Using Volunteered Geographic Information (VGI) to support decision-making in Disaster Management Systematic Literature Review

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Agenda

- Disaster Management
- Volunteer Geographic Information (VGI)
- Protocol
- Initial Conduction

Disaster Management

TX - High Temperature

IF - Florestal Fire

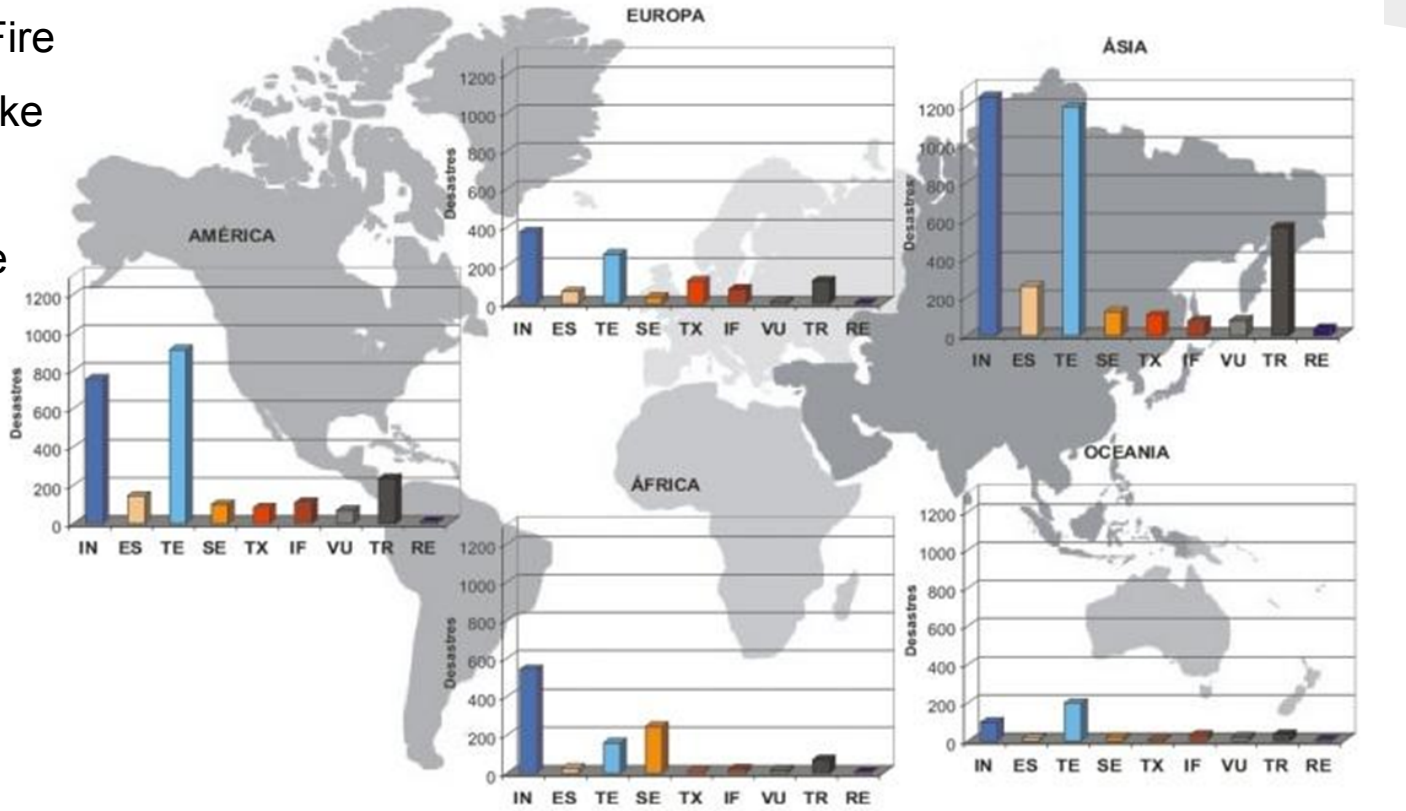
TR - Earthquake

IN - Floods

ES - Landslide

TE - Storms

SE - Drought



INPE (1900 - 2006)

Disaster Management

Disaster management is an alternative to improve resilience and therefore avoid or reduce the impact of natural disasters (Baharin *et al.*, 2009).

Disaster Management

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Scientific predictions about the upcoming changes and their associated impacts **are important**.

But the **accurate**, **timely** and **complete** information about the current state of environmental variables are **also important**.

Volunteer Geographic Information (VGI)

However, the largely damages caused by the disasters:

- affects the coexistence of people,
- brings difficulties to the Emergency Agencies (EA), and
- **delay** the **response** processes...

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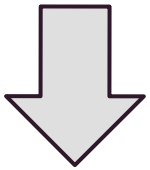

that necessarily needs to be **fast** and **reliable**, because a **slow** **response** based on incorrect data can lead to **serious consequences**, such as **loss of lives**.

(Ostermann and Spinsanti, 2011; Erkine and Gregg, 2012)

Volunteer Geographic Information (VGI)

*"**Volunteered Geographic Information (VGI)** is defined as a **collection** of digital **spatial data** produced by **individuals** and **non-formal institutions** using **appropriate tools** to **gather** and **disseminate** their views and **geographical knowledge** on the **web**."*

(Goodchild, 2007)

Volunteer Information

Protocol

Objective: Identify relevant primary studies that address the use of Volunteer Geographic Information (VGI) as a source of information to increase the quality and accuracy of decision-making process at the disaster management.

Research Questions

RQ1: How volunteer information can help on the decision-making process used at the disaster management?

- **Secondary Question 1:** What are the **techniques, processes or models used to decision-making**?
- **SQ2:** What is the **type of disaster** treated in the study?
- **SQ3:** What is the **type of decision-making**?
- **SQ4:** What are the mechanisms used to collect data?
- **SQ5:** What are the mechanisms used to share data?
- **SQ6:** What is the **phase** of disaster?
- **SQ7:** Which is the **domain model** used, i.e. hydrologic models?

Sources Selection

Keywords: The keywords related with this review are “Volunteered Geographic Information”, “Decision Support System” and “Disaster Management”:

Volunteered Geographic Information: "VGI", “Crowdsourcing", "User-generated content", "Social Media", "Collaborative System", "Collective Intelligence", "Collective Knowledge", "Citizen Based", "Social Computing", "Citizen Based", "UGC";

Decision Support System: "DSS", "Decision Making", "Decision-making", "Decision Model", "Decision Support Model", "Decision Support";

Disaster Management: "Disaster Management" OR "Crisis Management" OR "Emergency Management" OR "Disaster Response" OR "Emergency Response" OR "Flood" OR "Earthquake" OR "Tsunami" OR "Crisis Situations" OR "Crisis Response" OR "Natural Hazard" OR "Disaster Relief".

Inclusion Criteria

IC1: The primary study uses volunteer information to help on the decision-making process at the disaster management;

IC2: The primary study presents some resource to make decision using volunteer information at the disaster management.

Exclusion Criteria

EC1: The primary study isn't write in English;
EC2: The primary study isn't available;
EC3: The primary study is duplicate;
EC4: The primary study isn't published;
EC5: The primary study that didn't archived more than 2 on the quality criteria;
EC6: The primary study is related with disaster management but not uses volunteer information for decision-making;
EC7: The primary study uses volunteer information for decision-making but isn't related with disaster management;
EC8: The primary study related only with volunteer information;
EC9: The primary study related only with decision-making process;
EC10: The primary study related only with decision-making process for disaster management;
EC11: The primary study related only with volunteer information for disaster management;
EC12: The primary study isn't related with any topic of this review;
EC13: The study is a previous version of a more complete study about the same research;
EC14: The primary study is a posters, guidelines, course end work, MSc and PhD thesis, technical reports or workshops proposals.

Quality Criteria

QC1: Is there a clear statement of the research objectives?
QC2: Were the results evaluated in an unbiased manner?
QC3: Are the results reported clearly?
QC4: Is there a clear background which supports the research?
QC5: Is the method used for validation of the study clear?

Initial Conduction

Initial Selection: First, we will select only studies obtained by applying the search string in the data sources defined for this review. Pay attention to the selection of just-focus fields (**Title, Abstract, Keywords**) in search engines. In this step, you must also be stored in the file *BibTex* each item returned in the selection, they will be imported into the tool *JabRef*;

Second Selection: The studies selected in the previous stage will be evaluated according to its **title, abstract and keywords** and a list containing only those considered potentially relevant should be generated. In this step, the PDF file of the articles in this list must also be stored;

Data Extraction: Then, **the studies will be read and evaluated in its entirety**. The strategy adopted for the extraction of data consists of the evaluation of the review by the student and his supervisor in order to eliminate any bias that might arise during its implementation. We will use an automated tool in a questionnaire form aiming to facilitate this extraction.

Initial Conduction

Source	Results
ScienceDirect	8
Scopus	47
SpringerLink	142
ISI Web of Science	7
AISeL	31
Total	**235**

Initial Conduction

ACM Digital Library:

Separated in blocks;

We do not exclude papers duplicated because this will be execute on next step of the review.

Title: Disaster management AND VGI	20
Title: Disaster management and DSS	10
Title: VGI and DSS	2
Abstract: Disaster management AND VGI	71
Abstract: Disaster management and DSS	135
Abstract: VGI and DSS	44
Keywords: Disaster management AND VGI	32
Keywords: Disaster management and DSS	8
Keywords: VGI and DSS	6
Total	**328**

Initial Conduction

IEEExplore

- *Splitted into two substrings;*
- *Does not allow searching in the abstract and title in the same string.*

Title: Disaster management AND VGI AND DSS	0
Abstract: Disaster management AND VGI AND DSS	12
Total	**12**

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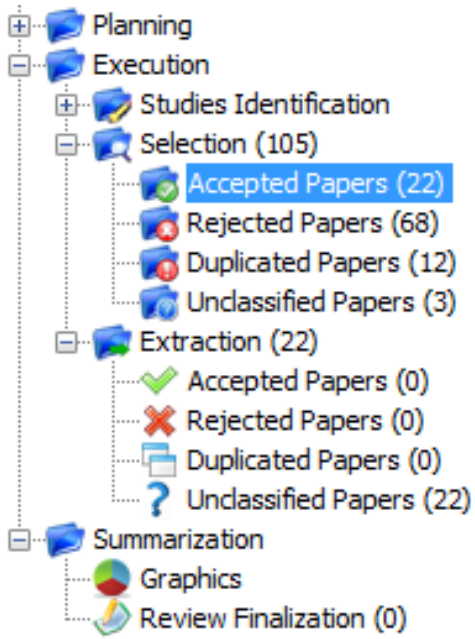

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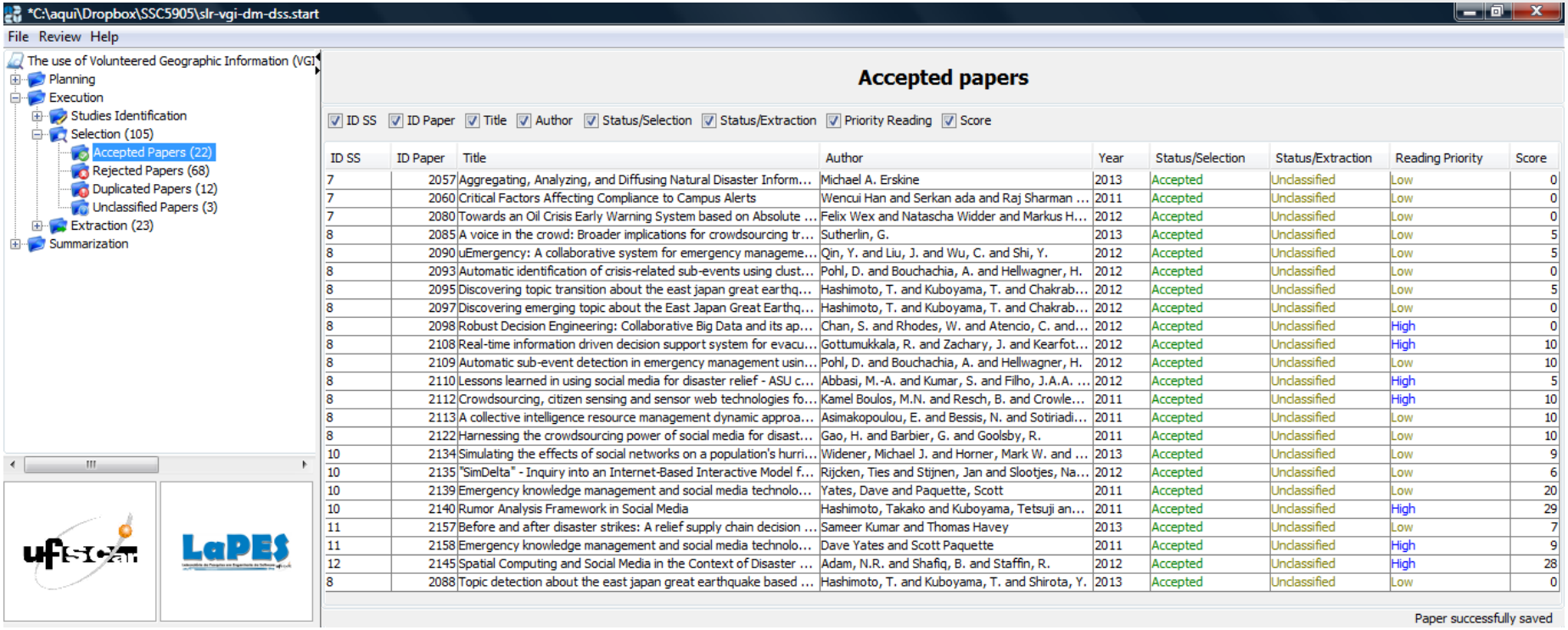

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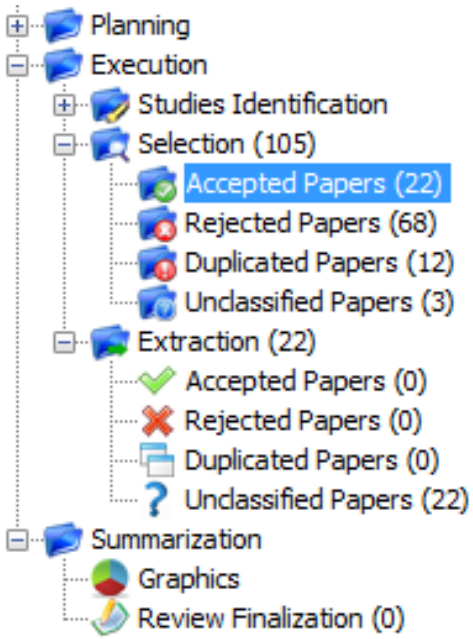

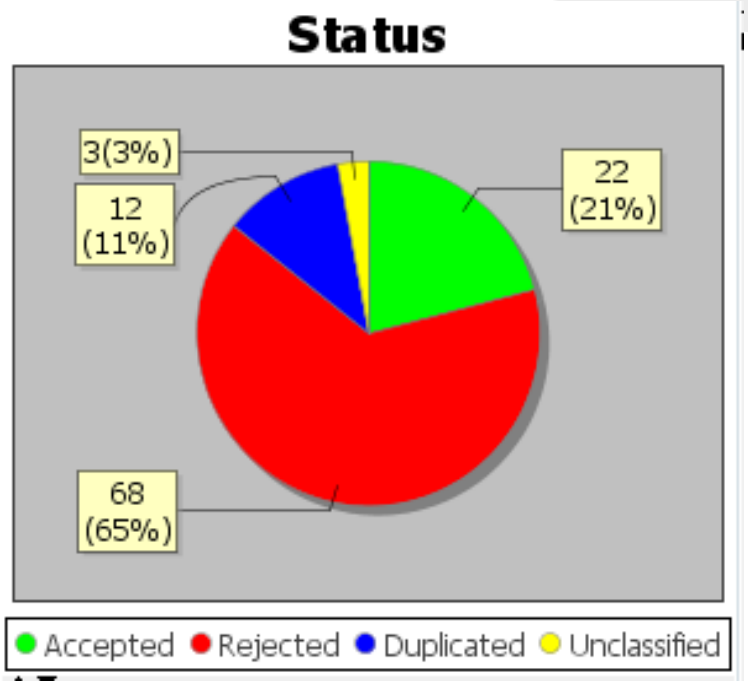

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Thank You!

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Systematic Literature Review

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