#### Digital Earth Session Crisis Media for Human Security

Asanobu KITAMOTO National Institute of Informatics http://agora.ex.nii.ac.jp/~kitamoto/

#### Self Introduction



- Background: image processing, data mining, and visualization.
- Interest: data-centric approaches for earth environment, cultural heritage and biology.
- Running several web-based databases for public access.

# Crisis Media in the Age of Big Data





- Crisis leads to the explosion of information.
- [Q] Information is received by the right person at the right time?
- [Q] How big data and algorithms can be used to solve this problem?

#### **Digital Typhoon** http://agora.ex.nii.ac.jp/digital-typhoon/

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One of the most famous typhoon information Website. About 30 million page views per year.

- Heterogeneous sources are integrated and indexed in near real-time.
- Past data can be searched in the context of the current situation.
- Scientists and citizens use the websites for work, business, hobby.



# Search by Situation

Decision making is often made in comparison to past events. Search related events to the current situation.



Find similar typhoon cloud patterns in the past.

Find similar news text or events in the past.



Rain pattern

Find similar precipitation patterns in the past.

## Social Weather Monitoring



#### Snow (white/red) and Rain (blue)



Futtekitter: http://agora.ex.nii.ac.jp/futtekitter/

2013/9/21

#### 2011 Great East Japan Earthquake http://agora.ex.nii.ac.jp/earthquake/201103-eastjapan/



- Started improvisational activities on March 11.
- Phase 1: organizing data to recognize the situation.
- Phase 2: analyzing data to have a unified view.
- Phase 3: archiving data to keep memories for the future (next disaster).

#### Wind Maps Around Fukushima

<最初 <-24時 <-6時 <-1時 2011-07-24 12:00 JST +1時 > +6時 > +24時 > 最後:



- Website released on March 22 to fill the gap of information need.
- People respond to big events.
- Information helps to make decision by themselves.

# **Electrical Japan**

Electricity-related data archiving for understanding the situation after the 2011 earthquake.

Maps of 3800+ power plants all over Japan, based on my own data collection.

The background is nighttime lights observed from satellites.

Overlay of power generation and consumption.

# From data visualization to data journalism



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#### 311 Memories

http://agora.ex.nii.ac.jp/earthquake/201103-eastjapan/311memories/

- "A silently moving timeline" made from 330,000+ online news articles.
- Encounter with words stimulate and revive memories since 311.

Received an award in 2013 Japan Media Art Festival

#### 311 TV



#### • Virtual TV channel to zoom in/out regional news.

#### From Place name to Location

宮城県などによると、気仙沼市や多賀城市な どで大規模な火災が発生。気仙沼市は津波で 市街地の3分の1が水没し、気仙沼湾に浮かぶ 大島の4集落が壊滅状態となった。女川町もほ ぼ壊滅という。岩手県では陸前高田市がほぼ 壊滅し、山田町や宮古市の一部が水没。福島 県では南相馬市の約1800世帯が壊滅状態とい う。宮城県警は東松島市のJR野蒜駅付近で、 この脱線した列車から乗客ら9人、別の列車か らも11人を救出した。





Analysis of news on 2011 Great East Japan Earthquake

GeoNLP (Geo+NLP) https://geonlp.ex.nii.ac.jp/

Key Technological Challenge

Extract and disambiguate place names from natural language text.

I like Kawasaki. Do you like Yokohama?

Ambiguous = Multiple interpretations.

*Kawasaki city* and *Yokohama city* in Kanagawa Prefecture. *Kawasaki town* in Fukuoka and *Yokohama town* in Aomori. *Mr./Mrs. Kawasaki* and *Mr./Mrs. Yokohama*.

#### **Open Data and Software Cycle**



- Open data: sharing place name gazetteers.
- Open software: sharing source codes.
- **Bigger data** leads to better performance.
- Better software leads to more participation.

## **Crisis Media and Human Security**

#### Think globally, Act locally.

#### Analyze globally, Decide locally.

- "Second opinions" from multiple sources should fill the gap of "single voice" from the authority.
- Open data and collaboration will empower crisis media and its users.

#### Resources

#### Digital Typhoon

- http://agora.ex.nii.ac.jp/digital-typhoon/

- Archives of 2011 Great East Japan Earthquake
  - http://agora.ex.nii.ac.jp/earthquake/201103eastjapan/

#### • GeoNLP

- https://geonlp.ex.nii.ac.jp/

Laboratory Website

- http://agora.ex.nii.ac.jp/~kitamoto/