

Recent Floods and Storms in the World



The number of death and missing: 1,833
 Damage \$108 billion (2005 USD)
2005 Hurricane Katrina (U.S.A.)



The number of death and missing: 4,123
 Damage: \$1.7 billion (2007 USD)
2007 Cyclone (Bangladesh)



The number of death and missing: 138,366
 Damage: \$10 billion (2008 USD)
2008 Cyclone (Myanmar)



The number of death and missing: 193
 Damage : at least \$52.4 billion (2012 USD)
**2012 Hurricane Sandy (U.S.A.)
 & 2013 Hurricane Haiyan (Philippines)**

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Data

[Japan] 2011 Great East Japan Earthquake

- Surveyed data: Evacuation Behavior attributes
- Considering personal attributes such as gender (male and female), age (the old, children, babies), dependent on care (babies, handicapped people, sick people, pregnant), and others (mothers, living alone, students, difficult to return home, and so on), this part analyzes characteristics and differences among categorized groups.

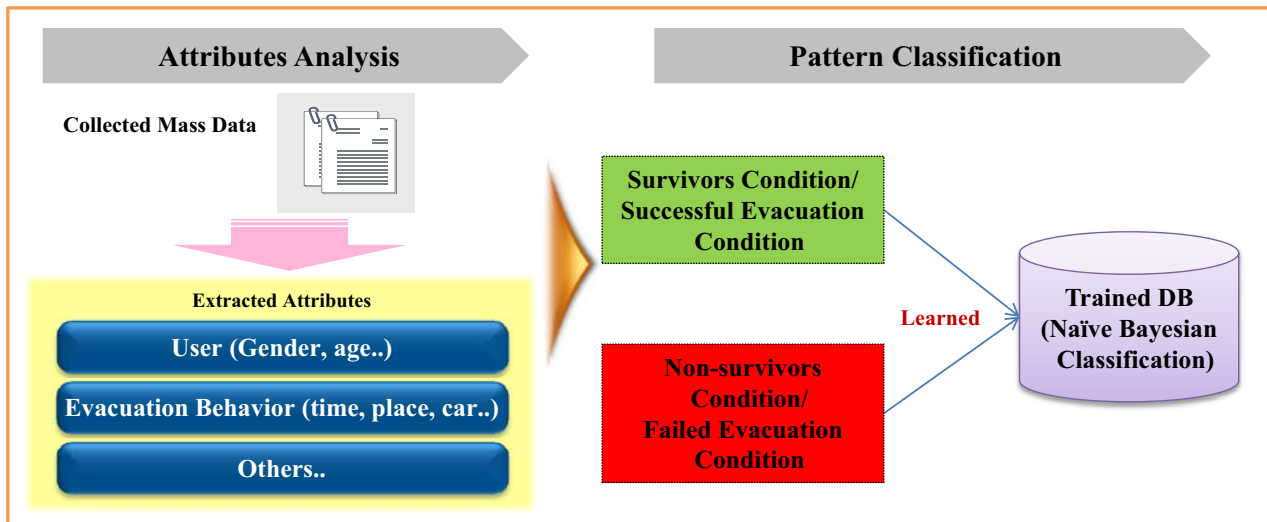
[U.S.] Hurricane Sandy in October, 2012

- Twitters, Newspapers, Government announcements/ reports, etc.

* Why Hurricane Sandy study? Is there any relationship between hurricane and earthquake?

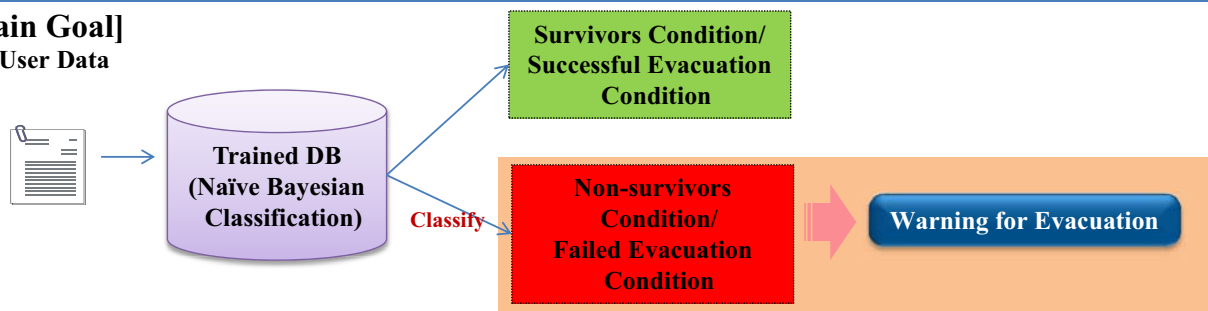
: Yes, there are more than three times of hit by hurricanes (typhoons) in Japan. The evacuation behavior is not too different among disasters. Then, it could be more frequently applied to a disaster by hurricane because of lesser (but bigger impacts) occurrence of the earthquake.

Data Process (1/2)



[Main Goal]

User Data



Data Process (2/2)

Analysis using naive Bayes and Bayesian Network. (N=558)

No	sentence	gender	age	care	behavior	class
1	even if you dont want to move for yourself think of what will happen if you call 911	1	0	4	1	save
2	before the storm i called him up and said gene the storm it looks badl and he said	1	0	4	3	save
3	he just told me: i m not going to leave	1	0	4	0	save
4	my mom pleaded with her sister who lives in seagate a place that was totally destr	1	0	4	5	save
5	louie rueda 62 who lives on beach 41st street with his wife said he had no plan to l	1	4	4	3	save
6	lynn collins 56 a longtime rockaways resident hadn t heard about the evacuation b	1	4	4	0	save
7	officials issued evacuation orders for four healthcare facilities in the rockaways tu	1	0	4	0	save
8	romney s flippancy made my skin crawl the first time i d heard his attempt at humo	1	0	4	0	save
9	during press conferences with elected officials in the wake of the storm i heard a se	1	0	4	0	save
10	new yorkers took to the streets on sunday to reinforce recovery from superstorm sa	1	0	4	2	save
11	eugene contrubis heard the many warnings about hurricane sandy but decided to ri	1	0	4	0	save
12	all these people and their families including the precious pets need our help both p	1	0	4	2	save
13	officials say shelters will be set up in 18 counties to accommodate roughly 12 000	2	0	4	0	save
14	hurricane sandy growing stronger over warm caribbean waters lashed eastern cubi	1	0	4	0	save
15	staten island residents fed up with fema organize own relief efforts last week when	1	0	4	2	save
16	in the aftermath of one of the worst weather systems to hit the northeast finding adi	2	0	4	4	save
17	while preparing to help the victims of hurricane sandy on monday world vision wor	1	0	4	2	save
18	in order to help distribute all of these items in the area impacted by the storm most	1	0	4	2	save
19	superstorm sandy may consign as many as a quarter of a million new and used car	1	0	4	0	save
20	simon massy and his 9-year-old son henry took one last walk near their powerless	1	3	4	1	save
21	william mckoon 78 who lived on shore front parkway in the rockaways was added t	1	4	4	5	death
22	among those who have been removed from the list of sandy victims are herminia st	1	0	4	1	save
23	jessie stretch 24 and jacob vogelman 23 were killed by a falling tree ort	1	3	4	1	death
24	anthony nark a bronx resident drowned inside a car on the first floor of empire par	1	0	4	2	death
25	lauren abraham a 23-year-old richmond hill woman was electrocuted the night of t	1	3	4	0	save
26	anthony lains 30-year-old flushing man was killed when a tree crashed through his	1	3	4	5	death
27	george stathis 90 was discovered at 154 beach 121 street the morning of saturday r	1	4	4	5	death
28	arthur kasprzak a nypd officer was killed monday act	1	0	4	5	death
29	rick gold 67 was discovered by a neighbor in the basement of his house at 511 bea	1	4	4	5	death
30	james rossi an 85-year-old male who lived at 575 quincy ave	1	4	4	0	save
31	patricia bevan 59 was floating in a pool of water on the first floor of her home at 61	1	4	4	0	save
32	police man 29 while off-duty as he helped seven family members including a 15-mo	1	3	4	2	save
33	it s a major win for emergency management personnel and local officials who orde	1	0	4	0	save
34	seaside heights was devastated by hurricane sandy but there were no casualties	1	0	4	0	save
35	george latay 61 of brick nj (asphyxia due to drowning)	1	4	4	5	death
36	erwin bockhorn 72 of little egg harbor nj (drowning)	1	4	4	5	death
37	chris christie briefed the public in little ferry urging schools to accept students dis	2	0	4	0	save
38	mariilyn skillender 70 defied the orders to evacuate and watched as the water lev	1	4	4	0	save
39	to help new jersey residents as they clean up their homes the department of health	1	0	4	2	save

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Time taken to build model: 0.02 seconds   Accuracy: 89%
=== Evaluation on training set ===
Time taken to test model on training data: 0.02 seconds
=== Summary ===
Correctly Classified Instances          499          89.4265 %
Incorrectly Classified Instances        59          10.5735 %
Kappa statistic                        0.6803
Mean absolute error                    0.1513
Root mean squared error                0.2866
Relative absolute error                 43.7126 %
Root relative squared error             68.9403 %
Coverage of cases (0.95 level)         98.2079 %
Mean rel. region size (0.95 level)     72.491 %
Total Number of Instances              558
    
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1. Behavior: evacuate, drive, stay, help, refuse to evacuate (only one behavior at that time)
2. Gender: male, female
3. Age: baby, child (under 15yrs), adult, old (over 60yrs)
4. Care: handicapped, sick, pregnant

Behavior choice & Gender

	Evacuate	Drive	Stay	Help	Refuse to evacuate
Male	78%	95%	67%	75%	75%
Female	22%	5%	33%	25%	25%

Behavior choice & Survival/Death

	Evacuate	Drive	Stay	Help	Refuse to evacuate
Death	14%	7%	37%	1%	41%
Saved	55%	32%	7%	2%	4%

Age & Survival/Death

	Baby	Child	Adult	The Old	Unknown
Death	-	2%	9%	40%	49%
Saved	3%	-	4%	4%	89%

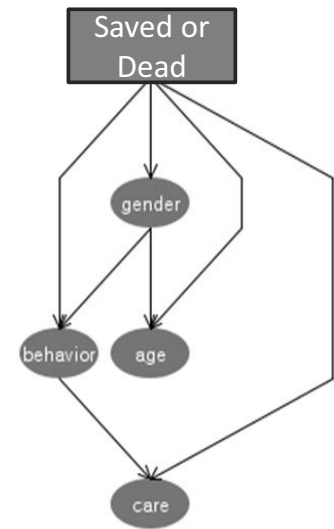


Fig. Co-relationship of class and attribute



東日本大震災ビッグデータワークショップ - Project 311 - 報告会 2012/10/28 (東京)

Unit for Liveable Cities, Graduate School of Engineering/Medicine, KYOTO UNIVERSITY

個人属性と時系列変化による情報の推移について

ソフト防災チーム
 京都大学 小山真紀 藤森崇浩 横枕直人
 早稲田大学 ユンナミ 濱田政則

京都大学大学院 工学研究科・医学研究科 安寧の都市ユニット



早稲田大学 理工学術院

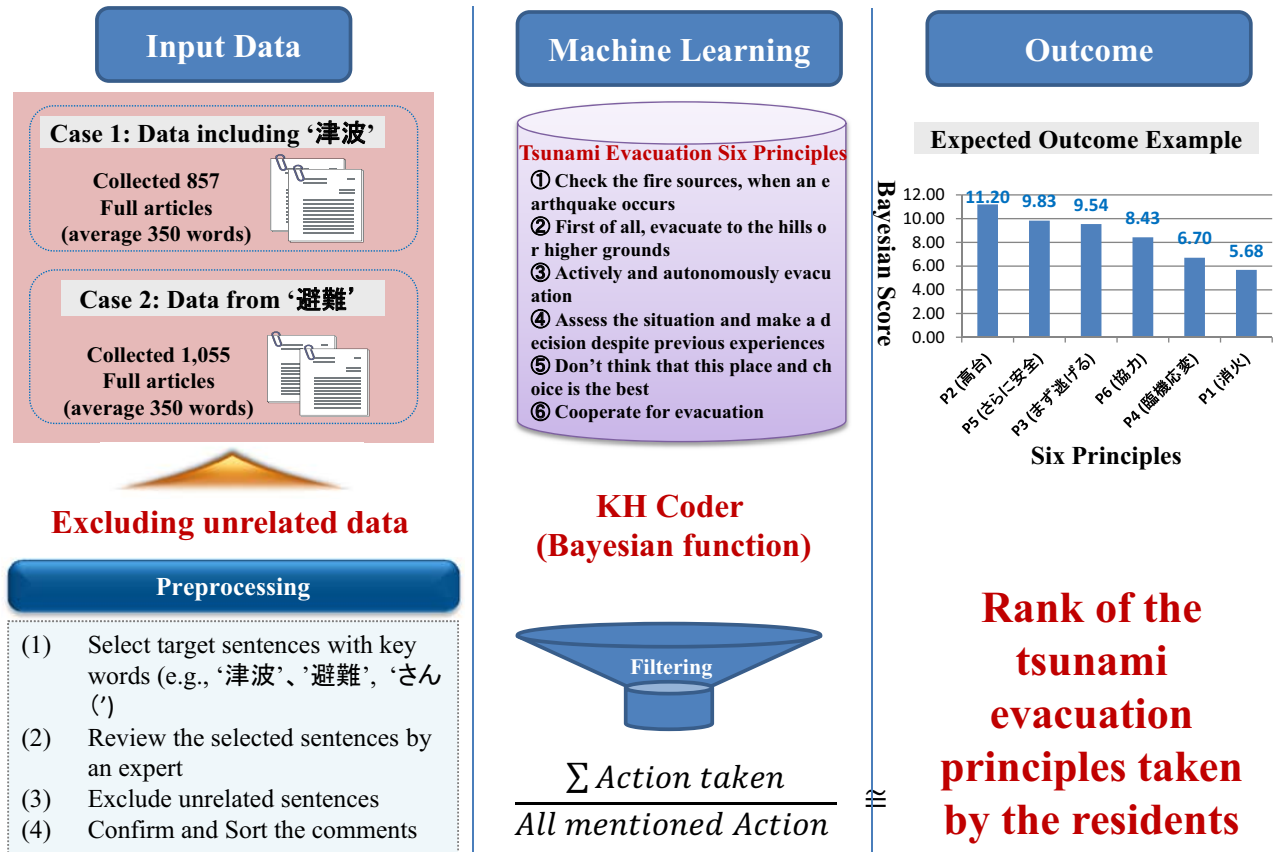
Faculty of Science and Engineering, Waseda University

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濱田研究室 WASEDA Univ
 Hamada Laboratory, Earthquake Engineering



Process of Data Analysis (Japan case)



Current Status

8

FEMA Guideline (10)

There may be conditions under which you will decide to get away or there may be situations when you are ordered to leave. Follow these guidelines for evacuation:

1. Plan places where your family will meet, both within and outside of your immediate neighborhood. Use the **Family Emergency Plan** to decide these locations before a disaster.
2. If you have a car, keep a full tank of gas in it if an evacuation seems likely. Keep a half tank of gas in it at all times in case of an unexpected need to evacuate. Gas stations may be closed during emergencies and unable to pump gas during power outages. Plan to take one car per family to reduce congestion and delay.
3. Become familiar with alternate routes and other means of transportation out of your area. Choose several destinations in different directions so you have options in an emergency.
4. Leave early enough to avoid being trapped by severe weather.
5. Follow recommended evacuation routes. Do not take shortcuts; they may be blocked.
6. Be alert for road hazards such as washed-out roads or bridges and downed power lines. Do not drive into flooded areas.
7. If you do not have a car, plan how you will leave if you have to. Make arrangements with family, friends or your local government.
8. Take your **emergency supply kit** unless you have reason to believe it has been contaminated.
9. Listen to a battery-powered radio and follow local evacuation instructions.
10. Take your pets with you, but understand that only service animals may be permitted in public shelters. **Plan how you will care for your pets in an emergency.**