Generating Summaries with Topic Templates and Structured Convolutional Decoders

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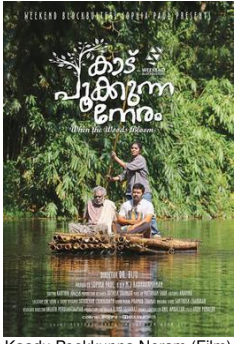
Entity Summaries



Kaadu Pookkunna Neram (Film)

References [edit]

1. ^ "The law of the jungle". 25 August 2016 – via The Hindu.
2. ^ http://english.manoramaonline.com/entertainment/movie-reviews/kaadu-pookkunna-neram.html
3. ^ James, Anu. " 'Kaadu Pookkunna Neram' to be screened as only Indian movie at Eurasia Film Festival".

Kaadu Pookkunna Neram (2016) - IMDb
https://www.imdb.com/title/tt5461134/
★★★★☆ Rating: 7.9/10 - 38 votes
Kaadu Pookkunna Neram Poster. A police group is deployed by the government to do away with Maoist menace (A banned Left organization) in a tribal village ...

KAADU POOKKUNNA NERAM | British Board of Film Classification
https://bbfc.co.uk/releases/kaadu-pookkunna-neram-2016
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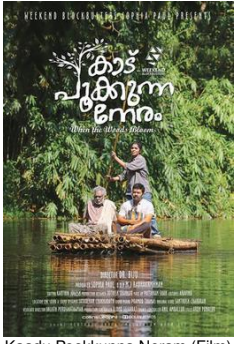

Kaadu Pookkunna Neram (Film)

Kaadu Pookkunna Neram (English :When the Woods Bloom) is a 2016 Indian Malayalam film written and directed by Dr. Biju. The film is produced by Sophia Paul under the film production house, Weekend Blockbusters. It stars Indrajith Sukumaran as a policeman, who is sent into deep jungles to capture the chief of a radical organization, played by Rima Kallingal, but instead finds himself trapped in it. Kaadu Pookkunna Neram premiered at the Montreal World Film Festival in September 2016.

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Content Structure of Entity Summaries

- ✓ cover **different topics**
- ✓ **order** discussed topics
- ✓ **domain specific** topics

write and direct

production

premiere

Kaadu Pookkunna Neram (English :When the Woods Bloom) is a 2016 Indian Malayalam film written and directed by Dr Biju. The film is produced by Sophia Paul under the film production house, Weekend Blockbusters. It stars Indrajith Sukumaran as a policeman, who is sent into deep jungles to capture the chief of a radical organization, played by Rima Kallingal, but instead finds himself trapped in it. Kaadu Pookkunna Neram premiered at the Montreal World Film Festival in September 2016.

Wray (2002); Barzilay and Lee (2004)

Decoding with Summary Structure?

- Neural text generation approaches
- Multi-sentence text as a **single long sequence** with a **sequence** decoder
  e.g. Gardent et al. (2017); See et al. (2017); Wiseman et al. (2017); Celikyilmaz et al. (2018); Perez-Beltrachini and Lapata (2018); Marcheggiani and Perez-Beltrachini (2018); Liu et al. (2018); Puduppully et al. (2019); Fabbri et al. (2019)
- Output texts are too **general** or **brief**; or simply **incorrect**

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- **A Decoder with Explicit Content Structure: Sentence Topics and Order**

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- Output texts are too **general** or **brief**; or simply **incorrect**
- **A Decoder with Explicit Content Structure: Sentence Topics and Order**
  1. **Two Level Decoder**
  2. **Sentence Topic Templates**

Sentence Topic Templates

- LDA treating sentences as documents
- Assignment of few topics to sentences

Topics in the Film domain:

#10: base, film, name, novel, story, screenplay
#14: win, film, music, award, nominate, compose
#18: film, receive, review, office, box, critic
#19: star, film, role, play, lead, support

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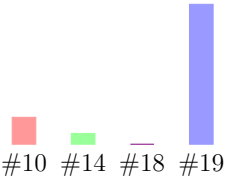
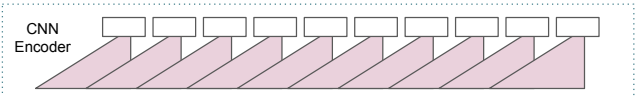
Sentences annotation:

It stars Indrajith Sukumaran as a policeman [#19]



Latent Dirichlet Allocation (LDA: Blei et al. (2003))

Decoder with Content Guidance



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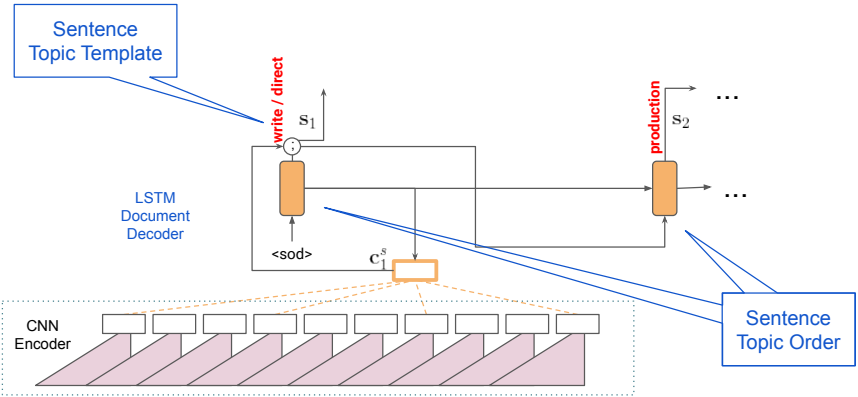

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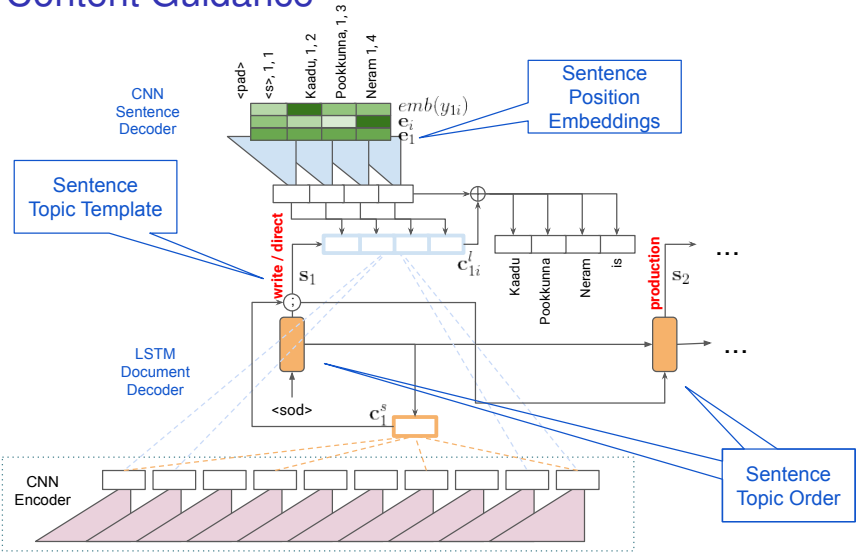

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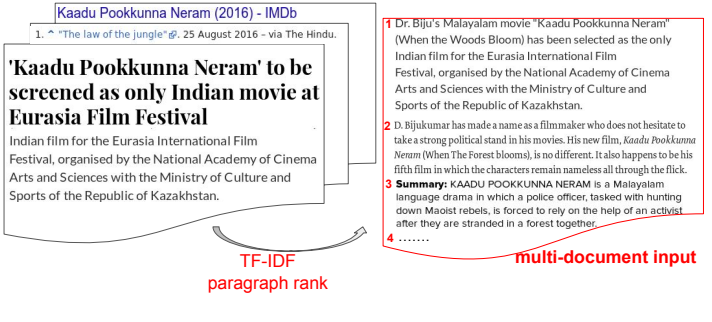
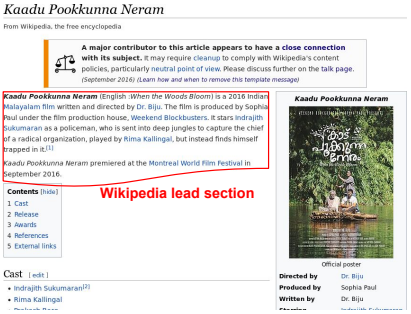
WikiSum Dataset Liu et al. (2018)

(multi-document input, Wikipedia lead section) pairs

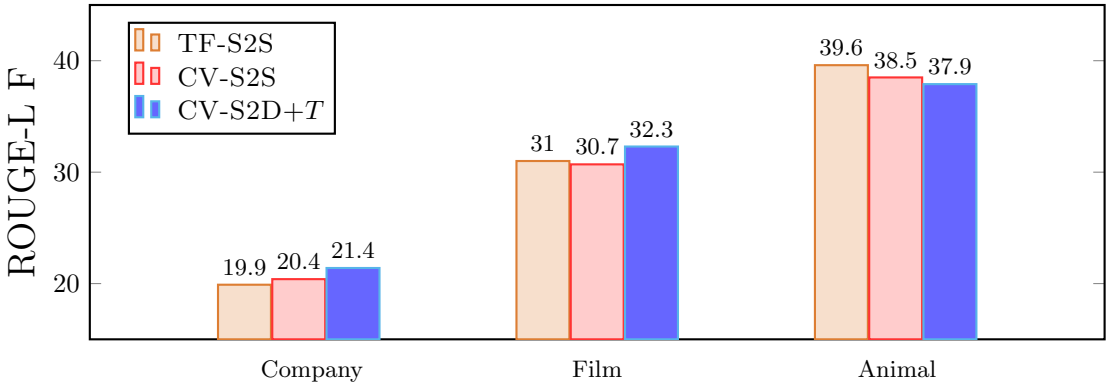




WikiCatSum= Three domains from WikiSum, 800 input tokens

Company (62k), **Film** (60k) and **Animal** (61k)

Improvements on Content Coverage (automatic)



TF-S2S: Transformer Seq2Seq (7 layers decoder)
CV-S2S: Convolutional Seq2Seq (3 layers decoder)
Ours **CV-S2D**+T: Convolutional Seq2Doc +Topics (1 layer document + 3 layers sentence decoder)

Manual Judgements on Summary Quality

	Company		Film		Animal	
	QA	Rank	QA	Rank	QA	Rank
TF-S2S	5	**1.87**	6	2.27	9	**1.87**
CV-S2S	5	2.27	6.67	**1.76**	8.33	2.04
Ours CV-S2D+*T*	**7**	**1.87**	**7**	1.98	**9.33**	2.09

3 judges, 45 summaries

QA: average of correctly answered questions (40 questions per domain)

Rank: average rank (lower is better) (content, fluency and repetition?)

Example Output

(Reference) Compacta capitalis is a moth in the family Crambidae. It was described by Augustus Radcliffe Grote in 1881. It is found in North America, where it has been recorded from Maryland to Florida, west to Texas and possibly Colorado, north to Illinois. The wingspan is about 35 mm. The forewings are white with a reddish-brown shading at the base and along the inner margin and two black discal spots, as well as an irregular subterminal line. There is a dark apical blotch on both wings. Adults are on wing from May to August.

Example Output

(Reference) Compacta capitalis is a moth in the family Crambidae. It was described by Augustus Radcliffe Grote in 1881. It is found in North America, where it has been recorded from Maryland to Florida, west to Texas and possibly Colorado, north to Illinois. The wingspan is about 35 mm. The forewings are white with a reddish-brown shading at the base and along the inner margin and two black discal spots, as well as an irregular subterminal line. There is a dark apical blotch on both wings. Adults are on wing from May to August.

(CV-S2S) Compacta UNK is a moth in the Crambidae family. It was described by Barnes and McDunnough in 1918. It is found in North America, where it has been recorded from Alabama, Florida, Georgia, Illinois, Indiana, Kentucky, Maine, Maryland, Massachusetts, Minnesota, New Brunswick, New Hampshire, New Jersey, New york, North Carolina, Ohio, Oklahoma, Ontario, Pennsylvania, Quebec, South Carolina, Tennessee, Texas and Virginia.

Example Output

(Reference) Compacta capitalis is a moth in the family Crambidae. It was described by Augustus Radcliffe Grote in 1881. It is found in North America, where it has been recorded from Maryland to Florida, west to Texas and possibly Colorado, north to Illinois. The wingspan is about 35 mm. The forewings are white with a reddish-brown shading at the base and along the inner margin and two black discal spots, as well as an irregular subterminal line. There is a dark apical blotch on both wings. Adults are on wing from May to August.

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(Ours) Compacta UNK is a moth in the Crambidae family. It was described by Grote in 1878. It is found in North America, where it has been recorded from Florida. It is also found in Mexico. The wingspan is about 20 mm. Adults have been recorded on wing from April to September.

Conclusions

- A novel structured decoder for multi-document summarisation
  aware of sentence topics and sentence order
- Structured decoding improves on content coverage
  @ACL Holtzman et al. (2019); Ippolito et al. (2019); Shen et al. (2019)

Code (PyTorch) @ `https://github.com/lauhaide/WikiCatSum`
WikiCatSum @ `https://datashare.is.ed.ac.uk/handle/10283/3368`

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WikiCatSum Dataset

- WikiSum Liu et al. (2018)
- Three domains (DBPedia **Cat**egories) derived from WikiSum, 800 input tokens

	Size	R1	R2	RL	SentNb	SentLen	#Topics
Company	62k	.551	.217	.438	5.09±3.73	24.40±13.47	40
Film	60k	.559	.243	.456	4.17±2.71	23.54±11.91	20
Animal	61k	.541	.208	.455	4.71±3.53	19.68±18.69	30

* R1, R2 and RL ROUGE recall

Content Coverage According to Abstract & Copy metrics

Model	Company		Film		Animal	
	A	C	A	C	A	C
CV-S2S	.046	.307	.097	.430	**.229**	**.515**
Ours **CV-S2D**+T	**.051**	**.316**	**.101**	**.433**	.223	.506