



## The Wisdom of Multiple Crowds during Critical Events

*Aggie and the Social Media Tracking Centre*

On December 7, 2016 a Ghanaian woman in the UK was trying to cast a proxy ballot in her country's general election. Polling officials informed her that she had prepared her ballot improperly and she would be unable to vote. Determined to vote and confident that she had registered correctly, she contacted over WhatsApp the Social Media Tracking Center (SMTC) an independent election monitoring effort in Accra, Ghana.

One of the approximately 25 volunteers at the SMTC read her reports using Aggie, the software platform that coordinates the workflow of the SMTC. After communicating further with the woman, one of the volunteers at the SMTC escalated her issue to another SMTC member embedded in the electoral commission (EC). With the help of the electoral commissioner and another EC official, she was able to help the woman vote.

### BACKGROUND

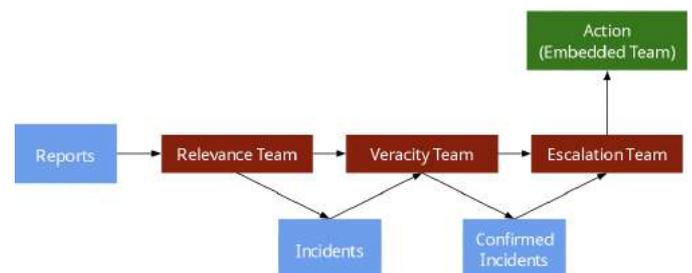
Many people and institutions are publishing online digital data at all times everywhere. Some of this data is found on social media platforms: consider the constant stream of posts on Twitter, Facebook or Weibo. Increasingly, new platforms allow users to participate in specialized, structured or formal data generation and real-time reporting, which presents opportunities for humanitarian technologies. For instance, it is newly possible to create chatbots for some of the major instant messaging platforms (ICRC et al., 2017).

The sources, purposes and particularities of this content seems to be forever growing, often created around seemingly the most mundane and banal of topics. But this torrent of content is also produced at the most serious of times and in the most critical of places: during moments of civic protest, national crisis, violent attack, or natural disaster (Rogstadius et al., 2013). It is during these moments – while witnessing some critical event – that citizens increasingly rush to their phone and use digital tools to report from the

ground. This deluge of user-generated data can be harnessed towards a critical and even life-saving analysis and response (UN, 2013; Imran et al., 2015).

A number of systems already exist with an aim towards applying user-generated content towards positive resolutions during critical events (Okolloh, 2009; Smyth et al., 2016). For instance, the crisis mapping community has developed real-time geo-locating systems that can help first responders locate and attend to people in immediate need (Middleton et al., 2014). In general, however, these systems only work with one media type: for instance specialized SMS text messages (e.g. FrontlineSMS), posts to a specialized website, Twitter messages (Li et al., 2012), or Facebook posts. This single-media focus is identified in a recent literature review (Cheung, 2016). Despite their successes, systems that focus on a single media type leave a wealth of potentially central data untouched and are hindered by their inflexibility in a changing digital media landscape.

### AGGIE



**Figure 1. Workflow followed at the SMTC.**

Aggie is an open source software platform that aggregates reports coming from multiple media including SMS and WhatsApp messages sent to the SMTC, public tweets and Facebook posts, and digital reports from other sources. Aggie enables a team at an SMTC to collaborate to process reports through an identification (Relevance Team), verification (Veracity Team), and escalation (Escalation Team) workflow, as



| ID# | Title                                       | Location                    | Assigned To | Status | Veracity       | Escalated? | Tags                                                         |
|-----|---------------------------------------------|-----------------------------|-------------|--------|----------------|------------|--------------------------------------------------------------|
| 362 | confusion between party agents<br>4 reports | Ablekuma South Constituency | andrew      | Open   |                | Yes        | public 'd: violence, electoral misconduct, confusion'        |
| 366 | Delay in Coalition Results<br>4 reports     | National Coalition Center   | andrew      | Open   | Confirmed True | No         | Public, 'd: Delay at National coalition center'              |
| 368 | Results Verification by EC<br>10 reports    | Unknown, Ghana              | josephine   | Open   | Confirmed True | Yes        | Public, 'd: STATEMENT: EC TO review results'                 |
| 371 | EC suspecting overvoting<br>16 reports      |                             | josephine   | Open   | Confirmed True | Yes        | public d: EC says there was over-voting, Fraud               |
| 372 | Seriuos allegation<br>1 reports             | Ridge Road, Accra, Ghana    | andrew      | Open   |                | No         | resultchnging, public, 'd: EC is trying to overtunr results' |
| 373 | Wrong Figures By EC<br>2 reports            | Ridge                       | andrew      | Open   |                | Yes        | rigging, public                                              |
| 375 | Refusal to sign Sheets at EC<br>1 reports   | Ridge Church, Accra, Ghana  | edna        | Open   | Confirmed True | Yes        | refusaltosign, declation, result, public                     |
| 376 | overvoting incedent<br>1 reports            | Ashanti Region, Ghana       | andrew      | Open   |                | Yes        | overvoting, public                                           |
| 377 | Ballot Stuffing<br>1 reports                | Ashanti Region              | edna        | Open   |                | Yes        | Ballot Stuffing                                              |

**Figure 2. The Aggie user interface for members of the SMTC. Rows here correspond to incidents that are being handled by members of a tracking center.**

shown in Figure 1. Incidents are created when monitors flag, and pool together, particularly important or salient reports. Figure 2 shows part of the web user interface for managing this workflow. Aggie was created at Georgia Tech and continues to grow at UNU-CS, both as a software tool and a research project.

## RESEARCH FOCUS

The Aggie research project aims to understand media practices in critical events to inform the design of tools like Aggie which employ multiple information sources to understand events and potentially respond to them as they unfold. We use the term critical events to refer to a large category of events important to peace, safety, and justice. Critical events may be brief, like an election, or ongoing, like hate speech.

Our primary hypothesis is that tools and methods for monitoring media are more effective when they use more communication platforms and when their design reflects the different affordances and uses of each platform. We address this hypothesis through empirical case studies of Aggie deployments and the continuing design and development of Aggie.

Some more specific research questions include:

- How can monitoring tools and processes support the process of crisis investigation?
- How can reports from multiple platforms (e.g. traditional media, Twitter, Facebook, SMS or WhatsApp) complement each other to help understand or verify incidents during critical events?
- How can Aggie handle differences in reliability and volume between media (e.g. Aggie may have vastly more reports from Twitter than from WhatsApp)?
- What heuristics can human monitors use to triangulate reports from multiple media in order to detect incidents faster and more reliably?

The aforementioned questions will be examined using observations, interviews, quantitative data analysis, usage log analysis, and software design.

Although this research project is not firmly tied to any one methodology or framework, we can identify some theories which guide our research questions. Most prominently, we draw on the theory of media ecology (McLuhan, 1964; Postman, 1970; Ito et al., 2010; Slater et al., 2004), which recognizes that individuals and groups use a repertoire of multiple



communications behaviors within their technical, social, cultural and spatial contexts. Under this theoretical perspective, we recognize that media choices by groups and individuals reflect different layers of socio-technic affordances (Gibson, 1979; Hutchby, 2001) and that in polymedia environments the affordances of each medium are defined in relation to each other (Madianou & Miller, 2012). Our research approach seeks to understand the contour of the communication ecology in critical events and, in particular, how various communication platforms differ and interact in a communicative ecology.

## PROGRESS

### Software development

We have released a series of software updates to Aggie in the run up for the Ghana election. Main new features include internationalization, easier installation through containers, better Twitter support, and systematic tagging of reports. Special effort has been done on improving the documentation, which can be accessed through the newly-created webpage for Aggie (<http://getaggie.org>).

### Deployments

We deployed Aggie for the Ghana elections with our partners in the country, Pen+Bytes. Pen+Bytes recruited more than 25 volunteers to form the Social Media Tracking Center (SMTC) and partnered with the Electoral Commission, the Coalition of Domestic Election Observers, and the National Election Security Task Force. These institutions helped the SMTC verify the incidents found by the volunteers in the reports collected by Aggie. At the request of Pen+Bytes, we implemented support for aggregating citizens' reports from WhatsApp. This added a new dimension to our cross-media approach to monitoring.

Initial contacts have been made with the Center for Diversity and National Harmony for a hate-speech related deployment as they were interested in using Aggie. The initiative is on hold as work for the Ghana elections has been prioritized.

## Publications and presentations

The main academic outputs up to now are an ICTD note paper, which summarizes the lessons learnt in previous elections using Aggie, and a full paper submission to the Information Systems for Crisis Response and Management (ISCRAM) conference.

The ISCRAM submission studies the WhatsApp impact in the monitoring process, which kind of incidents can be found in WhatsApp messages, and how WhatsApp was integrated into the organization of the SMTC.

Our research work and Aggie have been presented in regional fora like DevCa's Electoral Hackathon in the Dominican Republic, and the CUHK Research Summit on Digital Methods and Social Development.

## FUTURE WORK

Immediate work aims to close the research cycle that started with the Ghana elections, and to open a new cycle. On-going activities around the Ghana elections include writing a paper that analyzes how people and institutions use media to propagate reports of incidents and how they are captured by volunteers using Aggie. The data indicates that Twitter is the largest source of incidents, but a deeper analysis is needed to check the original source of such reports and how they got processed.

During the Ghanaian election, we conducted a controlled experiment regarding the strategies that volunteers use to find incidents with Aggie. A paper will analyze volunteers' usage logs and our interviews with them, comparing the two groups involved in the experiment. The Ghana election experience will be the basis of a policy brief that will advise organizations involved in election and governance monitoring on how to use multiple media types to support their activities during critical events.

The next cycle of the project will focus on increasing the impact and visibility of tools and methods developed at UNU-CS. We are planning to support the deployment of Aggie for an African election (potentially Kenya or Liberia).



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## LABS

This project is part of the Digital Peace Lab and the Small Data Lab.

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