ETH zürich

Influence of modern media on unstable social systems

Federico Danieli, Jessica Genta, Robert Keitel, An-phi Nguyen

Modelling and Simulating Social Systems with MATLAB

16.12.2013

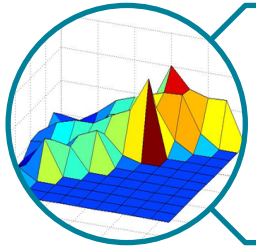
Outline

Introduction

- Motivation and goals
- Model

Social media implementation

- Media change decision
- Media change movement



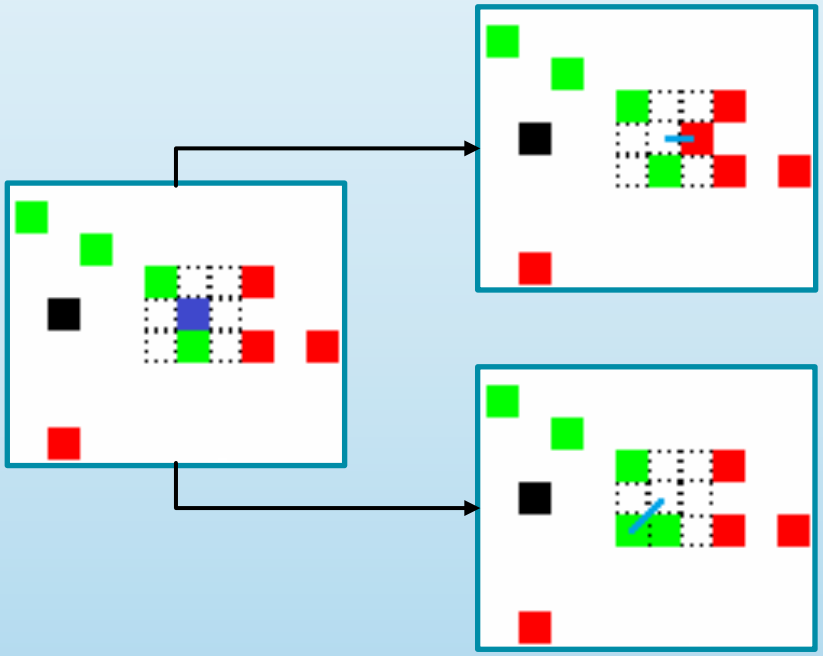
Conclusion

Model

Agents and cops as acting people on a 2D lattice:

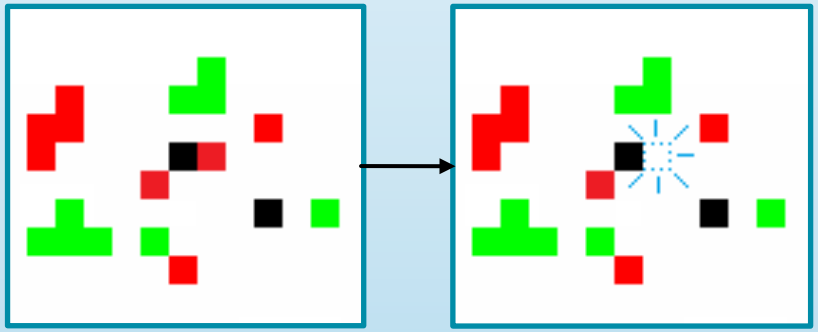
Behaviour of agents:

- Move to random position within vision
- Decide following rule: if G-N>T turn active, else inactive



Behaviour of cops:

- Move to random position within vision
- Arrest random active agent within vision



Media change decision

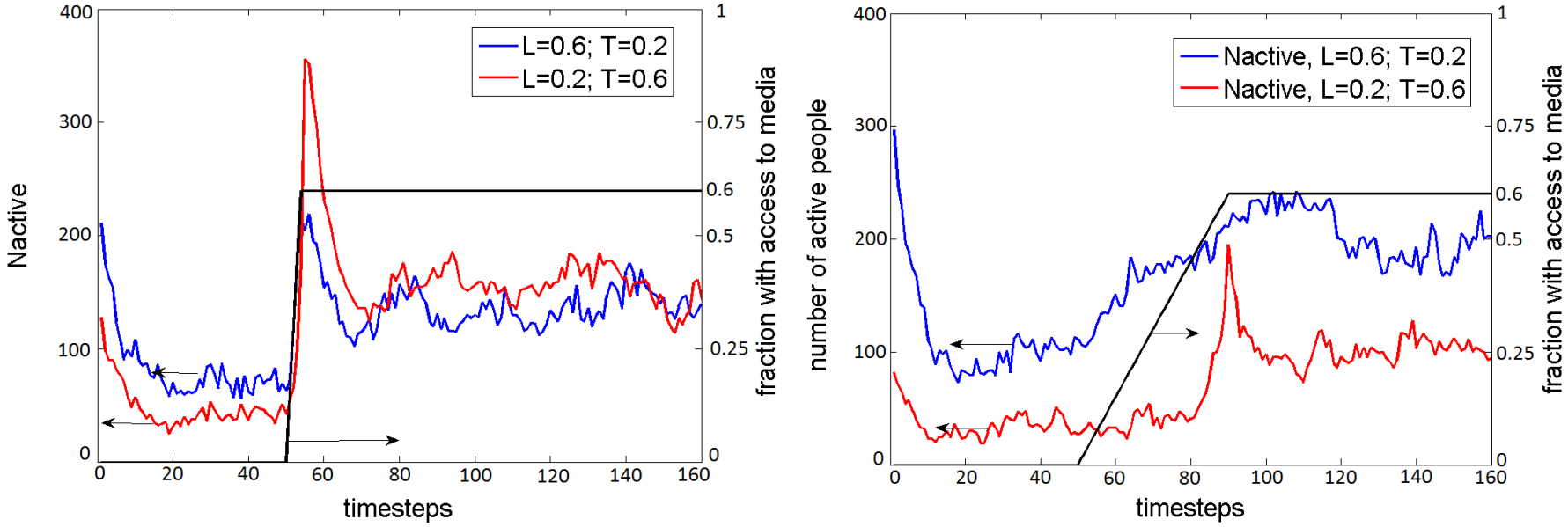
Media term introduced: M=m T Nactive/Nfree

New decision rule for people with access to media:
If (G-N)>T-M, turn active

Impact of media observed by changing the fraction of people with access to media over time

Objective: Check influence of parameters and of changing fraction of population with access to media over time

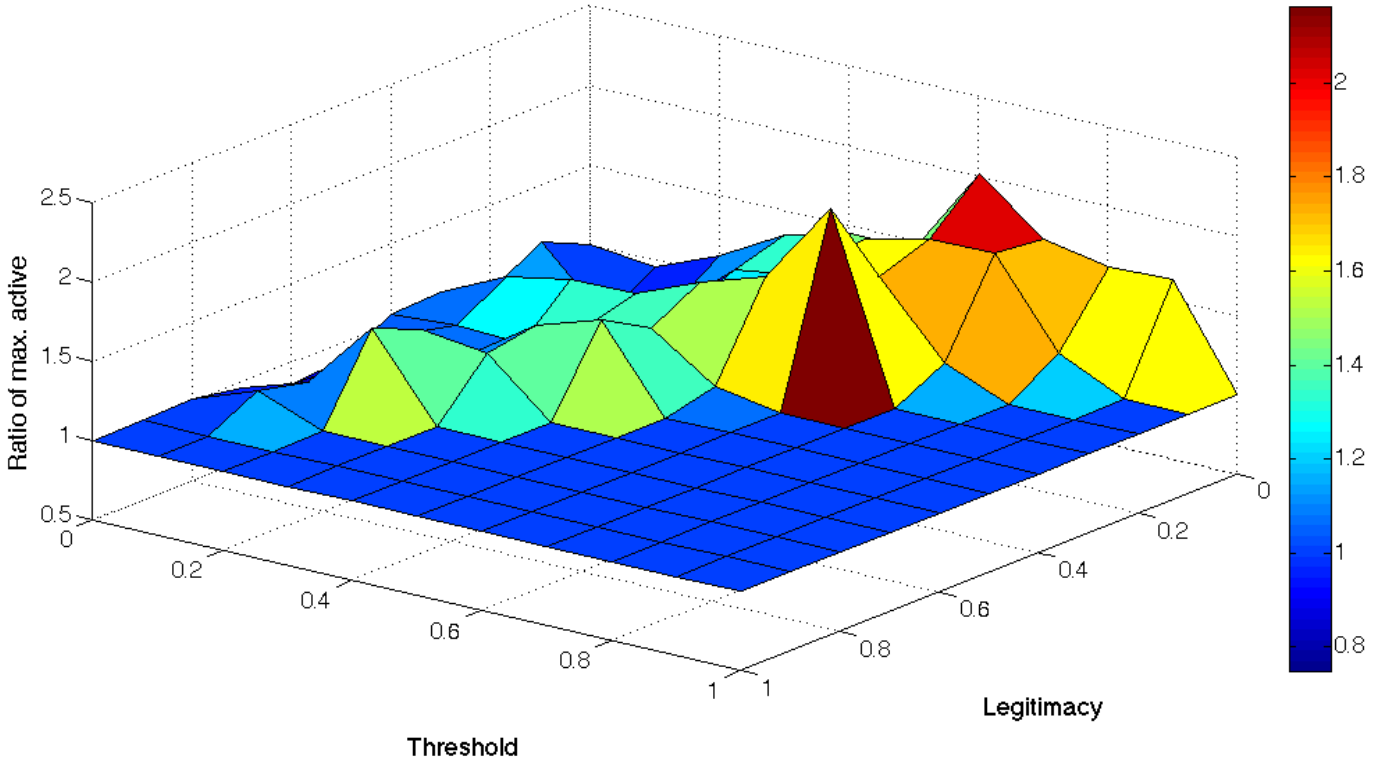
Results



Number of active people over time for two different systems, access to media in 4 steps (left) and in 40 steps (right)

- More pronounced peaks for systems with high threshold, low legitimacy
- Peak higher for fast increasing fraction of people connected to media

Results

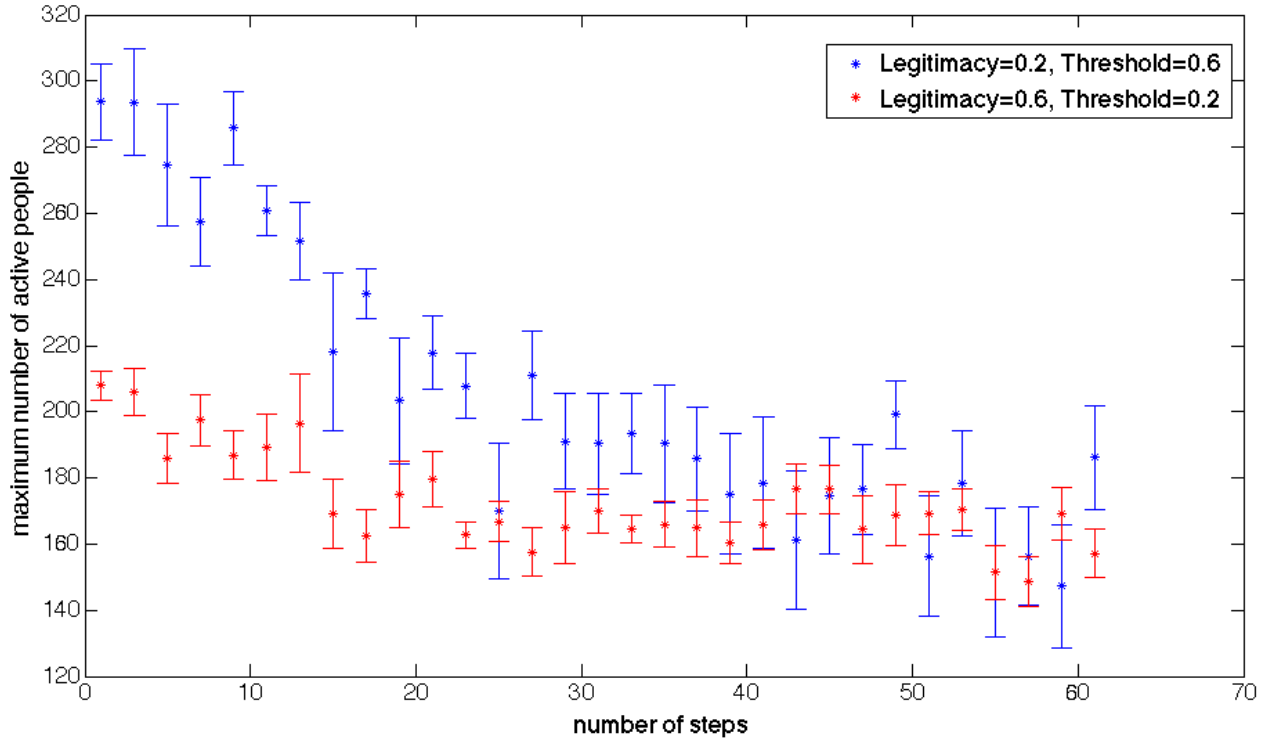


Ratio of maximum active people (fast increase of internet users / slow increase of internet users) as a function of threshold and legitimacy

- Greatest values: low legitimacy and high threshold

→ in unstable systems, if the access to internet increases rapidly, it is much more likely that outbreaks occur

Results



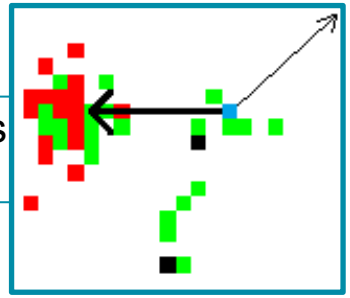
Maximum number of active people (average over 10 runs) for different number of steps needed to increase the fraction of population with access to media from 0 to 0.6

- Low legitimacy (high T): high number of max. active people for fast increase in access to media
- High legitimacy (low T): number of active people is not very high, even for a fast increase in access to media

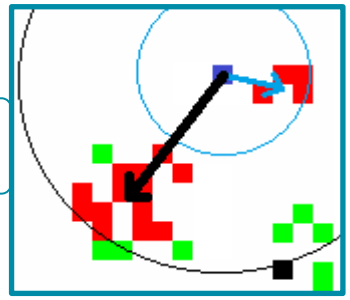
Media changes movement

Oriented movement introduced

Agents move according to position of other agents and cops inside an area of effect

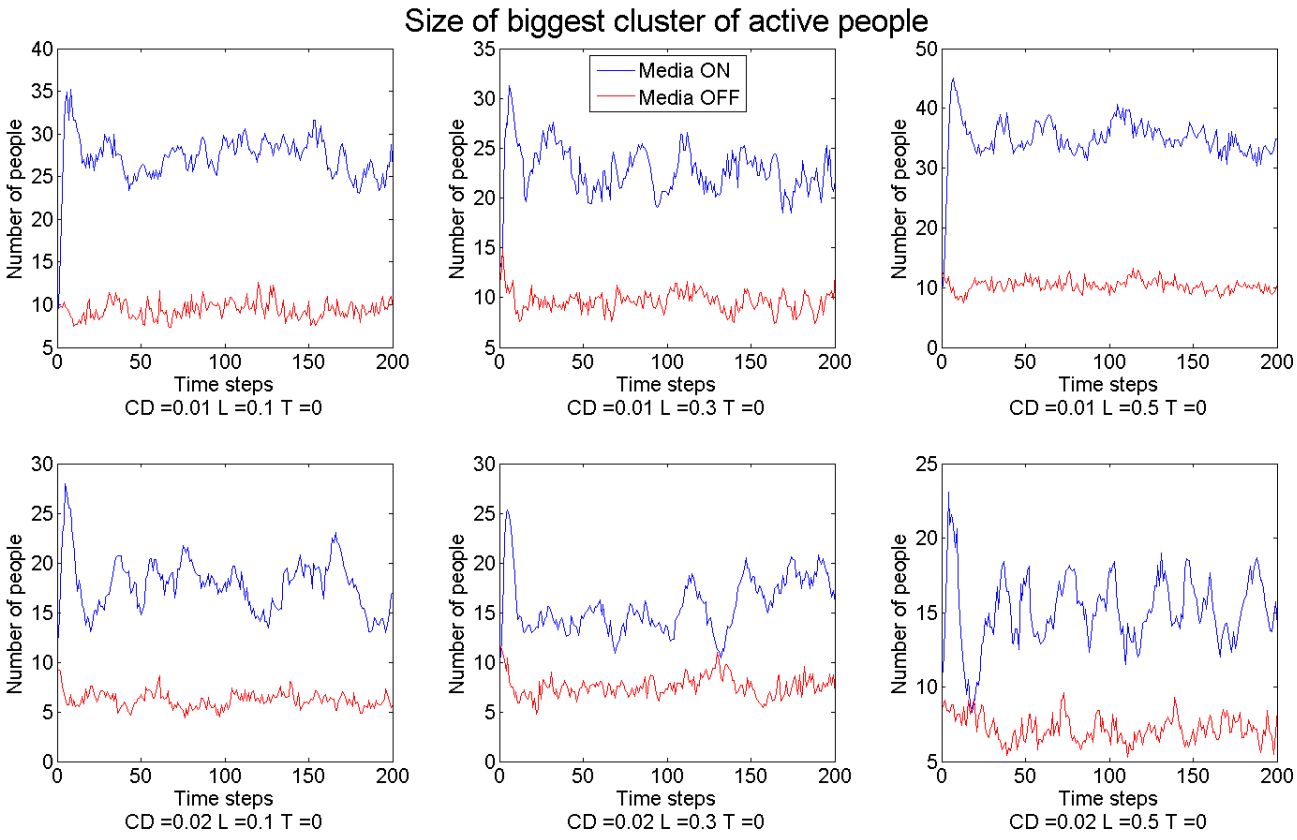


Impact of media observed by changing the area of effect

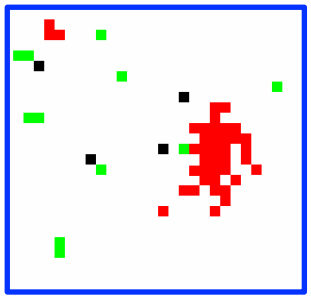


Objective: Check influence on people's behaviour, and on number of people involved in the rebellion

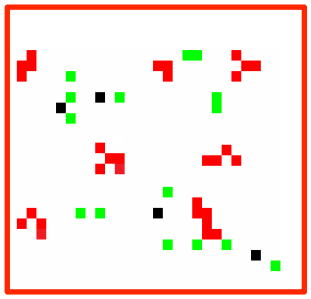
Results



Media ON:



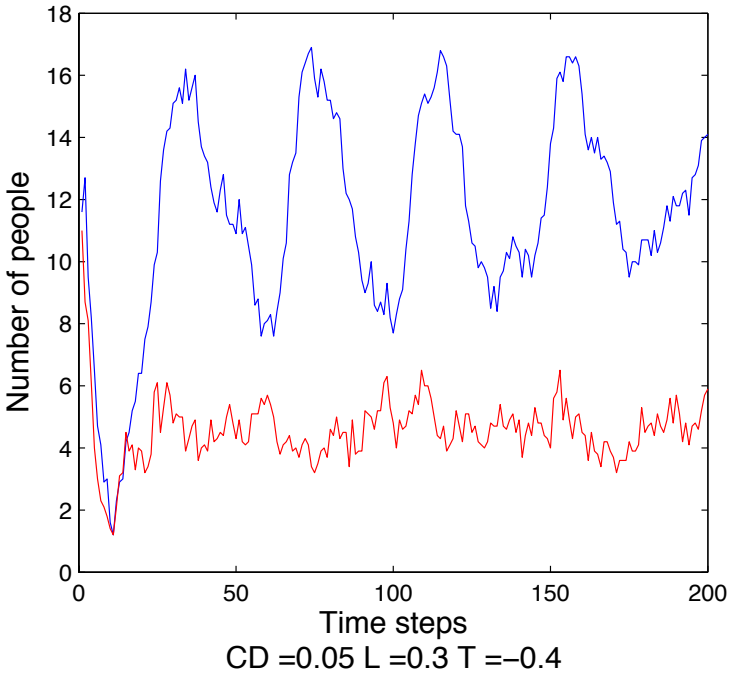
Media OFF:



With the effect of social media turned on, people tend to group together

Results

"United we stand, divided we fall"



- As people clusterize, a higher number of active people can be achieved
- Oscillations (mobs formations) are wider and last longer

Conclusion

In particularly unstable social systems

- A rapid increase in the number of people with access to media causes outbreaks to occur more likely

- Organization is boosted by social media: public manifestations involve more people and last longer

Accessibility to information and the possibility to use modern ways of communication can deeply affect the dynamics of large scale rebellious phenomena, eventually influencing their outcome

References

1. Epstein, J.M. *Modelling civil violence: An agent-based computational approach*

2. Epstein, J.M. & Axtell, A. (1996) *Growing Artificial Societies: Social Science from the Bottom Up* (MIT Press, Cambridge, MA)

3. http://www.internetworldstats.com 02.12.2013

ETH zürich

QUESTIONS?