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 Cross Media Tracking Center (CMTC) an independent election monitoring effort in Accra, Ghana. (We had previously referred to this as a Social Media Monitoring Center or SMTC.)

One of the approximately 25 volunteers at the CMTC read her reports using Aggie, the software platform that coordinates the workflow of the CMTC. After communicating further with the woman, one of the volunteers at the CMTC escalated her issue to another CMTC 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 seem 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 ge-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

Aggie is an open source software platform that aggregates reports coming from multiple media including SMS and WhatsApp messages sent to the CMTC, public tweets and Facebook posts, and digital reports from other sources. Aggie enables a team at a CMTC to collaborate to process reports through an identification (Relevance Team), verification (Veracity Team), and escalation (Escalation Team) workflow, as shown in Figure 1. Incidents are created when monitors flag, and pool together, particularly important or salient reports.

![Figure 1: Workflow followed at the CMTC](image-url)
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 CMTC 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 crisis investigations?
- 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 crossmedia 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 to the Ghana election. Main new features include internationalization, easier installation through containers, better Twitter integration, the addition of WhatsApp support, and enhanced tagging of reports. Special effort has been done on improving the documentation, which can be accessed through the webpage for Aggie (http://getaggie.org).

Deployments and Dissemination
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 (CMTC) and partnered with the Electoral Commission, the Coalition of Domestic Election Observers, and the National Election Security Task Force. These institutions helped the CMTC 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.

Over the last year, we focused on increasing the impact and visibility of tools and methods developed at UNU-CS. We presented Aggie at various academic venues. We are also partnering with Creative Development Lab to deploy an instance of Aggie to assist them in monitoring the Iraq elections of 2018.

Publications and Presentations
The main academic outputs from this project are an ICTD note paper, which summarizes the lessons learnt in previous elections using Aggie, a work-in-progress paper at the 14th International Conference on Information Systems for Crisis Response and Management (ISCRAM), and a short paper at the 2018 Conference on Human Information Interaction and Retrieval (CHIIR).

The ISCRAM paper 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 CMTC. The CHIIR paper looks into the collaboration practices among the volunteers at the CMTC and their feedback on using Aggie for social media monitoring.

In addition, we have also written a policy paper that advises organizations involved in election and governance monitoring on how to use multiple media types to support their monitoring activities and recommends collaborations with governmental and civil society entities to enhance their efforts.

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.

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