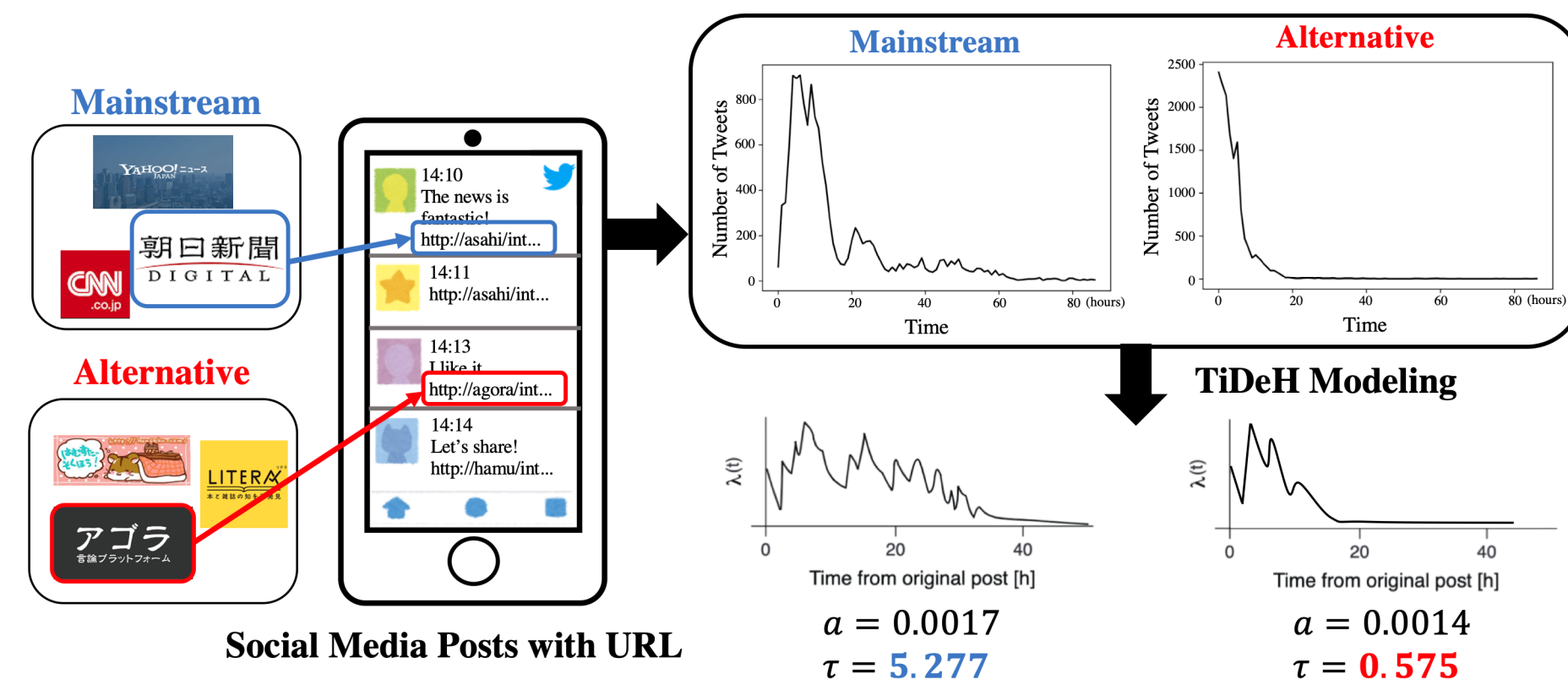# Comparable Analysis of News Diffusion between Mainstream and Alternative Media in Twitter

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What we do

- Classify Japanese news media into Mainstream and Alternative Media by crowdsourcing
- Analyzing how Japanese news media are spread on Twitter using Point Process
- The results of the analysis showed **that the diffusion of the mainstream tends to last for a long time**, compared to Alternative media.

Social Media Posts with URL

$a = 0.0017$
$\tau = 5.277$

$a = 0.0014$
$\tau = 0.575$

Background

- Pew research center reports that the number of readers of news media increase; About two-thirds of American adults get news on social media.

68% ever get news on social media

- There are many studies about the impact of news media on social media focused on **the U.S. society.**
  - News Media Bias [Ramy Baly et al, in EMNLP, 2020]
  - Echo Chamber from news media [Kiran Garimella et al, Web Conf, 2018]
  - Fake News [Zhouhan Chen et al, Web Conf, 2020]
- In recent years, the strength of the relationship between alternative media and the social media ecosystem causes **increasing attention to alternative media** as a research subject [Gabriel Fair et al, ICWSM, 2019]

Problem: Not enough is known about the impact of news media (especially Alternative media) on social media in other countries other than the U.S., such as Japan.

What is Alternative Media?

- John Downing defines that "**alternative media** express an alternative vision to hegemonic policies, priorities, and perspectives" [Atton C et al, 2002]
  In other words, alternative media are **counterparts of the mainstream media** such as major media.
⇒ Expected to have a positive effect on the diversity of news media in the 2000s.

- Increasing the social (not good) impact by Alternative media
  - 2013: Boston Marathon bombings
  - 2016: Pizzagate
- Some researches handle news media spreading fake news as alternative media
- Similar situation in Japan
  e.g. fake news "Jugon is killed by left wings" is spread by one of alternative media

From: https://www.buzzfeed.com/jp/kensukeseya/okinawa-dugonga-sea-pig
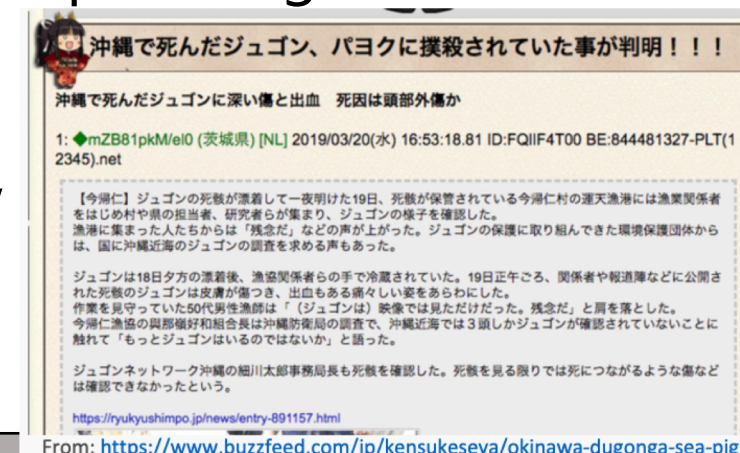
Purpose

Purpose Understanding the trend of diffusion of Japanese news media in Twitter

We especially focus on
- The speed of diffusion on Twitter
- The difference between Mainstream and Alternative Media

Steps

Step1: Classify Japanese news media into Mainstream and Alternative Media by crowdsourcing
Step2: Analyze the diffusion of posts containing URLs of each news media by Point process.

Step1: Classify Japanese News Media

We classify 35 Japanese news media, which are frequently posted on Twitter, into Mainstream and Alternative media based on the ratio obtained by asking "**Does this news media utilize primary sources?**" to 1,000 people.

35 New Media

20 News Media

15 News Media

Dataset

- **COVID-19 Japanese Tweet dataset**: Tweets including keywords related to "COVID-19'' and ranging from Jan 17 to Apr 30, 2020. The total is 12,289,740 tweets and 9,000 URLs.
- Gakujyutu (Japanese Political Topic): Tweets including 「学術会議」 ranging from Sep 30 to Oct 20, 2020. The total is 386,538 tweets and1,000 URLs.
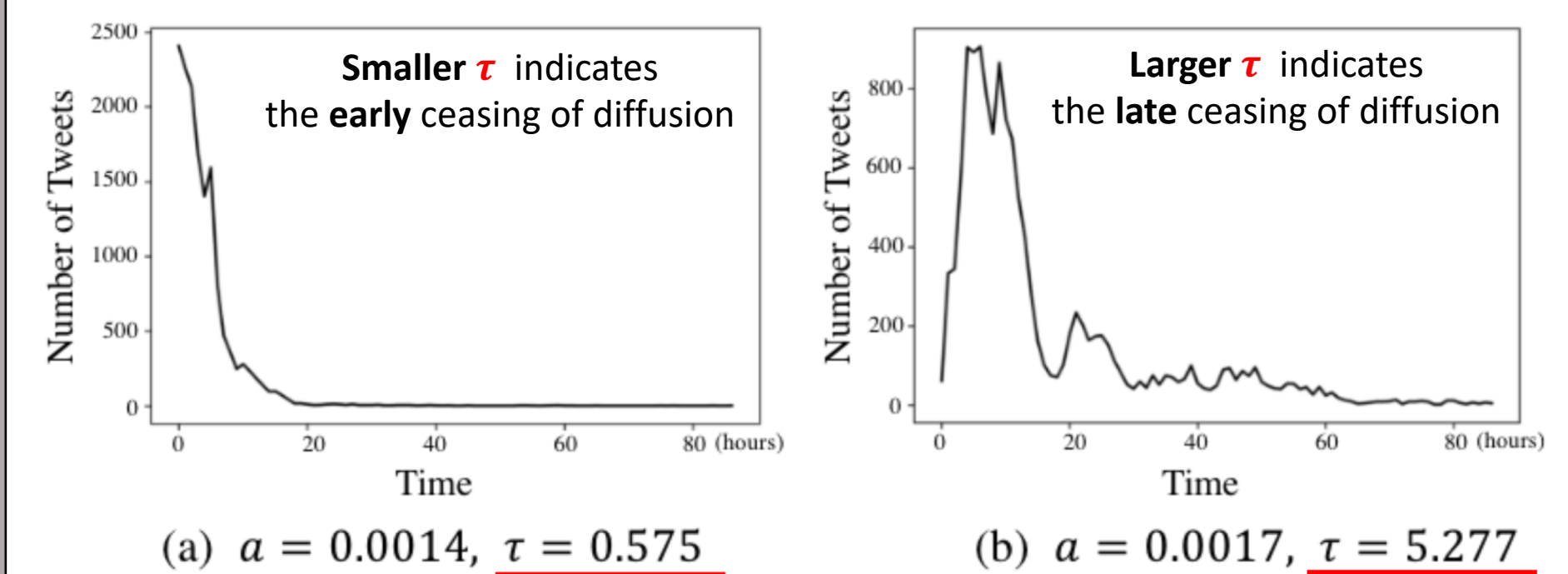
Step2: Analysis of the diffusion

Method Time-dependent Hawkes Process (TideH)
[Ryota Kobashi et al, ICWSM, 2016]

- One of point process model, suitable to social media
- Calculate the probability of the next post from past posts.
- Considering the circadian rhythm and the freshness of information

$$p(t) = a\left\{1 - r\,\sin\left(\frac{2\pi}{T_m}(t + \theta_0)\right)\right\}e^{-t/\tau}$$

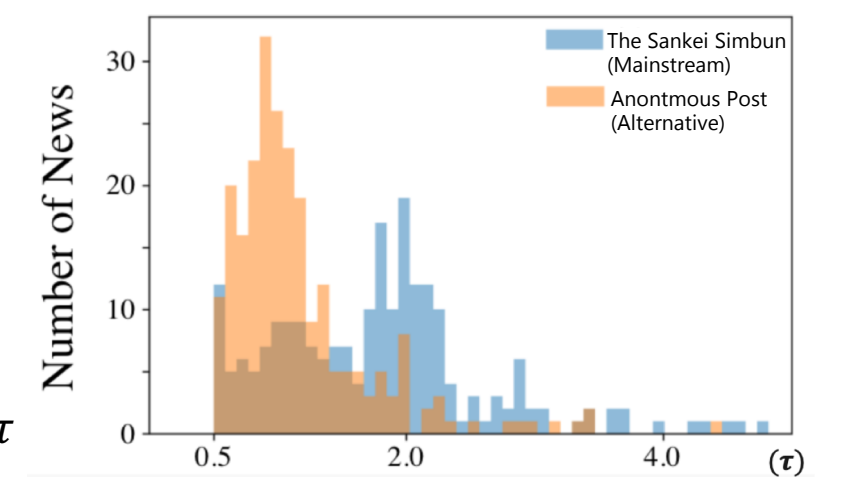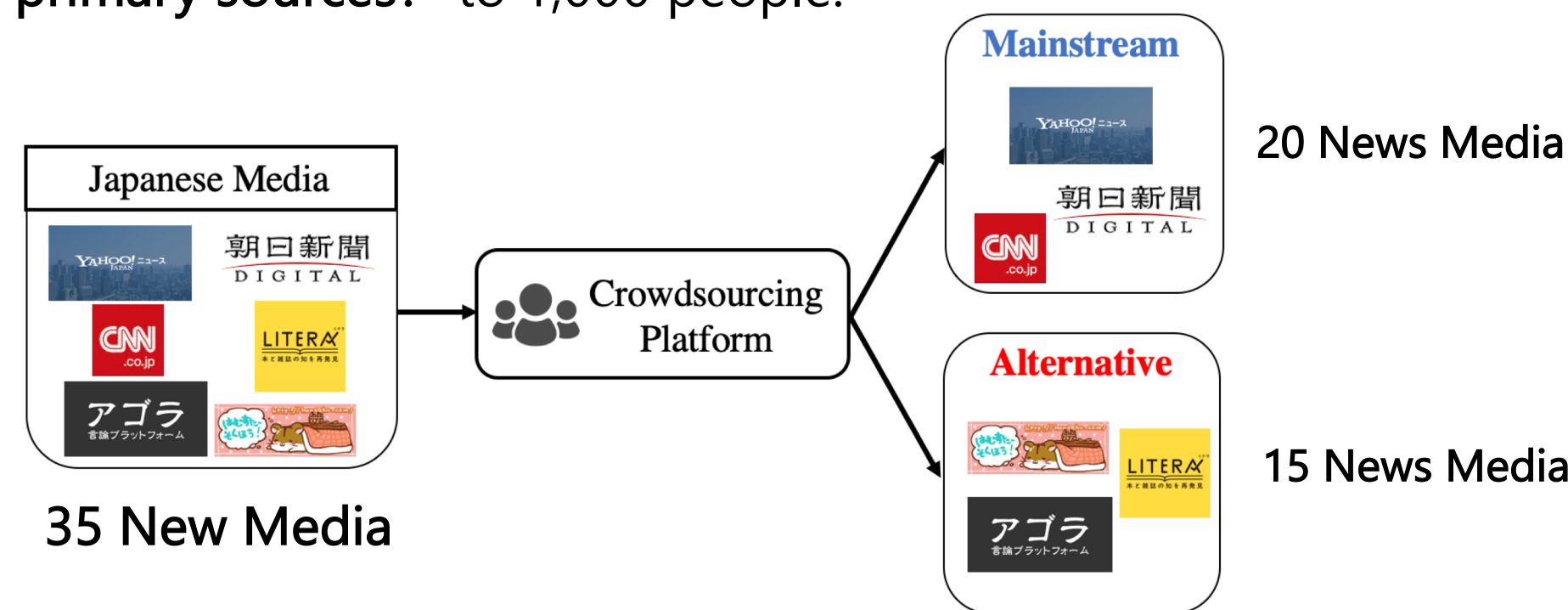intensity   Circadian Rhythm   the freshness

Smaller τ indicates the **early** ceasing of diffusion

Larger τ indicates the **late** ceasing of diffusion

(a) $a = 0.0014$, $\tau = 0.575$ (b) $a = 0.0017$, $\tau = 5.277$

Result Compare τ of the posts of each media

Mainstream			
Name of Media	Average	Media	URLs
Yahoo!ニュース (Yahoo! News)	2.106	1.814	1309
NHK NEWS WEB	2.095	2.041	716
産経ニュース (The Sankei Shimbun)	2.898	**2.445**	246
AFPBB News	3.529	2.000	134
ハフポスト (HuffPost)	3.233	2.155	38
毎日新聞 (The Mainichi Shimbun)	2.966	2.101	134
朝日新聞デジタル (The Asahi Shimbun)	2.851	2.001	149
日本経済新聞 (Nikkei)	3.068	2.001	113
東洋経済オンライン (ToyoKeizai Online)	3.484	**2.665**	34
東京新聞 (The Tokyo Shimbun)	3.848	**2.663**	25
時事ドットコム (Jiji.com)	2.941	1.999	150
京都新聞 (The Kyoto Shimbun)	**4.590**	1.924	18
読売新聞オンライン (The Yomiuri Shimbun)	**3.906**	1.968	17

Alternative			
Name of Media	Average	Media	URLs
アゴラ 言論プラットフォーム (Agora)	2.137	1.951	6
しんぶん赤旗 (Shimbun Akahata)	3.490	2.085	7
ニューズウィーク日本版 (Newsweek in Japan)	2.993	**2.312**	35
バズフィードジャパン (Buzzfeed Japan)	3.606	2.105	52
zakzak (Yukan Fuji)	3.495	2.083	36
政治知新 (Seijichishin)	**1.574**	**1.537**	35
ロイター (Reuters)	2.289	1.998	27
日本経済新聞 LITERA	2.138	1.691	34
アノニマスポスト (Anonymous post)	**1.215**	**0.998**	241
LINE NEWS	**1.384**	**0.706**	10
PRESIDENT Online	**3.963**	2.064	13
Share News Japan	-	-	-
Nordot	1.928	**1.286**	108

- Mainstream media have bigger τ (The diffusion is slow to subside)
  - Mainstream: 2.325 (average)
  - Alternative: 2.317 (average)
  - 4 media, of the top 5 media with the largest τ belong to mainstream, while 4 media, of the top 5 media with the smallest τ belong to alternative.

- Online news media (e.g. Yahoo! News) has small τ.
- National news paper (e.g. Sankei, Mainichi) has the almost same τ.
- Media with political bias (e.g. Anonymous Post) has smaller τ.

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