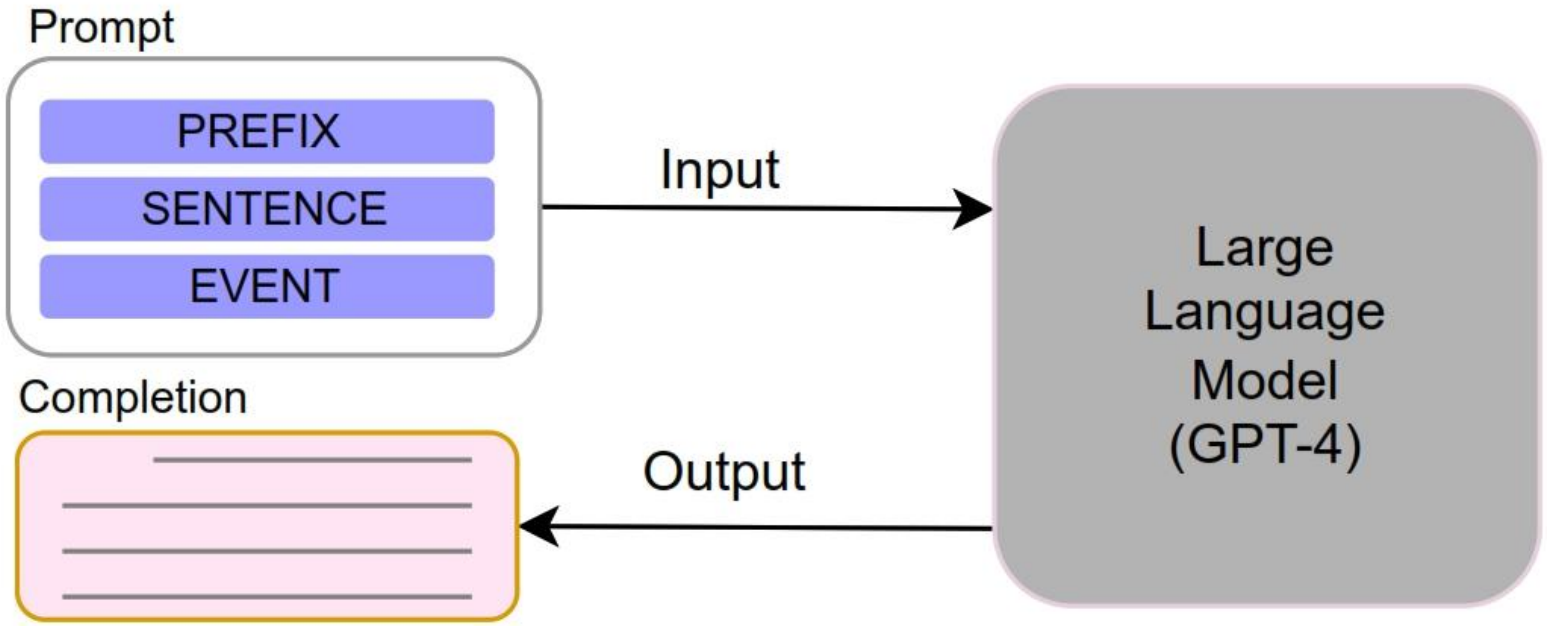
Hyperparameters

Hyperparameter	Values
Epoch	1000
Batch size	32
Learning rate	2e-5
LSTM size	100
BiLSTM size	100
Word embedding dimension	100
BERT embedding dimension	3072

RESULTS

METHOD	WORD EMBEDDINGS			BERT EMBEDDINGS		
	PRECISION	RECALL	F1 (macro)	PRECISION	RECALL	F1 (macro)
Verbs Only	33.8[32.4-35.1]	90.2[88.9-91.5]	49.1[47.6-50.6]	-	-	-
LSTM	88.8[87.6-89.9]	83.6[82.4-84.8]	86.1[85.2-87.0]	-	-	-
BiLSTM	87.9[86.7-89.0]	85.9[84.8-87.8]	86.9[86.0-87.8]	86.8[85.7-87.9]	94.9[94.2-95.7]	90.7[89.9-91.4]
+Sentence CNN	89.9[88.8-91.0]	81.3[80.0-82.6]	85.4[84.4-86.3]	87.0[85.9-88.1]	94.5[93.8-95.3]	90.6[89.9-91.4]
+Subword CNN	87.6[86.5-88.8]	88.7[87.6-89.7]	88.2[87.3-89.0]	87.8[86.7-88.9]	95.1[94.3-95.8]	91.3[90.6-92.0]
+Document Context	87.4[86.2-88.6]	86.6[85.4-87.7]	87.0[86.1-87.8]	**89.3**[88.2-90.2]	**95.3**[94.5-96.0]	**92.2**[91.5-92.8]

Large Language Model (GPT-4)



Zero-shot and Few-shot Learning

[prefix]
Sentence: [sentence]
Event:

(a) zero-shot

[prefix]
Sentence: [sentence]
Event: [event]
Sentence: [sentence]
Event:

(b) few-shot

Prompt based learning in LLM

{"sentence" : "One day a crocodile named Karalamukha came out of the waters and loitering on the sands came to the tree ","event" : "came, loitering, came"}

{"sentence" : "Mandy laughed and said , " I can not believe you ","event" : "laughed, said"}

.....

LLM result

LEARNING	N-SHOT	F1
ZERO-SHOT	-	39.4
FEW-SHOT	5-shot	58.9
	10-shot	72.1
	20-shot	79.8
	30-shot	84.5
	40-shot	84.7

Conclusions and Future Work

- Event Classification
- Event Argument Extraction

Thank you!