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China in the eyes of news media: a case study under COVID-19 epidemic

Key words: Country image; COVID-19 epidemic; Topic mining; Entity; Tone of news; Emotion

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Motivation

Q1: What has the international media focused on during the COVID-19 epidemic period?

Q2: What is the media's tone when they report China?

Q3: What is the media's emotional tone when they are talking about China?

Datasets

Data collection



Data cleaning



Translation

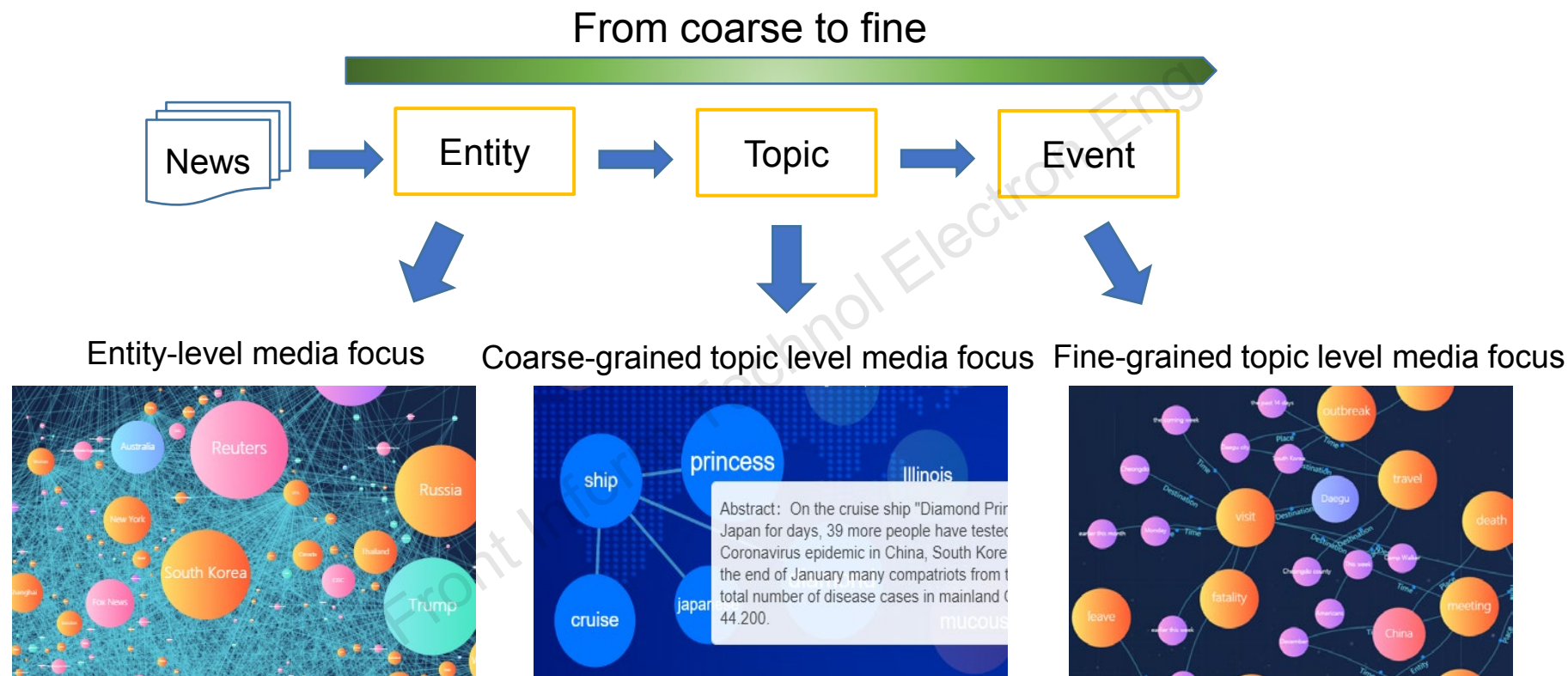


Annotation

Country	Media	Count	Country	Media	Count	Country	Media	Count
the United States	CNN	4308	Germany	Süddeutsche Zeitung	20791	Portugal	CMJORNAL	7134
	CNBC	6014		Frankfurter Allgemeine Zeitung	533		EXPRESSO	6176
	NYT	10886		BLID	934		RTP	291
	WP	4913		WESER-KURIER	4264		PUBLICO	1249
	FOX NEWS	2577		Der Spiegel	4524		TODAY	16714
France	RFI	1545	The United Kingdom	Daily Mail	2604	Singapore	Channel News Asia	7671
	Le Nouvel Observateur	2612		BBC	282		Straits Times	21267
	Le Monde	3388		Reuters	2372		bernama	1319
	Le Figaro	488		読売新聞	650	Malaysia	The Star	1889
Russia	RIA	3341	Japan	毎日新聞	8875		La Vanguardia	839
	TASS	35552		朝日新聞	234		El Mundo	3181
	RG.RU	17317	South Korea	조선뉴스	1998	Spain	EL Pais	9681
Cuba	Granma	1048		중앙일보	1773		News24	342
Australia	Sydney Morning Herald	8240		동아일보	559		Sport24	85
	The Age	4743		경향신문	446	India	IndiaToday	2350
Brunei	borneobulletin	3692	Brazil	Agência Brasil	3857		Rediff	636
Italy	lastampa	6553		Folha de Sao Paulo	12568	Belarus	belta	2194
Venezuela	El Nacional	841	Canada	nationalpost	9202		naviny	1922
	El Universal	1475		theglobeandmail	3244	Kazakhstan	kazpravda	1637



Multi-level media focus (Q1)



Multi-level media focus

- The media pay special attention to people's livelihood and society issues.
- The number of news articles increases and then declines with time.

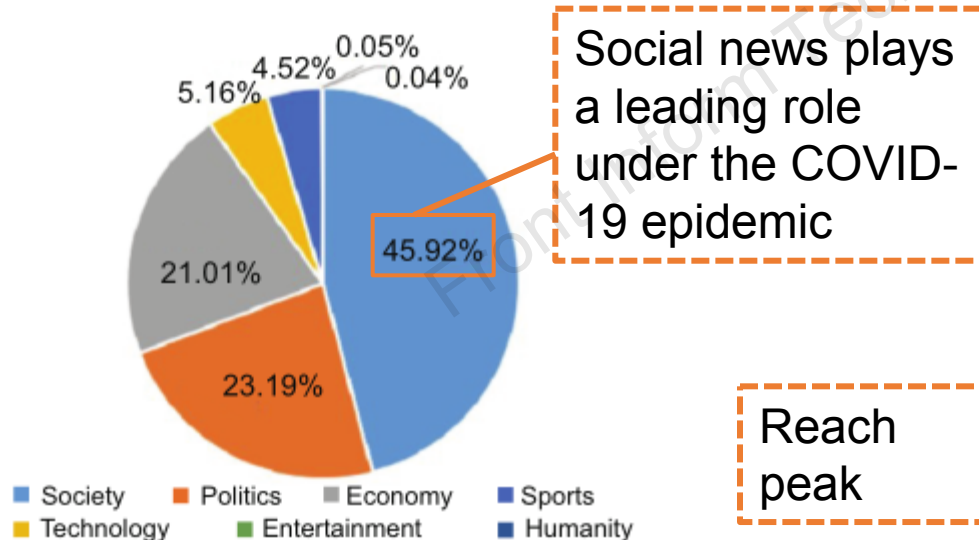


Fig. 4 Topic distribution

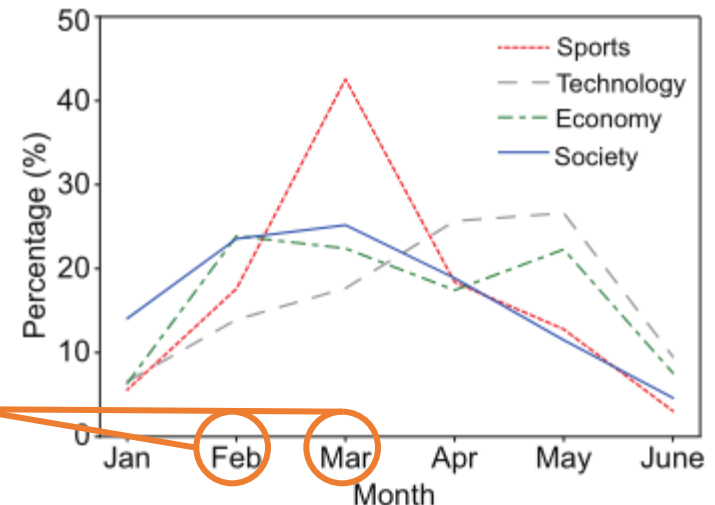


Fig. 6 Topic distribution over time

Multi-level media focus

- In different periods, the international media pay attention to different topics.

Period	Topics
In the first 20 days of January	novel coronavirus found in China, virus outbreak in China, Wuhan is under lockdown
In late January	The media shifted its focus from China to other countries
In February	Aggregated events were postponed or canceled, stock market volatility, the progress of the vaccine
In March and April	progress of Chinese vaccines, specific drugs and treatments, virus outbreak in U.S., Tokyo Olympics, events postponed
In May	the stock market, crude oil, exchange rate, compensation, from China for COVID-19, virus origin, vaccine competition, China's second wave of epidemics, China-Australia relations, NPC and CPPCC China
In early June	People's Bank of China buys bank loans, stocks surged, China will strengthen global cooperation in vaccine trials, Trump administration says it will block Chinese airlines from flying into the U.S., China urges citizens to avoid Australia, Harvard research, New virus cases raise fears in Beijing

Tone of news against China (Q2)

- Most of the news has a neutral tone against China, accounting for **62%**.
- Negative: France, the United Kingdom, the United States
- Positive: Russia, Singapore, Cuba, Brunei

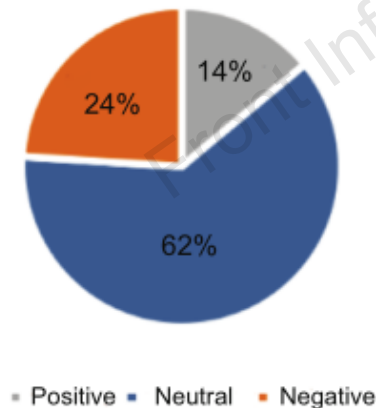


Fig. 7 Distribution of tone of news against China

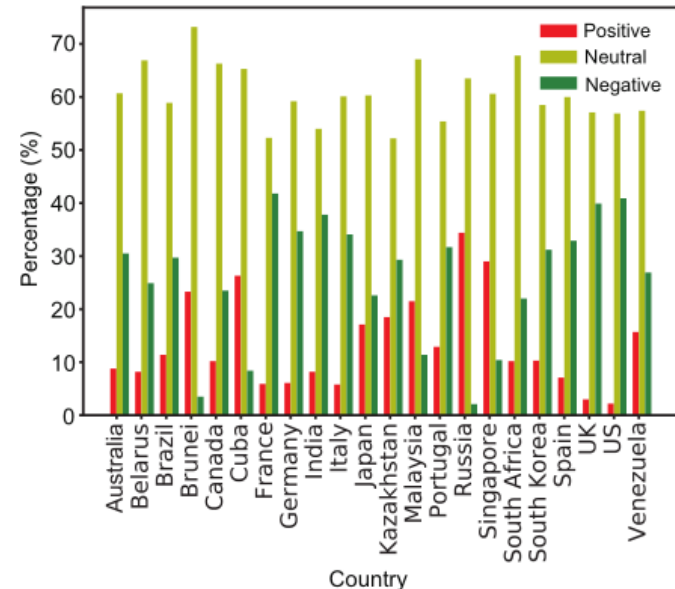


Fig. 8 Tone of news against China in different countries

Tone of news against China

- The overall negative position shows an increasing trend with time first and then a decreasing one.

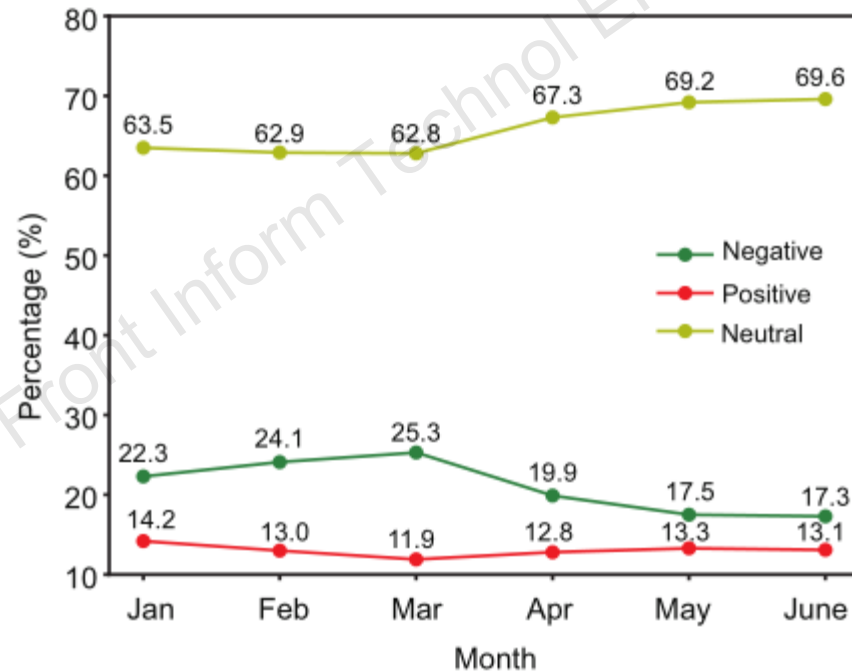


Fig. 10 Tone of news against China over time

News emotion tones toward China (Q3)

- For news sentiment intensity, we use Vader (Hutto and Gilbert, 2014) to calculate the sentiment intensity of a news article.
- For news label based emotions, we design a useful multi-label emotion classification model to capture the semantics.

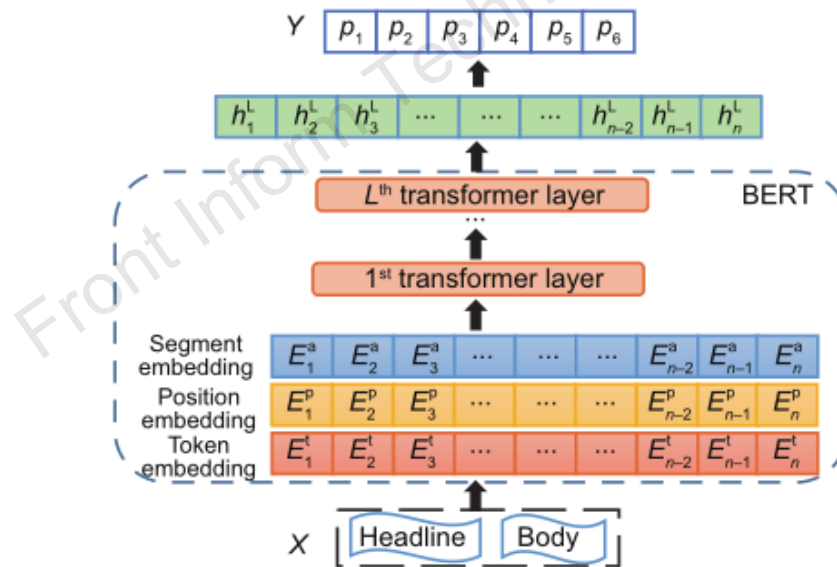


Fig. 13 Illustration of the multi-label emotion classification model

News emotion tones toward China

- News emotion intensity score increases first and then decreases.
- **Malaysia** has the **highest sentiment intensity**, while **Canada** has the **lowest intensity**.

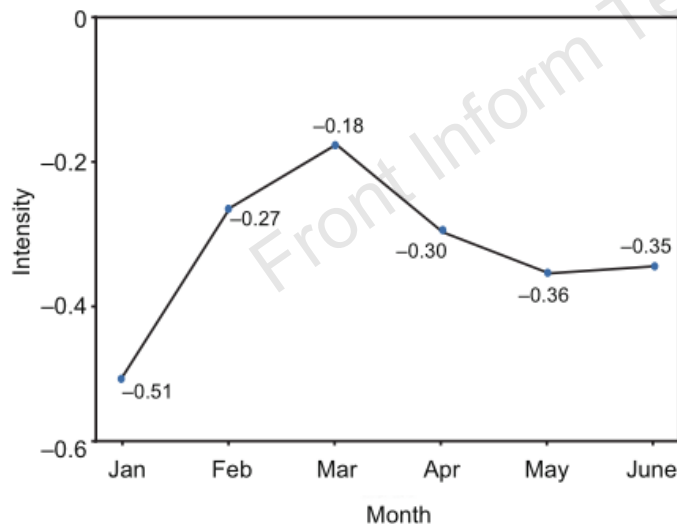


Fig. 11 Sentiment intensity over time

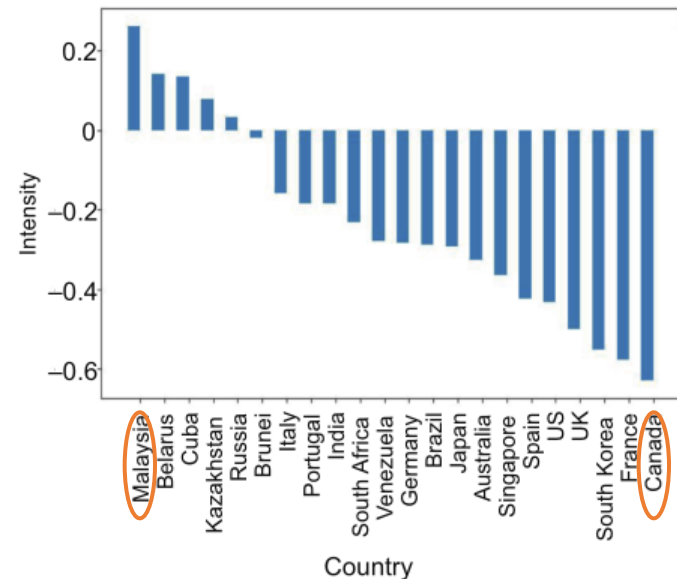


Fig. 12 Sentiment intensity for each country

News emotion tones toward China

- International news toward China holds **more negative** emotions than positive emotions, up to 26.0% and 5.5%.
- **France**'s news reports have an extremely high percentage of “**hated**” emotion, followed by **Canada**, **the United Kingdom**, **South Korea**, **Spain**, and **the United States**.

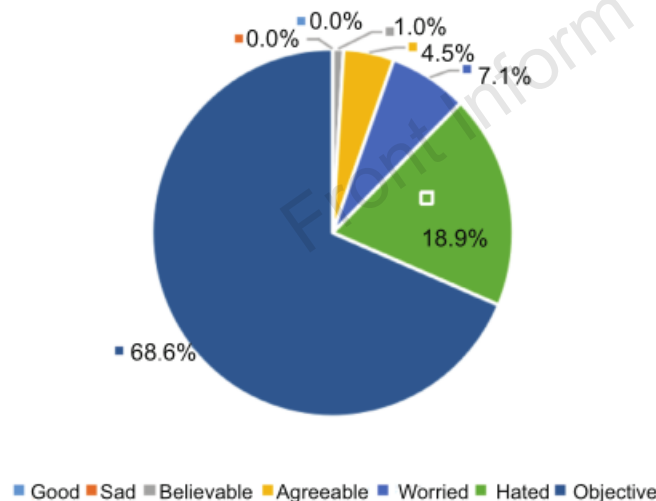


Fig. 14 Emotion distribution

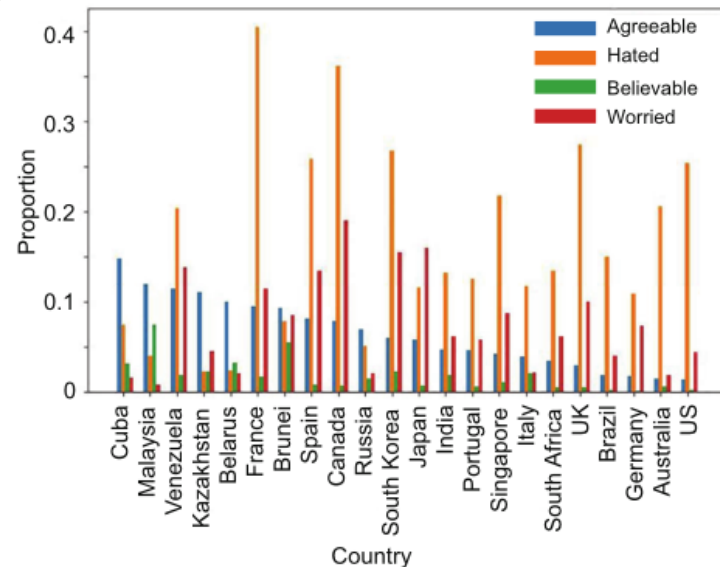


Fig. 15 Emotions in different countries

News emotion tones toward China

- The proportion of “agreeable” toward China is generally low in every country.
- Cluster 2 shows more **positive** emotions than others.
- Cluster 3 shows more **negative** emotions than others.

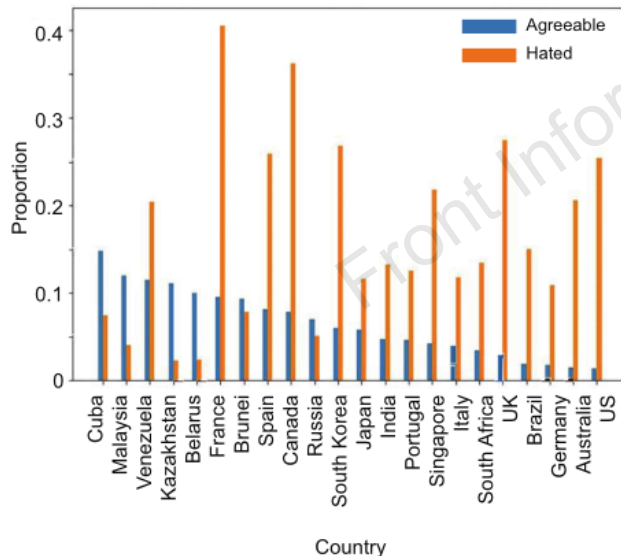
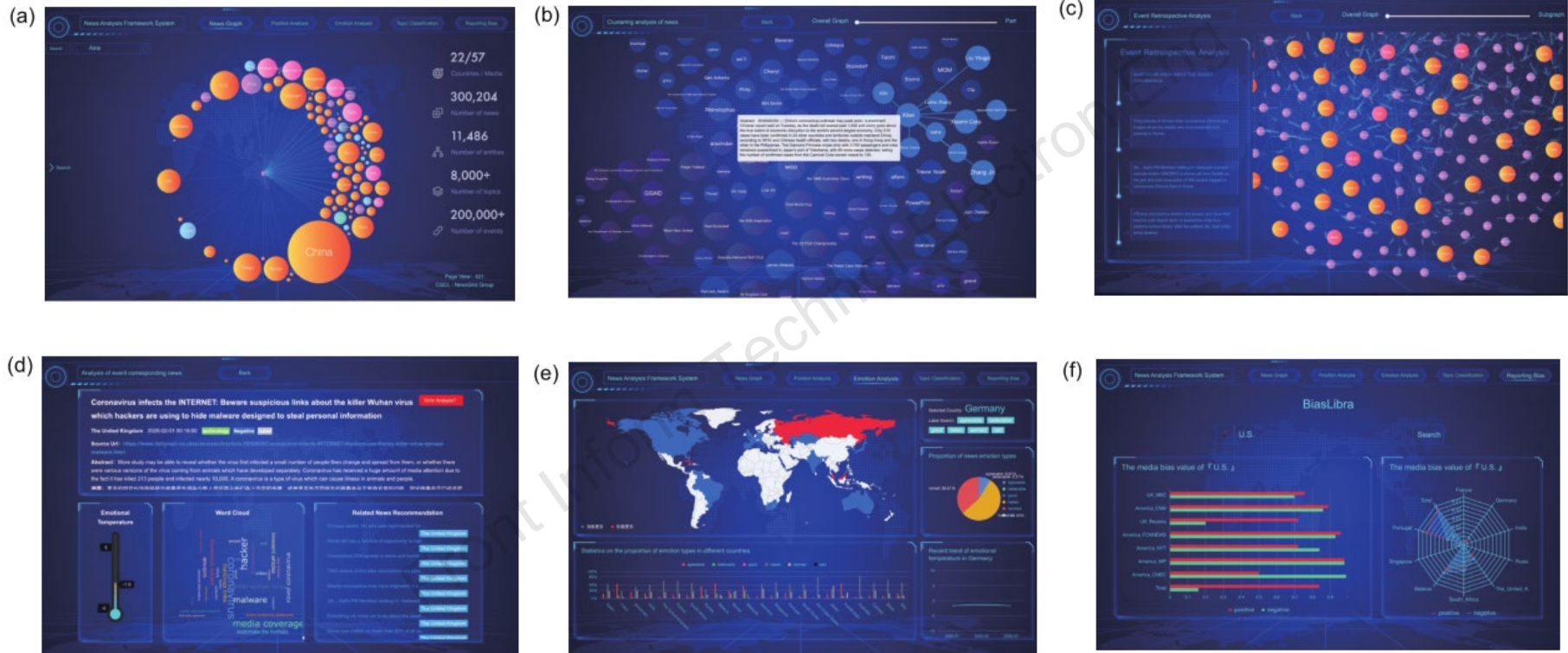


Fig. 16 Proportion of “agreeable” and “hated” emotions for each country

Table 3 Results of country clusters based on the proportion of emotions

Cluster	Countries
1	Japan, India, Portugal, Singapore, Italy, South Africa, Brazil, Germany, Australia, the United States
2	Cuba, Malaysia, Kazakhstan, Belarus, Brunei, Russia
3	Venezuela, France, Spain, Canada, South Korea, the United Kingdom

Prototype system



The first three figures (a–c) are visualizations of a multi-level media focus. The last three figures (d–f) show coarse-grained topics and the tone of news and emotion analysis.

System framework

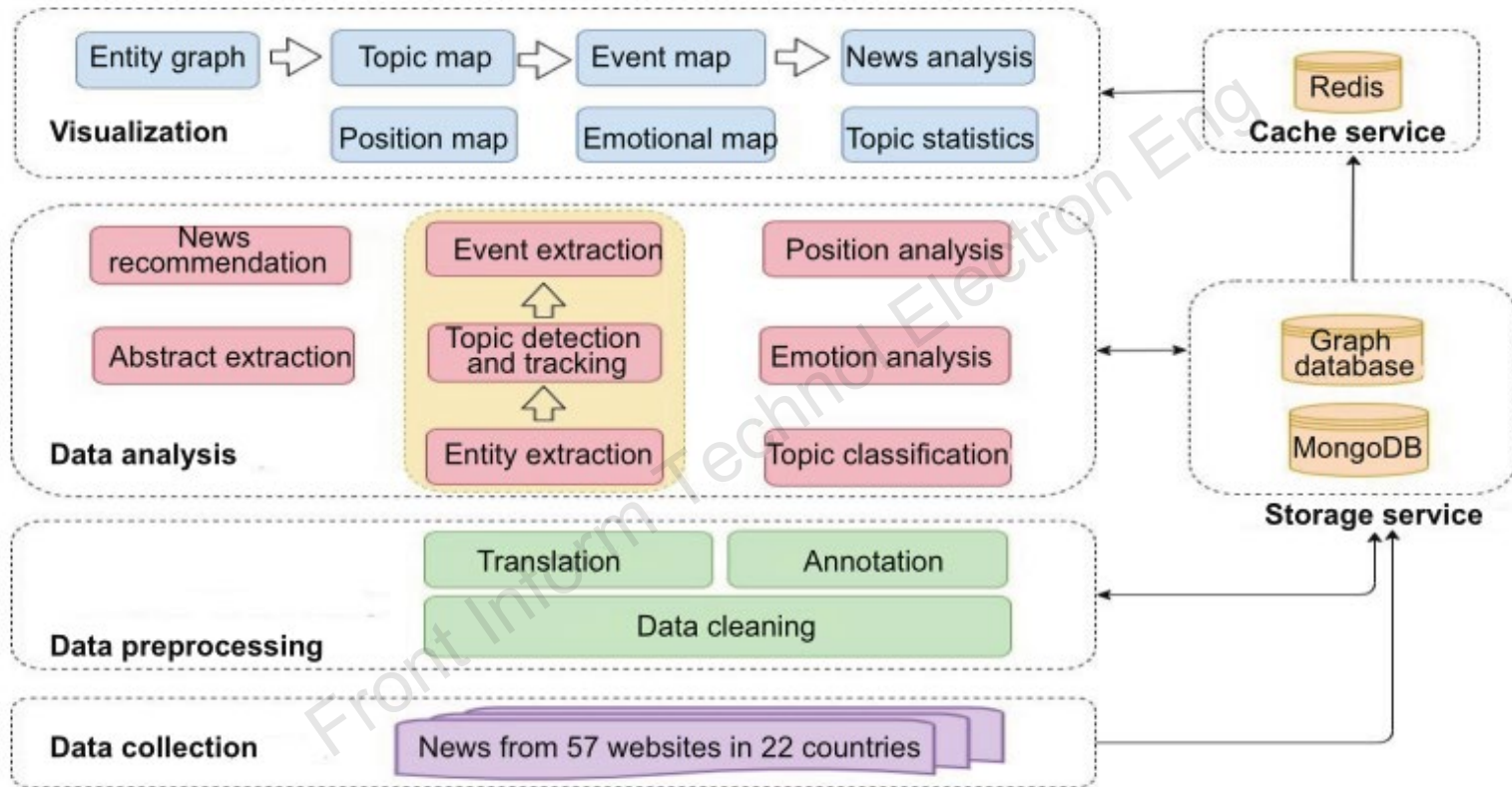


Fig. 17 System framework

Conclusions

1. We crawled more than 280 000 pieces of news from 57 mainstream news media entities in 22 countries and made a detailed analysis.
2. Different countries' news emotions towards China:

news emotion toward China	positive	Cuba Malaysia Venezuela
	negative	France Canada United Kingdom

Conclusions (Cont'd)

3. In different periods, the topics on which the international media more focus:

PERIOD	What has the international media focused on?
the second wave of the COVID-19 epidemic period	<pre> graph LR A[mainstream media] -- concern --> B[medical scientists] </pre>
the COVID-19 epidemic period	<pre> graph LR S[Singapore] -- concern --> C[China's economy] M[Malaysia] -- concern --> C Ca[Canada] -- concern --> P[Chinese politics] F[France] -- concern --> P </pre>
In March and April	<pre> graph LR Med[media] -- concern --> V[progress of Chinese vaccines] Med -- concern --> D[specific drugs and treatments] Med -- concern --> U[virus outbreak in U.S.] </pre>