LiveDissent: A Media Platform for Remote Participation in Activist Demonstrations

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Abstract

Social media platforms such as Twitter and Facebook have become a critical tools for the coordination of activist movements and demonstrations. Additionally, live streaming platforms like Periscope have started to emerge as modalities for reporting on and remotely experiencing activist activities. In this design fiction, we present LiveDissent, a fictional media platform that leverages both established and emerging technologies to support remote participation in activist demonstrations. These technologies include mobile live streaming, telepresence robots, unmanned aerial vehicles, and digitally augmented picket signs. LiveDissent brings these technologies together into an aggregated platform for remotely watching and participating in demonstrations. We discuss a planned in the wild study at an upcoming demonstration, through which we will explore the design and implications of social media and telepresence for participation in activism. Finally, our authors' statement connects to related prior work and explores potential research and ethics questions.

Author Keywords

activism; telepresence; mobile live streaming; social media

ACM Classification Keywords

H.5.m [Information interfaces and presentation (e.g., HCI)]: Miscellaneous

Introduction

The means of activism and political participation are changing. Over the past decade, we have seen social media platforms such as Twitter and Facebook emerge as critical tools for the organization, reporting, and experiencing of activist movements and demonstrations [16, 4, 19, 20, 9]. Similarly, during the past two years, mobile live streaming has been widely adopted as a means for activists to broadcast demonstrations in real time to remote participants [3, 14]. Beyond just sharing these experiences, live streaming has proven to be a effective tool for spreading awareness of issues, promoting the accountability of authorities, and providing a means for remote participants to engage in activist experiences they wouldn't otherwise be able to. In this work, we explore research questions regarding supporting activism with the next generation of media technologies.

For example, one emerging technology that is already significantly impacting activism in practice is unmanned aerial vehicles (UAVs) or drones. UAVs have been a tool commonly used by law enforcement agencies and the military for foreign and domestic surveillance [17]. However, in recent protests, there have been reports of increasing numbers of private drones equipped with streaming video capabilities. The drones have seemingly been owned and operated by local activists to capture aerial footage of authorities and help document police and activist activities (Figure 1) [5]. In some cases, authorities have employed counter measures such as shotguns [15] and surface to air missile defense systems [1] against activist drone activity.

In addition to aerial drones, we imagine the potential impact of other emerging technologies at demonstrations. For example, telepresence robots, such as the Beam Pro [7], could be used to proxy for remote activists potentially hundreds of miles away. Other technologies like pico projector

Figure 1: Drone footage of police using water cannons on protesters during freezing weather conditions. The video was captured by activists using private drones during the North Dakota Access Pipeline demonstrations. Credit: Myron Dewey MA, Digital Smoke Signals, Professor/Drone Pilot/Filmmaker

[18] powered picket signs could be dynamically configured to show images or video created by online participants (Figure 2). These kinds of technologies stand to give remote participants new opportunities to participate in activism and affect social and political change.

The emergence of these technologies and phenomena have stimulated us to address new research questions including: 1) How do emerging media and telepresence technologies enhance participation in demonstrations for both in-person and online actors? 2) How do we support coordinating participation around and through these technologies? 3) What are the effects, consequences, and safety concerns of telepresence technologies such as UAVs and robots at activist demonstrations? 4) What are the rights and responsibilities of local and remote participants, device owners, and the authorities during telepresence augmented activist demonstrations?

Figure 2: Digital picket signs use pico projectors to display remote participant submitted art on protest signs. Original Credit: 99% Australia

To explore these questions, we are designing LiveDissent, a media platform for supporting enhanced local and remote participation in activist demonstrations. In the following sections, we present the design of a LiveDissent prototype. Subsequently, we propose an explorative fictional field study to investigate the above research questions through deployment of a LiveDissent prototype at a demonstration.

LiveDissent Prototype

We have designed LiveDissent as a fictional media platform to support participation in political and social demonstrations by remote and on-the-ground activists. The LiveDissent prototype would be implemented as an online, desktop and mobile platform for organizing, coordinating, and participating in activist demonstrations through live streaming media and telepresence technologies. The LiveDissent research prototype incorporates a fleet of digital picket signs, video streaming capable UAVs, and telepresence robots which are made available to participants during active demonstrations. To support remote participation, the prototype provides democratic mechanisms for remote activists to access and use these devices at demonstrations. In the following sections, we present and motivate the design of each LiveDissent modality.

Mobile Live Streaming
Similar to Periscope and Facebook Live, the LiveDissent mobile app allows users to upload live video streams to a web platform. Each live stream will be tagged as belonging to a specific event, enabling remote participants to browse streams by event. Each stream will also incorporates real time text chat, which remote participants can use to communicate with each other and local participants.

Additionally, live streamers can choose to provide their GPS location and camera orientation. This will enable present-

ing ongoing live streams on top of a map of the event, in order to provide awareness of available camera perspectives and overall coverage. Remote viewers are then able to use the real-time map to help coordinate positioning of on-the-ground streamers, to ensure that important angles are covered.

Digital Picket Signs
The LiveDissent prototype also supports the use of digital picket signs. A digital picket sign will incorporate a lightweight pico projector, attached to the handle of a blank picket sign. The projector is then used to display custom images and video on the sign (Figure 2). This pico projector is driven by a Raspberry Pi with a cellular data connection, which polls the LiveDissent web service for a set of images and videos to display. The sign will then cycle through the submitted content as the on-the-ground activist carrying the sign participates in the demonstration.

We want the digital picket signs to serve as a highly visible means for remote participants to have impact at demonstrations. To that end, remote and on-the-ground users can submit their sign designs as images or short animated gifs using the LiveDissent web and mobile apps. This content is then downloaded and displayed by the on-the-ground picket signs.

Participant submitted sign content for each event will be posted to an online sign board (Figure 3). This sign board is similar in function to the social media site Reddit, with activists being able to up and down vote sign content that they think supports the cause. Signs with a higher vote count will subsequently be shown with more frequency on digital picket signs at the demonstration. We hypothesize that by being able to vote on sign media sources, participants will be able to collaboratively moderate their content. Creative and appropriate signs will be voted to the top, while

counter-productive signs will down voted and not shown on picket signs. The digital picket sign also have a veto button on the handle, giving the on-the-ground sign carriers an option to not show sign messages they find inappropriate to the demonstration or which they personally do not wish to represent.

Unmanned Aerial Vehicles
A fleet of UAVs will be made available to activists to provide aerial video streams of demonstrations. While operating, UAV camera video is streamed to the LiveDissent platform, where it will be presented in coordination with other on-the-ground live streams. Aerial video will help provide more coverage of a demonstration and promote the accountability of authorities.

The LiveDissent prototype supports two methods for controlling UAVs during demonstrations. First, UAVs can be checked out by a specific participant, who can then directly control their location and camera angle. Alternatively, UAVs can be shared among a collection of participants, who then democratically control the UAV through a voting system. Users are able to vote on specific locations using a map interface of the demonstration area. The system then directs the UAV to fly to the specified location and pan the camera over the surrounding area.

To promote the safe operation of UAVs and compliance with Federal Aviation Administration (FAA) regulations, we design the LiveDissent UAV control system to provide a few initial safety measures. First, drones utilized by LiveDissent will be equipped with real time collision avoidance capabilities, so that they are not accidentally or maliciously driven into participants, bystanders, officers, vehicles, buildings, or other obstacles on the ground. The UAV control system will also enforces a minimum and maximum flight height to ensure the safety of participants on the ground, as well
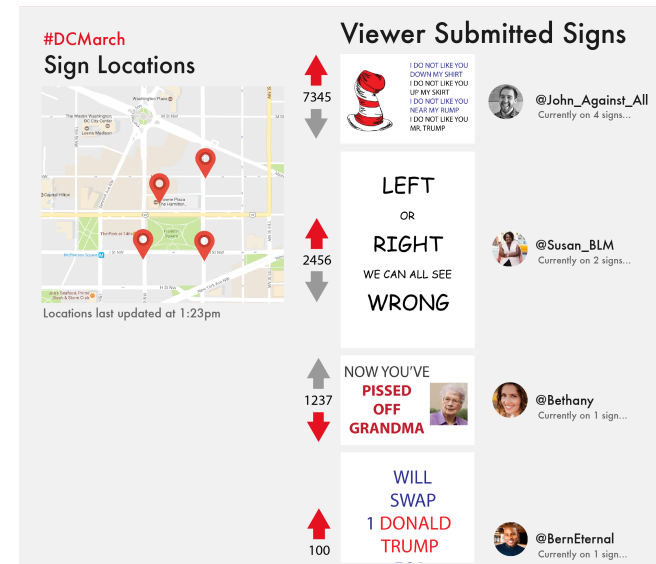

Figure 3: The sign board enables participants to vote on participant submitted sign content and see current digital picket sign locations. The map shows the current locations of the active digital picket signs for the #DCMarch in progress. On the right is a list of the current top sign images along with the user who submitted them.

as other aircraft in the area. The system independently manages drone take off and landing procedures at designated landing zones. UAVs low on power are no longer controlled by LiveDissent participants; they will be automatically guided to landing zones to prevent crashes or drone failures in unsafe areas.

Telepresence Robots

In addition to UAVs, LiveDissent provides a fleet of telepresence robots which are available on location for planned demonstrations. These robots are available for use by remote participants through the LiveDissent web app. During the demonstration, remote participants can control the robot's position and orientation. They can then use their webcam to engage with local activists and participate in the demonstration (Figure 4). This not only enables remote participants to interact with activists as if they were actually at the demonstration. It further allows local activists to see and feel the support of people from all over the world, who support the same cause. If there are no available devices, remote participants will be placed into a waiting queue until the next device becomes available.

Telepresence robots will have their activity automatically streamed to the LiveDissent web app. This includes the live audio and video of the operator, the live audio and video captured from the robot, and its location and orientation. Other remote viewers are able to watch along as the operator interacts with activists on the ground. To prevent any one user from dominating a telepresence robot, a maximum time is enforced for robot operators. Additionally, to support democratic moderation, online viewers are able to vote to extend the time of or kick the current operator.

Similar to the UAVs, LiveDissent telepresence robots implement some safety and quality measures. The robots have a maximum speed to prevent them from being used as ramming devices or in other potentially harmful ways. When low on power, they automatically return to a designated charging location. In the event that a robot is incapacitated, a LiveDissent volunteer is alerted of its location so they can either fix the issue or return the robot to the designated retrieval location.

Figure 4: A remote activist confronts police via a LiveDissent telepresence robot. Original Credit: AP Photo/Max Becherer

Online Coordination Platform

The LiveDissent online platform will serve as an aggregation point for viewing and participating remotely in activist demonstrations. Each of the modalities—including mobile live streams, digital protest signs, UAV footage, and telepresence robots—will be aggregated, coordinated, and presented together through the LiveDissent web interface. A coordinating map interface will show the location, orientation, and status of each the devices active around a particular demonstration. From here, participants can focus on particular streams, or select multiple streams to watch

together, to experience the demonstration from multiple concurrent views (Figure 5).

Additionally, LiveDissent will provide both demonstration-wide and stream-specific chat channels for participants to communicate through. These channels are accessible to both local and remote participants, using the web and mobile apps respectively. Participants can post text, images, links, and videos to these channels to communicate with participants in the demonstration at large or with the specific audiences of each video stream.

By viewing the map for a demonstration, remote participants will be able to maintain a different kind of awareness not available to those on the ground. Remote participants will have easier access to other information sources around the demonstration, such as news outlets and social media. Remote participants will then be able to use this awareness to help alert those at the event of significant events and issues that spontaneously emerge. We hypothesize that this kind of crowdsourced coordination will serve as a rewarding participatory experience for remote activists, leading to more informed, effective, and safer demonstration efforts.

We note here that remotely participating in demonstration via the LiveDissent prototype will be open to the public. All participants will be able to vote in the democratic mechanisms available for participating via digital picket signs, UAVs, and telepresence robots. However, privledges such as user timeouts and banning will be provided for demonstration organizers so that they are able to moderate behavior underminining the cause.

Proposed Field Study
To observe emergent use of the LiveDissent prototype in a situated demonstration context, we will be conducting an in the wild deployment at the upcoming March for Universal
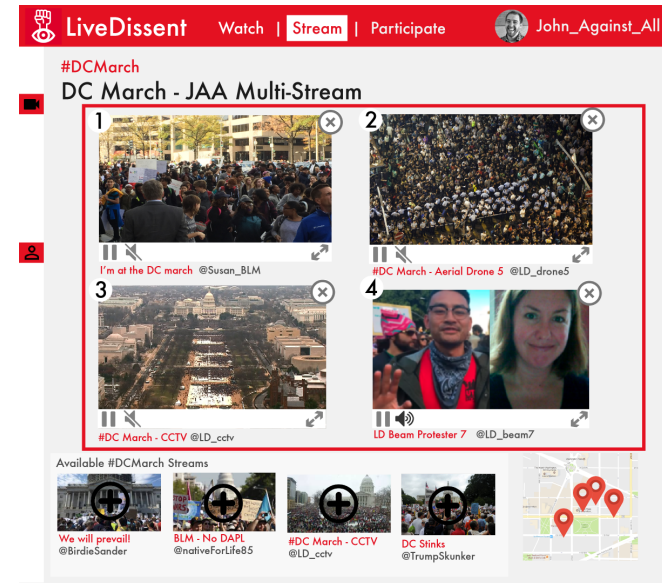

Figure 5: The LiveDissent multi-stream view enables participants to watch multiple mobile live mobile streams, aerial drone video streams, and telepresence robot streams simultaneously. Participants are also presented with a map showing the real time locations of stream sources.

Health Care in Washington, DC. Researchers will be on the ground at the demonstration observing as well as distributing and maintaining devices. During the march, we will be deploying 20 digital picket signs, 3 UAVs and 5 telepresence robots for use by local and remote participants.

The LiveDissent research team has been communicating with the demonstration organizers to coordinate the locations of UAV launching zones and robot recharging stations. We are also enlisting the help of demonstration organizers to help distribute, observe the use of, and secure proto-

type devices throughout the event. We have received the planned route for the march. Using this data, we have pre-programmed flight path boundaries for the UAVs as to avoid restricted no-fly-zones and to keep them within a set radius of the planned route. Similar demonstration specific boundaries have also been developed for telepresence robots.

To recruit participants, demonstration organizers have been advertising the availability of the LiveDissent prototype as part of their campaigning. To attract remote participants, we will be posting march specific links to the LiveDissent web app on social media just prior to the start of the march and will continue to do so until the march is over.

During the deployment all video streams will be recorded. The interactions of remote participants through the mobile and web LiveDissent app will also be anonymously logged for later analysis.

After the demonstration is over, we will be contacting those who participated with LiveDissent for follow-up interviews about their experiences. These participants will include local demonstrators who held digital picket signs, produced mobile live streams, and interacted with telepresence robots. Additionally, we will contact remote demonstrators who manned the telepresence robots, submitted content for the picket signs, communicated in global or stream-specific chats, and participated controlling LiveDissent UAVs. Through these semi-structured interviews we aim to elicit qualitative data regarding users' experiences as they relate to our research questions.

Authors' Statement

We present the fictional LiveDissent research prototype to evoke a discussion of new forms of participation in political activism. In recent months and years, we have seen increasing occurrences of activist demonstrations, in the United States and elsewhere, involving political and social movements, such as Black Lives Matter, Arab Spring, Occupy Wall Street, the Dakota Access Pipeline, and the Anti-Trump Resistance. It is clear that social media forms play an increasingly important role in the organization, reporting, and experiencing of activist movements and demonstrations [16, 4, 19, 20, 9].

Beyond Twitter and Facebook, mobile live streaming via apps like Facebook Live and Periscope have recently emerged as means for sharing and reporting on activist activities [3, 14]. While Dougherty explored the production of mobile live streaming as a form of civic engagement [2], more research is required to investigate emerging mobile live streaming practice at activist events. Further, recent research has found that the aggregation of multiple live media streams together around events can lead to increased opportunities for participation and engagement [6]. However, there are additional potential implications for the design of live social media channel aggregation, in situated activist contexts, such as protests.

There are many open questions involving the design of social media and live-streaming to support activism. For example, we imagine that emerging technologies—such as telepresence robots and UAVs—have the potential to further impact political activism in practice. One obvious change is that telepresence technologies afford new capabilities for remote participants' embodied presence.

Significant prior research has investigated the use of telepresence technology at work [10, 12], in health care applications [11, 10], and at academic conferences [13]. Recent work is also starting to explore the use of drones for collaboration and sharing experiences [8]. However, there is less work investigating use of telepresence devices in the wild, at emotionally charged events such as political protests.

What are the potential implications of participating in activist experiences through these types of technologies? Does participation become more meaningful, rewarding, and impactful for remote and on-the-ground participants? We hypothesize that, yes, it would, but the specific implications for individuals and activist movements as a whole are unclear.

When these new forms of remote participation become more available, we imagine a plethora of emergent research questions, concerning how we should design computational tools and media to support activists.

- How will it be decided who gets to participate and how?

    - First come first serve?
    - Pay to participate?
    - Crowd voting?
    - Should people be allowed to remotely participate in demonstrations in other countries? Is it even possible to prevent this?

- What are the benefits and dangers of centralized aggregations of activist media and communication? Publicizing the identities and locations of activists may directly pose a threat to their privacy and safety. Additionally, centralizing activist communication channels and media may make it easier to disrupt their activities and ultimately undermine their efforts.

- Are there gate keepers to activist media and telepresence tools? And if there are, who are they?

    - Protest organizers?
    - Government agencies?
    - Private media platform owners?

- How do we support the organization and acquisition of these kinds of resources? While technologies like UAVs and pico projectors are becoming more affordable, they still cost hundreds of dollars. Meanwhile, telepresence robots cost thousands of dollars. All of these technologies also require some technical expertise to setup and safely use.

- Is it dangerous to enable humans to control UAVs or telepresence robots at political demonstrations?

    - Will remote activists operate devices responsibly, given their physical removal from the situation?
    - What are the risks of malicious actors hijacking devices and attempting to instigate violence?
    - What safe guards should be in place to protect local activists and authorities?

- New forms of participation in political activism will not be able to address all peoples or needs equally. As researchers, how should we prioritize our objectives?

In this work, we presented the potential design and evaluation of the LiveDissent media platform to explore new ways of supporting remote and local participation in activism. The fictional prototype describes how new technologies can be integrated to create new experiences around activism and raises questions about this research area, many being ethical in nature. Ultimately, it is still unclear if these technologies and the experiences they afford will impact and empower activist movements in a positive and safe way.

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