

DECIDE 2.0

Intelligent Processing of Citizen Opinions in Social Media

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Background

Government 2.0 refers to government's adoption of Web 2.0 technologies to socialize government services, processes and data.

Government 2.0 - benefits:

- New ways of communication with citizens – e.g. through **social media tools**.
- New opportunities for **government agencies to be informed about citizens' needs and opinions** through user-generated content.



Government 2.0 - challenges

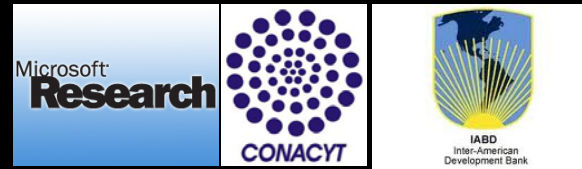
The integration of data streams from social media into government 2.0 infrastructures poses several challenges:

- **Magnitude of information flow** – i.e. Twitter disseminates 55M tweets p/day; forces to rely on text mining (TM) and opinion mining (OM) techniques to filter noise and detect topics of community discussion.
- **TM and OM techniques are not common practices in government.**

Government 2.0 - challenges (cont.)

- Social media data streams are usually incomplete or potentially inconsistent, as citizens might have different views on a certain issue.
- Citizens' arguments in social media must be assessed and confronted by government officials in order to be used as inputs in government decision making processes.
- To build trust, some decisions made by government need to be backed by arguments when informed to citizens.

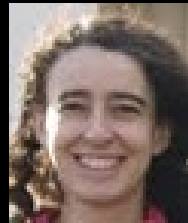
About DECIDE 2.0



- **DECIDE 2.0:** a LACCIR research project supported by Microsoft Research, IDB and CONACyT (Mexico).
Research team: Argentinean and Mexican researchers; Elsa Estevez (external consultant, UNU-IIST).



C. Chesñevar (ARG)



A. Maguitman (ARG)



R. Brena (MEX)



E. Estevez (UNU-IIST)

- **Research Problem:** To combine **context-based search** and **argumentation** in a collaborative system for managing service- and policy-related information in **social media tools** used by governments.
- **Project Aim:** a framework for intelligent processing of citizens' opinions in social media, based on a collaborative system operating on top of existing social networks.

DECIDE 2.0 - goals (1/2)

- To implement models of trust and reputation propagation –users post information on social media whose reliability has to be assessed in order to effectively use such information for decision making.
- To develop algorithms for integrating information coming from different sources –several users may post messages related to the same topic; accrual of information needs to be modeled properly.

DECIDE 2.0 - goals (2/2)

- To design effective context representations and community identification algorithms –when analyzing citizen opinions, emerging communities have to be identified, and associated contextual information is to be obtained.
- To develop customized information models –providing targeted information to various categories of stakeholders requires having different “views” of the issues under analysis.

DECIDE 2.0

Context **C** of e-gov related issues

Argument Computation from Opinions on **C**

Argument-based decision making

Opinion extraction on **C** using context-based information retrieval

Production of global assessment of citizens' opinion (identifying *pro* and *con* arguments about **C**)

CITIZENS' OPINION DATABASE

Citizens' opinion on **C** (with details for policy-making oriented decisions)

Citizens

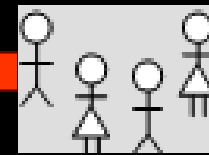


post opinions



Social media tools

Government Officials



post policy-related issues

Brief discussion on ongoing work

"An Argument-based Approach to Mining Opinions from Twitter"
(K. Grosse, C. Chesñevar, A. Maguitman).

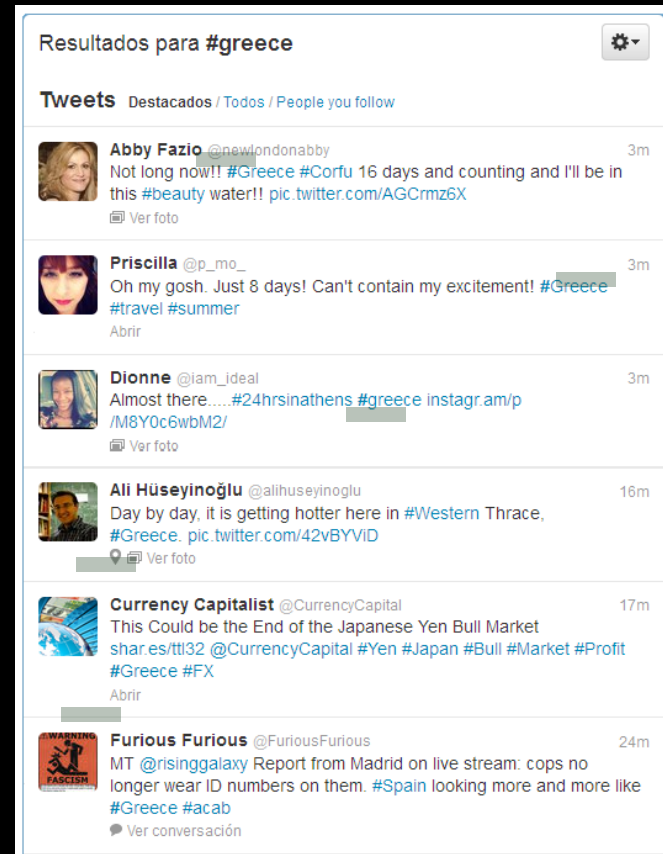
*To appear in Proc. First Intl. Conf. on Agreement Technologies (AT 2012),
Duvbrovnik, Croatia, Oct.2012.*

- Set of Tweets for a given Query or Context (for the sake of ex.: #Greece)
- Each Tweet t contains a set of terms {t1, t2, ... tk}
- A mapping M that maps Tweets in a set of possible sentiments




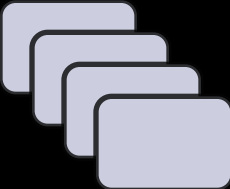

 Neutral tweet on C

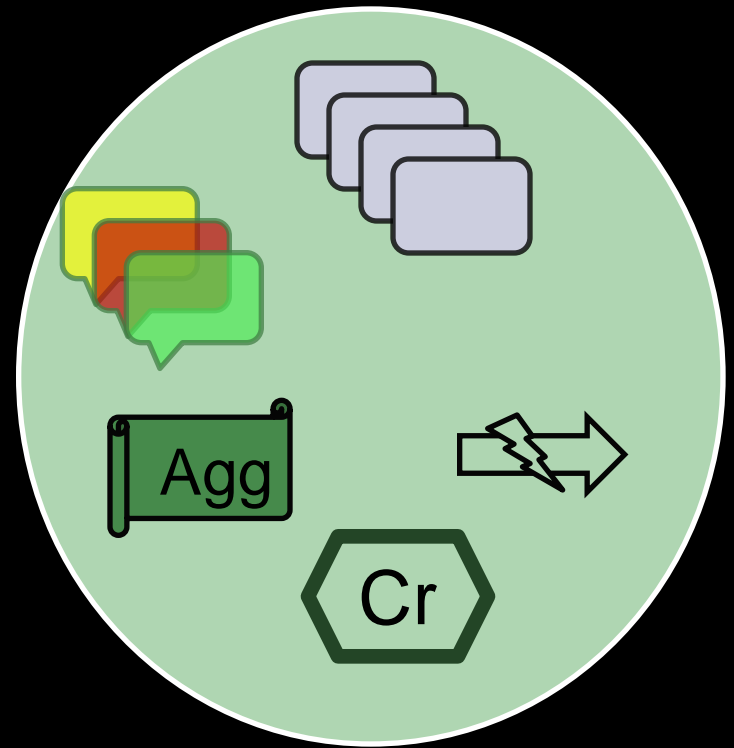
 Positive tweet on C

 Negative tweet on C



Twitter-based argumentation framework

- Criterion Cr 
- Aggregation Operator 
- Set of sentiments 
- All possible Twitter-based arguments 
- Attack relation between TB-Arguments (e.g. positive and neutral arguments are in conflict) 



A Twitter-based (TB) argument

- Query **Q**
(context)

- Prevailing sentiment
(pos,neg,neutral)

- Set of Tweets

tweets returned by

Agg(Cr,Q)

Universe of all Tweets

#Greece



Intended meaning: the citizens' overall opinion on query "#Greece" is neutral according to criterion Cr.

Query subsumption and Specificity

- From a given query Q {#Greece} we can derive more specific queries, like Q₁ {#Greece, bailout} or Q₂ {#Greece, money}.
- Q subsumes Q₁ and Q₂.

Universe of all Tweets

#Greece
bailout



A screenshot of a Twitter search results page for the hashtag #Greece. The page shows a list of tweets with user avatars, names, and text. The tweets are partially visible, showing various discussions related to Greece.

#Greece
inflation



A screenshot of a Twitter search results page for the hashtag #Greece. The page shows a list of tweets with user avatars, names, and text. The tweets are partially visible, showing various discussions related to Greece.

Attacks between TB-arguments

Universe of all Tweets

#Greece
money



Resultados para #greece

Tweets Destacados · Todos · People you follow

- versandaal** @versan...
Meanwhile 69 pct say better not take in immigrants from less developed countries #Greece
- Amax** @amax...
#Greece has a "zombie government". It may have to choose between the euro and the radical left. [grievances.co.uk/comments/step... - v @griev](#)
- Mehran Khalili** @mehra...
Big shouting match ensued. She was told to go to hospital in Athens. 1.5h drive away. #Greece #noeurozoneexit
- NEWS Alliance** @NewsAlli...
Spain unveils #ECB in new austerity cuts as the country races to become the new #Greece - nothing can save the failed euro now
- Stratos Satoileas** @stratos...
Just a thought for today: [instagr.am/p/K5wFY-Qa/- #heathcare](#) #Greece
- teacherduce** @teacherdu...
Racist attacks immigrant 100m from Greek parliament. Passer-by intervenes only to be threatened by 6 cops [photos.state.gov/libraries/0777/02/1484... #Greece](#)



#Greece



Resultados para #greece

Tweets Destacados · Todos · People you follow

- Abby Fazio** @abbyfazio...
Not long now! #Greece #Cofu 16 days and counting and it'll be in this #beauty water! [pic.twitter.com/AGCrmzX](#)
- Priscilla** @prisc...
Oh my god. Just 8 days! Can't contain my excitement! #Greece #Travel #summer
- Dionne** @dionne...
Almost there... #Greece #greece #instagr.am/p/8wY0e6e3G2
- Ali Huseynoglu** @alihu...
Day by day, it is getting hotter here in #Western Thrace. #Greece [pic.twitter.com/4Zv9YVVD](#)
- Currency Capitalist** @CurrencyCap...
This Could be the End of the Japanese Yen Bull Market [share.es/102 @CurrencyCapital #yen #Japan #Bull #Market #Hott #Greece #EU](#)
- Furious Furious** @FuriousFurio...
MT @insurgatory Report from Madrid on live stream: cops no longer wear ID numbers on them. #Spain looking more and more like #Greece #racis [# We connect people](#)

Opinion Trees

Universe of
all Tweets

Opinion on Q
(root node)

#Greece



A screenshot of a Twitter search for the hashtag #Greece. The tweets are in Spanish and discuss the Greek debt crisis. A yellow speech bubble icon is positioned below the hashtag.

Counter-Opinion

#Greece
bailout



A screenshot of a Twitter search for the hashtag #Greece with the word "bailout" in the search filter. The tweets are in Spanish and discuss the Greek bailout. A red speech bubble icon is positioned below the text.

Counter-Opinion

#Greece
inflation



A screenshot of a Twitter search for the hashtag #Greece with the word "inflation" in the search filter. The tweets are in Spanish and discuss inflation in Greece. A red speech bubble icon is positioned below the text.

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Opinion trees can be recursively defined.

Algorithm GetOpinionTree

- **Input:** Query Q
Agg Operator
Criterion Cr

“#Greece”

Twitter API

All tweets from 21.7.2012
between 15.00 – 23.00, GMT

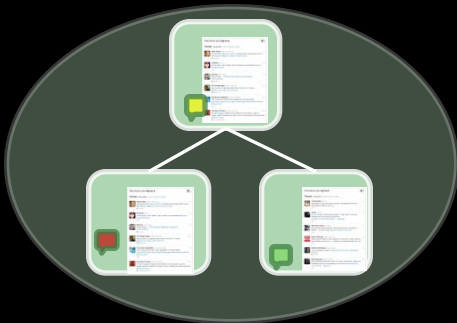
- **Output:** Opinion Tree OT rooted in Q with Agg under Cr



High-level Algorithm

GetOpinionTree

- IF $\text{length}(Q) \leq 140$
THEN Let $\langle \text{Arg}, Q, \text{Sent} \rangle$ be the root node
where $\text{Arg} = \text{Agg}(Q, C)$ and Sent is $s(\text{Agg}(Q, C))$
IF there are other Hashtags or keywords in $\text{Agg}(Q, C)$ that expand Q
THEN Compute $L = (h_1, h_2, \dots)$ List of Hashtags and keywords that
expand Q in $\text{Agg}(Q, C)$ according to some
threshold (for example frequency)
FOR EVERY $h_i \in L$ do
Put $\text{GetOpinionTree}(Q, h_i, \text{Arg}, C)$
as subtree rooted in $\langle \text{Arg}, Q, \text{Sent} \rangle$



A Java prototype was developed. Empirical analysis is being carried out for different sample contexts.

Some recent publications

"An Argument-based Approach to Mining Opinions from Twitter"
(K. Grosse, C. Chesñevar, A. Maguitman).

To appear in Proc. First Intl. Conf. on Agreement Technologies (**AT 2012**),
Duvbrovnik, Croatia, Oct.2012.

"Integrating Argumentation Technologies and Context-Based Search for Intelligent Processing of Citizens' Opinion in Social Media"
(C. Chesñevar, A. Maguitman, E. Estévez and R. Brena).

To appear in Proc. **ICEGOV 2012**, Albany, NY, USA, Oct. 2012.

"DECIDE 2.0 – A Framework for Intelligent Processing of Citizens' Opinion in Social Media" (E.Estévez, C. Chesñevar, A.Maguitman, R. Brena).

In Proc. 13th Annual International Conference on Digital Government Research (**D.GO 2012**), pp.266-267. Maryland, USA, 2012.

Conclusions and Future work

- We contend that our approach can lead directly to improved coverage, scalability and context-awareness with respect to the current model of information delivery and retrieval in social networks.
- Governments can greatly benefit from the proposed solution by a) having adequate mining techniques to retrieve valuable information provided by citizens on social media, and b) by targeting different announcements to the appropriate group of government stakeholders.
- Current results using Twitter show that the underlying machinery for DECIDE 2.0 is indeed feasible, lending itself to software implementation. Formal properties are currently being studied.

Thanks for your attention!
Questions...?