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Meaningful use of Social Bots? - Possible Applications in Crisis Communication during Natural Disasters

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SOCIAL BOTS

Social media play an increasingly important role in communications during natural disasters such as bush and forest fires, floods or storms. Emergency organisations often lack the resources and the know-how to take full advantage of the opportunities. Social bots and artificial intelligence are also phenomena gaining in popularity and complexity. They could provide assistance to handle the growing number of social media messages.

Social bots are computer algorithms that automatically produce content and interact with humans on social media, trying to emulate and possibly influence human behaviour (Ferrara et al., 2016). Stieglitz and colleagues (2017) classified them by the level of imitation of human behaviour and their intent.
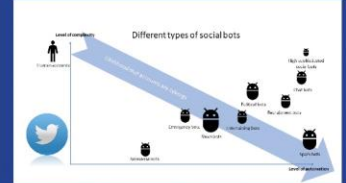
Classification of bot types into the dimensions of complexity and automation

RESEARCH QUESTIONS

RQ1: Are there bot activities in social media communication during natural disasters in Australia?

RQ2: In which phases of emergency management can social bots be used?

RQ3: Which tasks can social bots perform to support emergency management during natural disasters in Australia?

METHODS

Social Network Analysis

1. Most influential Twitter users during natural disasters (measured by weighted in-degree).

2. Tweet content analysis (classification of 209 randomly selected tweets).

3. Detection of Twitter bot activities during disasters measured by Botometer (Menczer, 2018) combined with manual checks.

Qualitative Content Analysis

1. Content analysis of expert interviews according to Mayring (1985).

2. Two phases of reduction, generalisation & inductive category formation.

3. Development of recommendations for concrete bot applications in disaster communication and management.
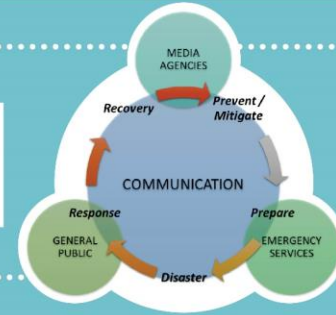
DATA SOURCES

Quantitative data
Twitter dataset about the Tathra bushfires and the bushfires in Victoria in March 2018 (13,305 tweets and retweets)

Qualitative data
Expert interviews with representatives of emergency organisations from New South Wales, Victoria & South Australia (14 interviewees from different areas of emergency management).
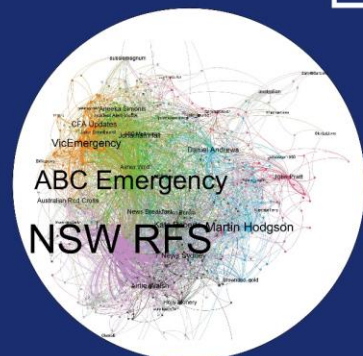
PPRR Emergency Management Framework & interaction dimensions (see Crondstedt, 2002)

FIRST FINDINGS

Qualitative Content Analysis

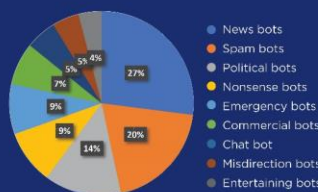### Social Network Analysis

ABC Emergency
NSW RFS
VicEmergency

Twitter retweet network of the most influential users during the 2018 Eastern Australian Bushfires in NSW and Victoria (visualisation via Gephi)

Most influential Twitter users
- Emergency Organisations NSW
- Emergency Organisations Victoria
- News Agencies
- Human Rights Activists
- Climate Change Activists
- Political Accounts
- Unrelated Accounts

Detected bot activities in the dataset

- News bots — 27%
- Spam bots — 20%
- Political bots — 14%
- Nonsense bots — 9%
- Emergency bots — 9%
- Commercial bots — 7%
- Chat bot — 5%
- Misdirection bots — 5%
- Entertaining bots — 4%

Classification of 148 detected bots into bot categories according to Stieglitz et al. (2017)

Recommended bot applications by the interviewees

Type	Phase	Description
Chat bot	Preparedness	Facebook messenger bot, which answers questions automatically
Social bot	Preparedness	Scouting for issues in communities and chatting with members
Emergency report bot	Response	Providing additional automated channel for accepting emergency calls
Intelligence bot	Response	Collection and analysis of disaster relevant material
Warning bot	Response	Automated caution & advice messages regarding the disaster
Information dissemination bot	Response/ Recovery	Providing geolocation-based information about recovery centres
Recruitment bot	Response/ Recovery	Finding and recruiting of suitable volunteers

Content categories in the dataset

- Caution and advice — 32%
- Other useful information — 22%
- Sympathy and emotional support — 13%
- Blame, Anger and dissatisfaction — 10%
- Infrastructure or utilities damage — 9%
- Donation needs or offers or volunteering services — 7%
- Displaced people and evacuations — 4%
- Not related or irrelevant — 2%
- Missing, trapped, or found people — 7%

Classification of 209 randomly selected tweets into content categories according to Imran, Mitra & Castillo (2016)

Tweet distribution in the four disaster management phases

- Prevention — 2%
- Preparedness — 14%
- Response — 57%
- Recovery — 27%
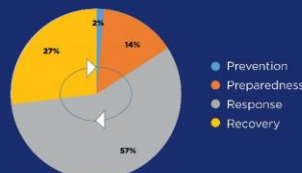
Assignment of 209 randomly selected tweets to the four disaster management phases

Outlook

At the moment, the qualitative content analysis is still in its first stages. However, first considerations point out that social bot applications can be useful across all disaster phases and are expressly desired by most emergency management experts. As the analysis progresses, it will become clear how such specific examples might look like.

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