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† †† ††† ††

† 464-8603
†† 464-8601
††† 464-8601
E-mail: †katok@murase.m.is.nagoya-u.ac.jp, ††{ide,murase}@is.nagoya-u.ac.jp, †††ddeguchi@nagoya-u.jp

あらまし

キーワード

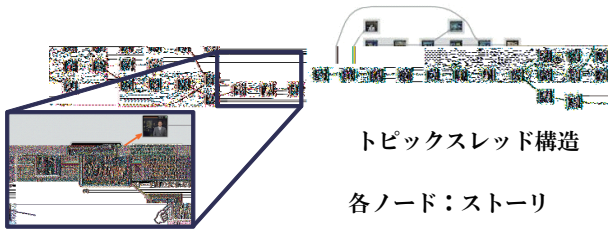
Estimation of the Representative Story Transition in a Chronological Semantic Structure of News Topics

Kosuke KATO†, Ichiro IDE††, Daisuke DEGUCHI†††, and Hiroshi MURASE††

† Nagoya University Faculty of Engineering
Furo-cho Chikusa-ku Nagoya-shi Aichi 464–8603 Japan
†† Nagoya University Graduate School of Information Science
Furo-cho Chikusa-ku Nagoya-shi Aichi 464–8601 Japan
††† Nagoya University Information and Communications Headquarters
Furo-cho Chikusa-ku Nagoya-shi Aichi 464–8601 Japan
E-mail: †katok@murase.m.is.nagoya-u.ac.jp, ††{ide,murase}@is.nagoya-u.ac.jp, †††ddeguchi@nagoya-u.jp

Abstract Archiving news videos is regarded as important,since they are valuable as sources of important social information. When exploiting archived news videos as information sources, it is important to track the flow of topics to understand its contents comprehensively. Concerning it, a method that structures the chronological semantic relations between news stories, namely the "topic thread structure" is proposed. It allows the understanding of the circumstance of the topic by tracing related stories one after another from the initial story. However, imposes a user to watch many stories along the topic thread structure when it contains various topics. Thus, we propose a method that estimates the representative story transition in a topic thread structure. In the proposed method, features obtained from a story and those from the topic thread structure are used for the estimation. We confirm the effectiveness of our method by comparing the proposed method to ground-truth topic threads obtained from votes by subjects.

Key words News video news video archive topic thread structure



1

mediaWalker [6]

1. はじめに

[1]

Fiscus [3] Duygulu [4] 3. 4.

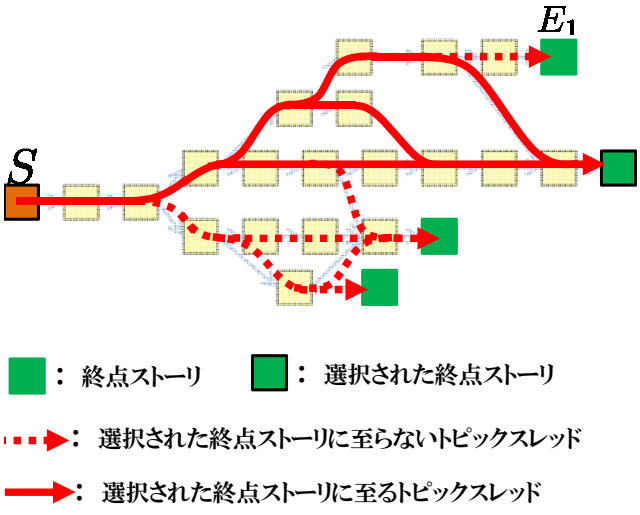
[3]

Wu [5]

2

[6]

mediaWalker [2] mediaWalker 1



2

1

2 1

2.

2. 主要なストーリ遷移の推定

2.1 主要なトピックスレッドの推定

[6]

- CC
-

2

1

2 2

3

3 S E_i

2.1.1

5

- **固有名詞の類似度**

CC

$\boldsymbol{W}_S$ S
$\boldsymbol{W}_{E_i}$ i E_i
$v_{\mathrm{relevance},i}$ (1)

$$\begin{cases} v_{\mathrm{relevance},i} = \dfrac{\sum_{j=1}^{n} W_{S,j} W_{E_i,j}}{\sqrt{\sum_{j=1}^{n} W_{S,j}^2}\sqrt{\sum_{j=1}^{n} W_{E_i,j}^2}} \\ \boldsymbol{W}_S = (W_{S_1}; \cdots ; W_{S_n}) \\ \boldsymbol{W}_{E_i} = (W_{E_{i,1}}; \cdots ; W_{E_{i,n}}) \end{cases} \quad (1)$$

- **経過日数**

S D_S i
E_i D_{E_i}
$v_{\mathrm{elapse},i}$ (2)

$$v_{\mathrm{elapse},i} = D_{E_i} - D_S \quad (2)$$

- **スレッド長**

S E_i
j $L_{i,j}$
$v_{\mathrm{lenght},i}$ (3)

$$v_{\mathrm{length},i} = \max_j (L_{i,j}) \quad (3)$$

2 [7]

- **放送順序による重要度**

i E_i
N_{T_i}
L_{T_i} $v_{\mathrm{order},i}$ (4)

$$v_{\mathrm{order},i} = \frac{N_T}{L_{T_i}} \quad (4)$$

- **映像長による重要度**

i
I_{E_i} $v_{\mathrm{interval},i}$ (5)

$$v_{\mathrm{interval},i} = I_{Ei} \quad (5)$$

0 1
v_j m_j $\sum_j m_j = 1$
i (6)

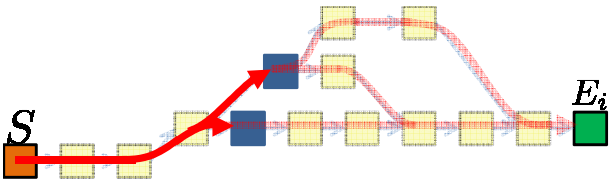
$$\begin{cases} \mathrm{Score}_i = \sum_j m_j \cdot v_{j,i} \\ \sum_j m_j = 1 \end{cases} \quad (6)$$

m_j

2.1.2

3

3.1
4 5



各ノード：ストーリ

：選択された終点ストーリ　：分岐後のストーリ

：トピックスレッド

4

1

	7.8	4	19
	7.0	2	24
	15.8	10	31
	4.4	3	6

- スレッド長

i

L_i

$v'_{\mathrm{length},i}$　(7)

$$v'_{\mathrm{length},i} = L_i \qquad (7)$$

3. 実験と考察

3.1 実験用データ

NHK　7

12

1

3.2 被験者実験による主要なトピックスレッドの決定

20

16

3.3 被験者実験の方法

2

2

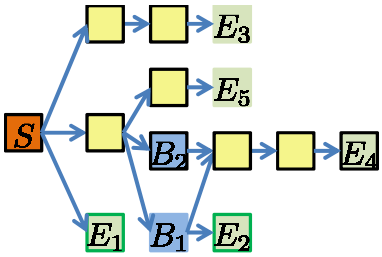
第 1 段階

第 2 段階　1

3.4 実 験 結 果

第 1 段階　12

5



E_i: i 番目の終点ストーリ

5

2　1

E_1	0	
E_2	0	
E_3	0	
E_4	12	4
E_5	4	

3　2

B_1	5	
B_2	7	

2

第 2 段階　12

12

1　2.17　5

3

3.5 実 験 方 法

3.5.1

1　CC

3

- 提案手法

- 比較手法 1
- 比較手法 2
- 比較手法 3
- 比較手法 4
- 比較手法 5

3.5.2

1　2

2

評価指標 1

4 1

	1	2
R	67% 8/12	0.52
3	50% 2.0/ 4	0.36
1	42% 5/12	0.18
2	42% 5/12	0.38
3	17% 2/12	0.17
4	17% 2/12	0.12
5	33% 4/12	0.17

5 1 3

	1	2
1	50% 2/4	0.34
2	75% 3/4	0.41
3	25% 1/4	0.32

6 2

	1
R	92% 11/12
3	92% 3.7/ 4
1	25% 3/12
2	67% 8/12
3	42% 5/12
4	50% 6/12
5	50% 6/12

評価指標 2 Kendall

2

n

2 P Kendall

(8) [9] n

P i j

$$= \frac{2P}{\frac{1}{2}n(n-1)} - 1 \qquad (8)$$

2

1 2 R Resubstitute 3

3.6 実 験 結 果

1 4 3

5

2 6 3

7 1

7 2 3

	1
1	100% 4/4
2	75% 3/4
3	100% 4/4

8 R 1

	$m_{\text{relevance}}$	m_{elapse}	m_{length}	m_{order}	m_{interval}
R	0.37	0.25	0.03	0.01	0.34
1	0.43	0.15	0.01	0.00	0.41
2	0.03	0.47	0.28	0.00	0.22
3	0.35	0.33	0.01	0.01	0.30

9 R 2

	$m_{\text{relevance}}$	m_{elapse}	m_{length}	m_{order}	m_{interval}
R	0.10	0.39	0.02	0.09	0.40
1	0.72	0.00	0.05	0.04	0.19
2	0.27	0.09	0.18	0.02	0.44
3	0.10	0.39	0.02	0.09	0.40

3.7 考 察

1 12

4.4

2.7/12

4

3/12

1 R 1

2 3

1 2 2

2 R

3

4

1

Kendall

0.52 5

10

7.6

2

R 5

8 9

8 1

2 3

2 R 3

11/12

2 3

1

1

2 2

0

0

12

4. む す び

2 1

2

1

謝 辞

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