Communication Emerging from the Crisis Resolution Stage: Topic Modeling of Tweets about Hurricane Maria

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Introduction

- Crisis and Emergency Risk Communication (CERC) model[1,2]
- Big data tools
- Communication patterns about resolution stage of Hurricane Maria

Method

Sample

- 12,146 Hurricane Maria tweets (posted 11/06-11/21/2017)

Data Analysis

- Data clean: R
- Topic modeling, latent semantic analysis, and word cloud: JMP Pro 13

Topic Model:

- A simple probabilistic procedure to generate documents on the basis of latent (random) variables
- Latent Dirichlet Allocation (LDA)[3] (Figure 1)

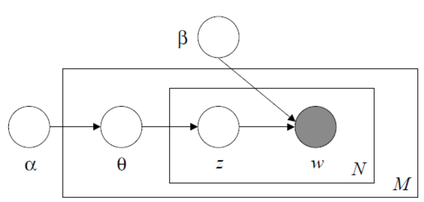

Figure 1. Graphical model representation of LDA. The boxes are "plates" representing replicates. The outer plate represents documents, while the inner plate represents the repeated choice of topics and words within a document.

Latent Semantic Analysis:

- Computing a partial singular value decomposition (SVD) of the document term matrix (DTM)

Findings

- Topics (Table 1):

1. Food support
2. Mental and physical health
3. Fatalities
4. Government responses
5. Water supply

- Government was criticized for:

1. Inadequate support for the victims and crisis recovery
2. Lack of remediation and rebuilding efforts

Table 1: Topic to Terms of Hurricane Maria Tweets

Food Support		Mental and Physical Health		Fatalities		Government's Responses		Water Supply	
Term	Loading	Term	Loading	Term	Loading	Term	Loading	Term	Loading
barsand	.9468	stress	.8988	cnn	.8069	realize	.8593	water	-.6814
pack	.9421	traumatic	.8988	funeral	.7715	needs	.8300	thousands	-.6602
supply	.9417	symptoms	.8985	homes	.7565	governor	.8129	nowhere	-.6494
goods	.9416	showing	.8812	toll	.6991	bill	.7952	bathe	-.6493
candy	.9322	population	.8648	death	.6659	clinton	.7938	running	-.6483
contracted	.9294	public	.8467	identify	.5532	supplies	.7249	juan	.5745
cheez	.9282	health	.7839	asked	.5530	relief	.5925	san	.5717
thread	.8586	officials	.7396	fatalities	.5530	abcpolitics	.5884	puerto rico	-.5288
company	.8459	nytimes	.6691	investigation	.5331	people	.5136	latinorebels	.5108

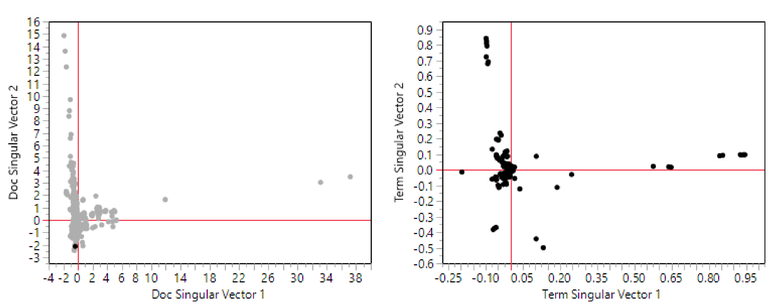

Figure 2. SVD Plot

Conclusions

- Government failed to use social media to initiate interactive crisis communication.
- Public expressed concerns on social media.
- Immediate communication about remediation and rebuilding responses were highlighted.

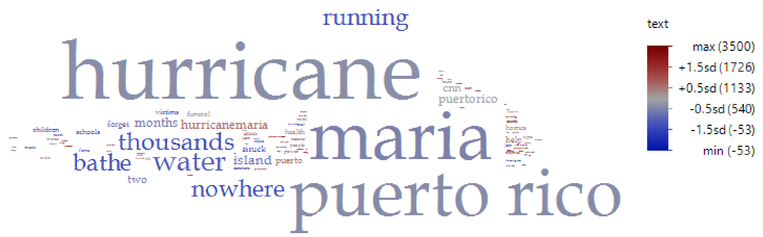

Figure 3. Word Cloud of Hurricane Maria Tweets

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References

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2. Reynolds, B., & Seeger, M. W. (2005). Crisis and emergency risk communication as an integrative model. *Journal of Health Communication, 10,* 43-55. doi: 10.1080/10810730590904571
3. Blei, D. M., Ng., A. Y., & Jordan, M. I. (2003). Latent Dirichlet Allocation. *Journal of Machine Learning Research, 3,* 993-1022. doi: 10.1162/jmlr.2003.3.4-5.993