Simulating the Effect of Social Media on Civil Violence

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Abstract

The abstract should briefly summarize your project in 150–250 words.

1 Introduction

Social media adds a new dimension to the dynamics of civil protests. The Arab spring provides a clear example of protests fueled by social media: it has been argued that social media played an instrumental role in the success of the anti-government protests [EW11] and that online revolutionary conversations often preceded major events on the ground [How+11]. Moreover, a 2011 survey of participants in Egypt's Tahrir Square protests indicates that social media use greatly increased the odds of respondents attending protests on the first day [TW12]. In this paper we focus on the effect that social media has on the dynamics of civil violence when it is used to fuel both new and existing protests.

1.1 State of the art

We use Epstein's model of civil violence [Eps02] as a starting point for our model. Epstein's paper provides an agent based simulation of civil violence. In this simulation, protesters rebel against authority (cops) in an environment resembling a riot. We will be focusing on one out of two models presented in Epstein's paper, in which agents in authority aim to suppress and imprison the group of protesters, who are actively rebelling.

Protesters can either be passive or be actively rebellious. Each protester's grievance level is influenced by two components: illegitimacy, which is the perceived illegitimacy of the government, as well as hardship, which measures each individual agent's economic privation. Each agent also has a calculated probability of being arrested. This probability depends on the amount of cops and the amount of already active rebellious protesters in his vision. Hence, more cops in his surroundings means a higher arrest probability, and more active protesters in his surroundings means a lower probability of being arrested. Protesters become active depending on how averse they are on taking risks, on their estimated probability of being arrested, and their given grievance levels. Cops will in general arrest and send to jail protesters that are active within their vision. After a randomly given jail time, protesters return back to the simulation.

These simple rules and components of the simulation provide some interesting findings. Specifically, it was observed that protesters become passive when cops are near, but become rebellious again when cops left their vision. Another observation is that in areas where a lot of rebellious protesters, and at the same time a small number of cops are gathered, there occurs an "uprising", in which most protesters become active and rebel. In general, the simple rules in the model produced some complex and emerging behaviors which represent real life's political upheavals and protests against authority.

1.2 New idea

In this research, we aim to extend Epstein's model of civil violence to include the effects of social media. Epstein's model was published in 2002 and did not include a notion of social media or online discourse in general. However, it seems reasonable to assume that a more modern version of Epstein's model would include the effects of online discourse, since the effects of social media on civil violence can be grave. Contrary to Epstein's model where vision is local and information is limited, the ubiquitousness of social media creates new dynamics where information is abundant and vision is expanded. We will investigate the effect that these changes have on Epstein's model.

2 Method

2.1 Simulation model

Here you should describe your model. How similar to the one used in your state of the art reference is it? Which things did you change, and why?
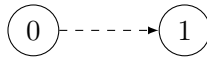

Figure 1: A figure should always have a caption.

If you add figures, such as Figure 1, always refer to them at least once. Please use tikz or vector formats like EPS or PDF. Avoid pixel formats such as PNG or JPG (because they would become pixelated or blurry).

2.2 Implementation details

Here you should describe the implementation of your simulation. Please explicitly mention any programming languages, tools or libraries you used.

2.3 Experiment design

Did you run multiple different versions of your simulation with different parameters? Then explain the different setups here and why you chose them.

You can also mention here what results you are expecting.

3 Results

3.1 Experiment findings

Key question 4: What are the results you obtained?

It can be good to use a Table, like Table 1. Please ensure that numeric results are right-aligned and have the same number of digits, to allow for easy comparison.

You might also want to include plots or graphs. Similar to figures, please do not use screenshots or pixel-based formats, but vector-based formats. Alternatively, generate your plots with the `pgfplots` package as done here in Figure 2.

3.2 Interpretation of findings

Summarise your results. Are the results what you expected? Which results are surprising? How do you interpret them?

Setup	run time	success rate
1	0.123	12%
2	0.456	34%
3a	0.789	56%
3b	1.234	78%

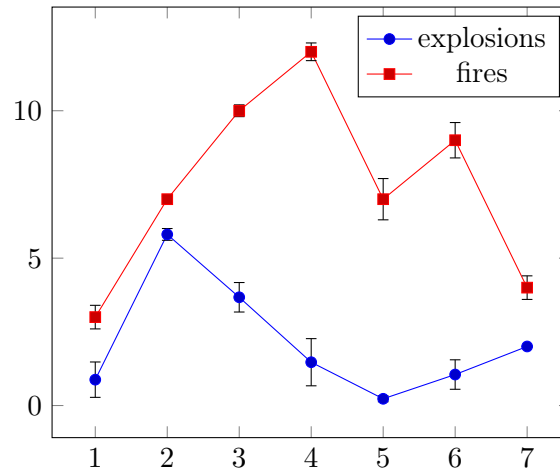Table 1: Tables should always have a caption.

Figure 2: Figures should also have a caption.

4 Conclusion

4.1 Discussion

What do you take away from your project? What did you learn?

4.2 Relevance

Key question 5: What is the relevance of this work?
Which new questions do you have now? Do you results suggest future research directions?

4.3 Team Work

How did you work together as a team? Who contributed how to this report and to the implementation? What should you have done differently?

References

[Eps02]   Joshua M Epstein. "Modeling civil violence: An agent-based computational approach". In: *Proceedings of the National Academy of Sciences* 99.suppl 3 (2002), pages 7243–7250. DOI: https://doi.org/10.1073/pnas.092080199.

[EW11]   Nahed Eltantawy and Julie B Wiest. "The Arab spring| Social media in the Egyptian revolution: reconsidering resource mobilization theory". In: *International journal of communication* 5 (2011), page 18. URL: https://ijoc.org/index.php/ijoc/article/view/1242.

[How+11]   Philip N Howard, Aiden Duffy, Deen Freelon, Muzammil M Hussain, Will Mari, and Marwa Maziad. "Opening closed regimes: what was the role of social media during the Arab Spring?" In: *Available at SSRN 2595096* (2011). DOI: http://dx.doi.org/10.2139/ssrn.2595096.

[TW12]   Zeynep Tufekci and Christopher Wilson. "Social media and the decision to participate in political protest: Observations from Tahrir Square". In: *Journal of communication* 62.2 (2012), pages 363–379. DOI: https://doi.org/10.1111/j.1460-2466.2012.01629.x.