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Social Media Mapping as Digital Infrastructure for Disaster Prevention and Reduction

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1-1. Purpose of the present study

- The occurrence frequency of meteorological disasters in addition to earthquake and volcanic eruption tremendously increased.
- As the digital infrastructures are toughened in the effective measures for disaster prevention and reduction, the importance of ICT and social media is widely recognized especially in recent Japan.

- At the time of the Heavy Rain Disaster in Western Japan in July, 2018, it was possible to gather and accumulate a variety of disaster information using the function of social media mapping included in the spatiotemporal information system developed by Makino et al. (2019).

- **Considering these circumstances and taking up the above social media mapping, the present study described the issues related to the development and utilization of digital infrastructures as one of the measures for disaster prevention and reduction.**

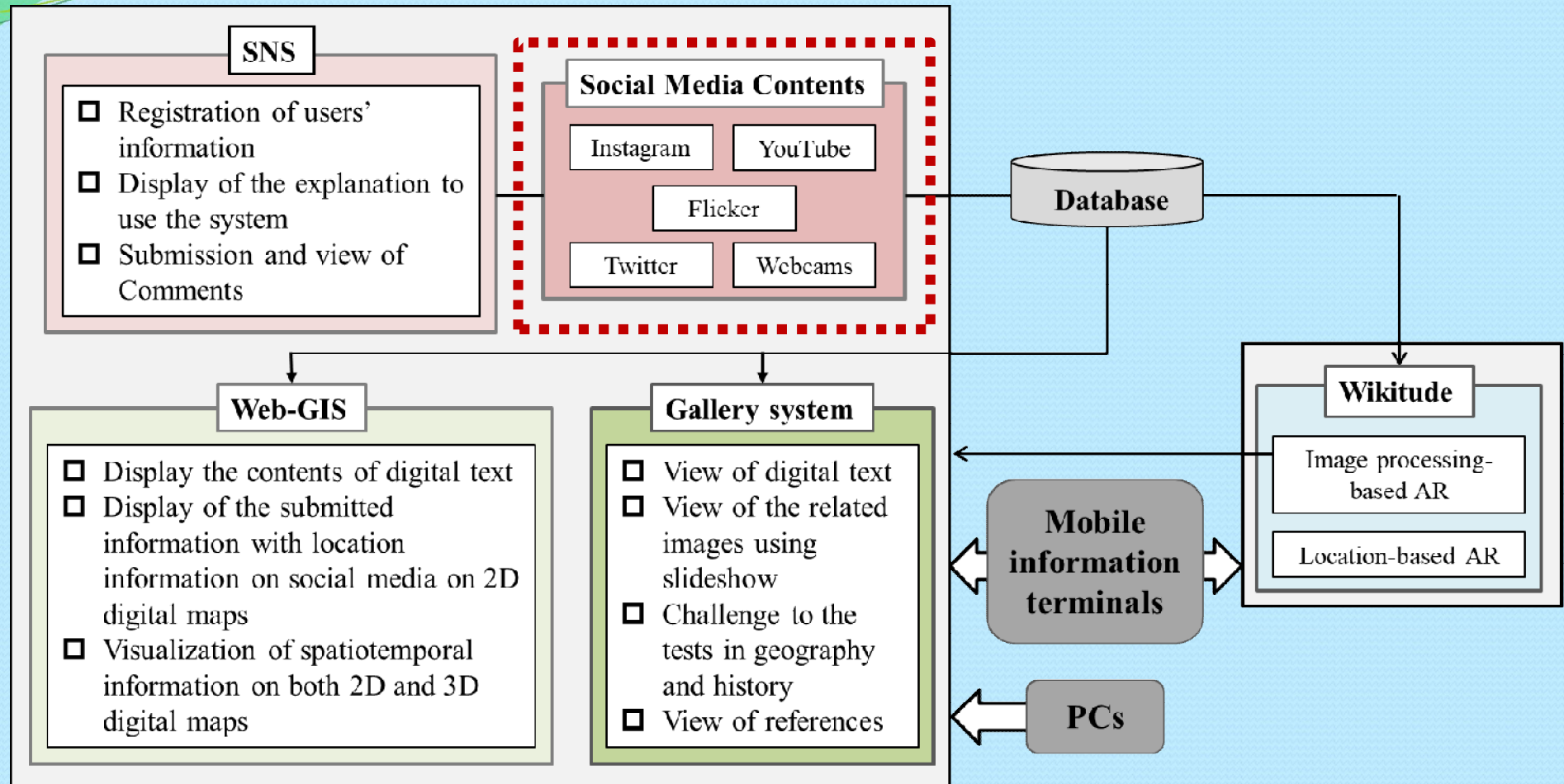# 2-1. Spatiotemporal information system

Fig. 1. System design of spatiotemporal information system.

- Using the function of social media mapping, all of the information with location information submitted from social media can be gathered and displayed on the 2D digital map of Web-GIS
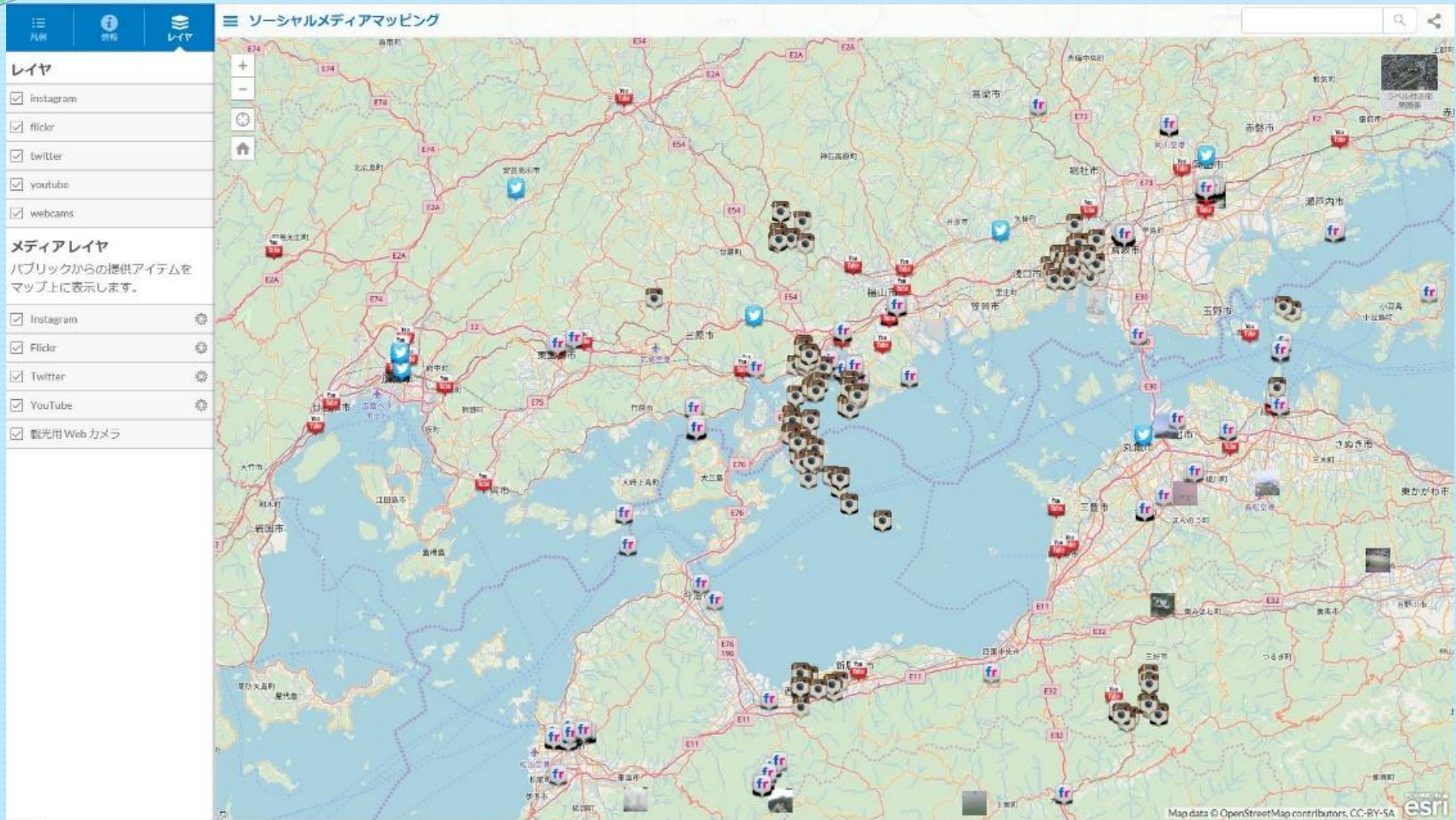
3

2-2. Screen of social media mapping

Fig. 2. Screen of social media mapping at the time of the Heavy Rain Disaster in Setouchi Region in 2018.

Fig. 3. Information related to the seriously damaged area in Mabi District, Kurashiki City, Okayama Prefecture using YouTube.

3-1. Classification by the kinds of hashtags

Table 1. Kinds of hashtags related the Heavy Rain Disaster in Western Japan in 2018.

Stages	Kinds of hashtags
At the time of heavy rain disaster	Situation (21), Evacuee (7), Rescue request and corporation (15), Name of specific place (5), Name of specific place in Mabi District (4), Information transmission (6)
After the time of heavy rain disaster	Name of heavy rain disaster (6), Support (20), Encouragement (4), Donation (2), Serious damage (5), Issues (10), Pets (2)

- Though various kinds of hashtags related to the heavy rain disaster were created, some of them meant the same phenomena and damages, and that might cause confusion among users.
- Most of hashtags were related to specific prefectures, cities, towns and districts in the damaged area.
- Additionally, there are the most hashtags related to Mabi District.

3-2. Use of Twitter

- Regarding important vital information, close relatives, friends and neighbors submitted the information in place of the persons who do not have any mobile information terminals nor cannot submit information by themselves. In the case, Twitter was most frequently used, and location information can be regarded as vital information.

- The issues related to the use of Twitter
  - There were many tweets with a hashtag in hope of diffusion, these were retweeted by the unspecified number of users, and those might lead to excessive information and confusion.
  - There were some tweets which expressed personal opinions and feelings, and vague situations. As such tweets increased, it was difficult to discover really important ones.

3-3. Classification by the kinds of hashtags

Table 2. Kinds of hashtags related Mabi District, Kurashiki City, Okayama Prefecture (July 16, 2018).

Date	Kinds of hashtags
July 6th (Fri)	Others (1)
July 7th (Sat)	Situation (6), Rescue request and corporation (24), Support (2), Encouragement (4), Others (10)
July 8th (Sun)	Situation (5), Support (5), Pets (1), Others (1)
July 9th (Mon)	Situation (1), Rescue request and corporation (1), Support (4), Encouragement (1), Donation (1), Attention reminding against false rumors (3), Others (4)
July 10th (Tue)	Support (1), Others (3)
July 11th (Wed)	Situation (2), Encouragement (1), Others (2)
July 12th (Thru)	Support (2), Donation (1), Others (2)
July 13th (Fri)	Situation (1), Support (2), Encouragement (1), Donation (2), Others (3)
July 14th (Sat)	Attention reminding against thieves (2), Others (1)
July 15th (Sun)	Support (1)

Fig. 4. Example tweet of rescue request using Twitter by the Twitter Japan.

Fig. 5. Tweet with an image related to a person who was rescued by Japanese Self-Defense Forces.

10

4-3. Necessity of rules for the use of Twitter at the time of disasters

- **(1) Creation of the tweet formats according to the purposes of information submissions**

- It is desirable to create the tweet formats according to the purposes of the information submissions

- **(2) Unification of the hashtags related to disasters**

- It is necessary to prevent causing confusion among users to unify the hashtags related to disasters.
- It is expected to create the specific rules to utilize Twitter during the normal period without any major disasters in response to regional characteristics in the unit of local government.

- **(3) Learning of information literacy when submitting and receiving information**

- It is necessary for users to fully consider whether they ought to tweet and retweet the information related to disaster or not.
- Users have to immediately erase old tweets which are not suited to the present situations by themselves.

5-1. Conclusion

- (1) In the super smart society of Japan, as the virtual space is closely involved with the real space, these mutually influence. Accordingly, when a disaster occurs in the real space, submission and reception of the related information using a variety of means are started approximately at the same time in the virtual space. Due to the close relationship between the real and virtual spaces, it is possible to rescue and support victims, and cause excessive information and confusion.

- (2) Additionally, it is essential to effectively utilize the information included in the virtual space at the time of disaster. Specifically, it is an important issue to make use of the information in social media for rescue in the real space. Furthermore, it is essential to take the measures for the people vulnerable to disaster who require the disaster information most. For this, it is necessary to prepare a variety of ICT in addition to oral communication.

12

Thank you very much for your attention !

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