Citizens *Art*sembly: Participatory Art-making to Enable Democratic Participation

Anthony Maocheia-Ricci
University of Waterloo
amaochei@uwaterloo.ca

Introduction

Globally, countries are facing struggles with maintaining trust in their democratic systems, where people do not believe their governments provide viable avenues for citizens to have influence on decisions [8]. In order to build trust and increase citizen engagement, governmental bodies can implement *Citizens' Assemblies*, an instance of a *representative deliberative process*, a participatory practice of dialogue and debate often used to address differences in values or complex problems [17]. To aid in participant deliberation, facilitators are encouraged to include innovative and creative methods to help participants use their imagination [10].

Digital civics as a research field is able to act as a bridge between political science and HCI. Research at SIGCHI conferences on democratic decision making ranges from small-group to society-wide participation, and includes technology made for both citizen-led and organization-led contexts [16]. Assembly-based participation technologies are well-researched, with projects extending into the world of interactive displays [9, 21] or public art [12].

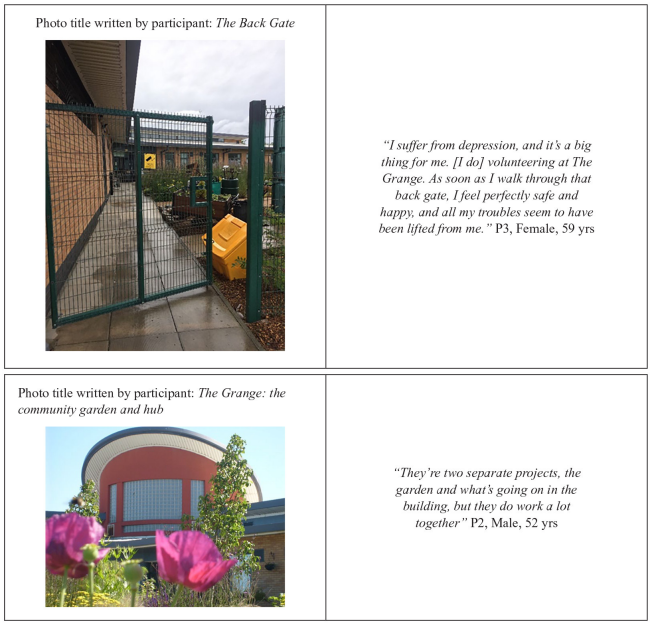
Usage of Citizens' Artsembly during an exhibition. Given the prompt "What does a climate-resilient city look like to you?", participants are able to respond to it by drawing their response on their phones. After submission, their drawings will appear on the projected screen.

Drawing from both the deliberation part of a Citizens' Assembly and work in interactive displays and art, *Citizens' Artsembly* is a participatory art piece and creativity tool for deliberative processes and beyond. Citizens' Artsembly enables assembly facilitators to prompt participants with thought-provoking questions and collect doodles in response, creating a piece of collective artwork describing the groups' opinions on the matter.

Context

The creation of Citizens' Artsembly was primarily inspired by scholarship in arts-based civic engagement, existing technologies or interactive artworks in digital civics, and design resources from HCI.

Arts-Based Inquiry is a postmodern genre of qualitative methodologies involving the creation or use of creative art forms in community-based research to consider a broader range of perspectives and social ways of knowing [11]. A subset of these methodologies include *Participatory Visual Methods* (PVMs), visual approaches to engaging communities in research through photography, digital storytelling, participatory video-making, and more [24].



Example photovoice submissions from Jackson and Ronzi [15].

Jackson and Ronzi [15] explored the health and well-being impacts of a community hub and garden through a PVM called *Photovoice*, where residents took photos representing their community and paired each with a title before engaging in focus group discussions.

Discussions In Space [21]'s public screen interface.

Rossitto et al. [20]'s user interface for audience participation, prompting "How do we create change?" in the first screen, and answers being displayed on the second screen.

Within digital civics and HCI, various platforms for user voting or interaction in physical spaces have been explored to increase community engagement. Harry et al.'s *backchan.nl* [14] integrated a web interface to ask and vote on questions displayed on a projected screen during conference presentations. Similarly, Schroeter's *Discussions In Space* [21] involved a public screen prompting questions related to urban planning where users could respond via SMS or Twitter.

backchan.nl [14] being used during a presentation, with the projected view in the top-left.

Of particular note are technologies within the space of digital civics involving the creative arts to some degree. Rossitto et al. [20] created an interactive performance, *Haemon*, hosted on a mobile application to be experienced while traveling through Stockholm's subway network. This experience enabled reflection and thought on social activism and riots within the city through the use of digital video.

Discussions In Space [21] being used live for a city planning initiative at a University.

People viewing *Haemon* on the subway [20].

The *Speaker's Corner*, where *Mégaphone* [12] obtains its input from.

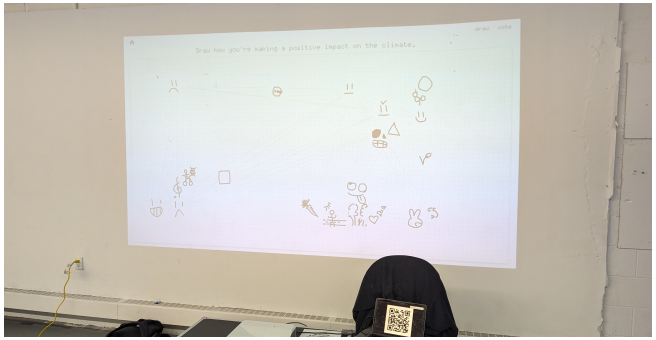
Fortin et al.'s [12] *Mégaphone* is a large-scale art installation involving both audio input/output and a façade containing an archive of words spoken. This public art was used by activist groups, students, journalists, and artists alike to act as an alternative news source, crowdfunding platform, and live media platform situatied in an urban neighbourhood.

The *Mégaphone* [12] large display, projected onto an adjacent building.

The more artistic the experience, the more the technology exhibits an *Ambiguity of Information*. Gaver et al. [13] discusses ambiguity of information as exhibited through the creation or reflection of uncertainties related to significant information, compelling people to engage in sense-making of the system's output. Projects such as *Mégaphone* [12] are more ambiguous by design, giving the audience increased room for interpretation and reflection than in other projects discussed. While user input might be ambiguous itself, ambiguity can also be added through the use of black-box systems like machine learning as seen in Sivertsen's [23] collection of ML-driven Art.

Experience

Citizens' Artsembly consists of (a) a large-scale display mode, to be used with a projector or large screen, and (b) a mobile website for participants to draw and vote on.

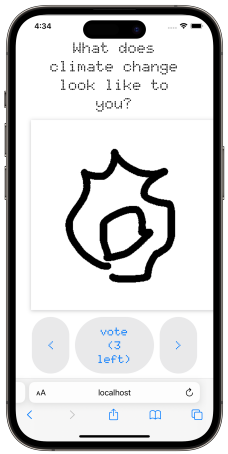


The display mode showing a completed round of "deliberation" using Citizens' Artsembly with the prompt "Draw how you're making a positive impact on the climate".

The display mode consists of a prompt located directly above a large canvas. An admin panel is hidden below the canvas, allowing the facilitator to change prompts and allotted time for deliberation, saving the current state of the canvas, enabling alternative modes, and starting the deliberative drawing process, activating a prompt.

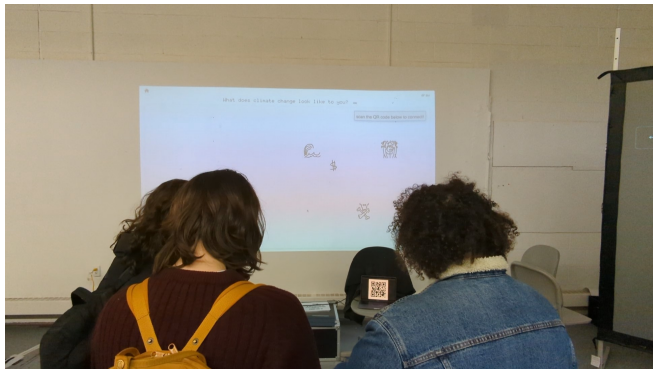
The mobile site is accessible at the same link as the display mode. On the drawing tab, after a prompt is activated, the same one on the display screen will be displayed above a small canvas where participants can doodle their response. The controls are minimal, where they are able to draw in black on a white background, and are given a "submit" and "clear" button. Upon submission, their drawing will appear on the display screen among all previous drawings, located closer to similar submissions.

The "draw" page on the mobile website. The prompt is displayed above the drawing canvas, and the action buttons are below.



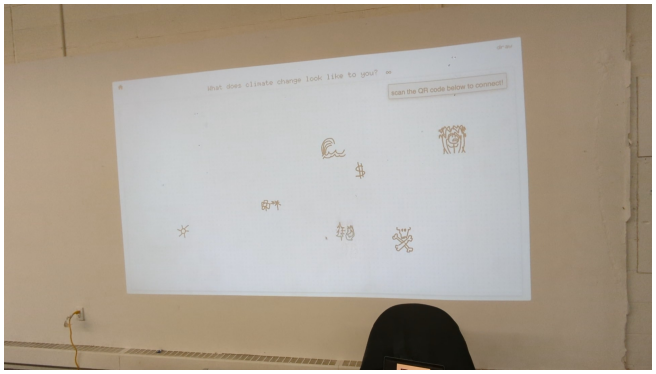
The "vote" page on the mobile website. The prompt is displayed above the gallery, and navigation and voting buttons are below.

On the voting tab, if a prompt is active, participants are shown the same drawings that exist on the display screen individually, and have the ability to "vote" for three drawings. Upon voting, the respective drawing on the display screen will increase in size proportional to the number of votes. After the allotted time, participants can use this tab to explore art submitted during the prompt.



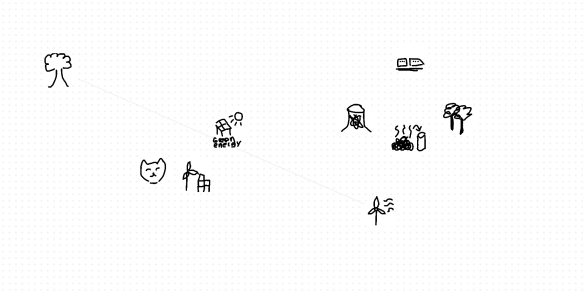
Participants in front of the display, responding to the prompt "What does climate change look like to you?"

An example of a participant's phone while drawing.



The resulting canvas on the display after submission. The picture is connected to similar drawings (if any).

Though initially made with Citizens' Assemblies in mind, the platform also supports an "exhibition mode", where pre-set prompts are cycled through in sequence. By default, each prompt is given 10 minutes of active time, enabling visitors to contribute to the drawing. Afterwards, the canvas will be saved locally, and a 2 minute intermission is started, where visitors can look at the finished artwork before a new prompt is made active, clearing the canvas.

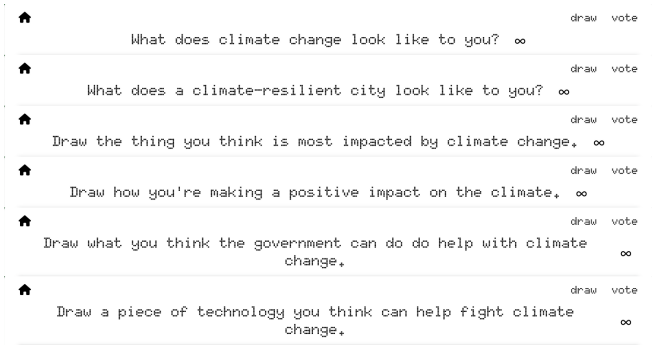


The resulting canvas for the prompt "What does a climate-resilient city look like to you?" completed in exhibition mode.

The "home" page on the mobile website. The system's functionality on the participant side was intended to be self-explanatory, so the mobile home page outlines and calls to both features immediately.

Concept

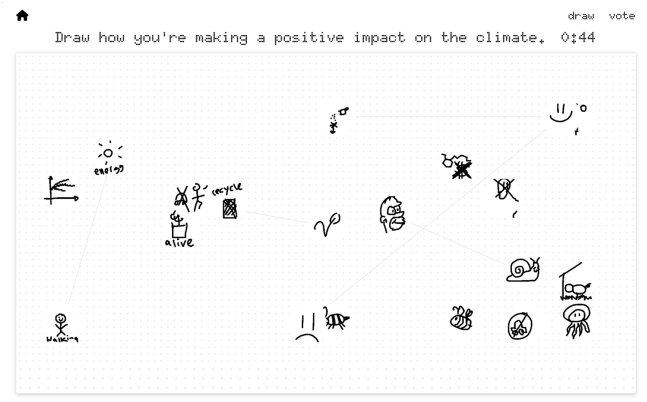
When using digital tools in citizen participation, it is important to be mindful of "digital divides" and additional platform-dependent resources [17]. Thus, any tool created with the intention to be used in deliberative processes should be simple enough to run on a broad range of technologies and be accessible to non-expert users. Citizens' Artsembly was thus designed to be as simple as possible such that any participant can access the system, load it on their phone, or a provided device, and contribute to the art piece's creation.



The prescribed list of prompts used during exhibition mode, in sequential order of appearance.

Globally, the majority of Citizens' Assemblies held are related to *environmental issues and policies*, with *strategic and urban planning* as close second and thirds [8]. Thus, to demo the exhibition mode, the prompts were created to reflect this, focusing on climate change, climate resilience, climate impact, government interventions, and climate technology.

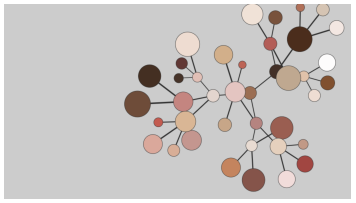
Overall, the design of the app was kept simple and monochromatic for all user-facing elements. The drawings were kept black and white to encourage quick, ambiguous doodles rather than well-planned artworks. The canvas background was inspired by whiteboarding software such as Miro [4] and FigJam [3] The font, Doto [19], is an monospace, bitmap-inspired font under the Open Font License. This was chosen intentionally both to match with the overall aesthetic of the app and to express Citizens' Artsembly as innovative and futuristic.



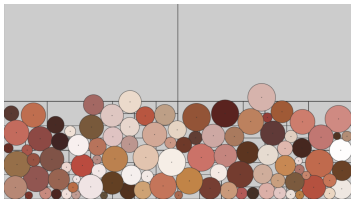
An example screenshot of the display mode outlining all of the aesthetic elements contained in the app: the black and white drawings, the whiteboarding-style canvas background, and the chosen font.

Implementation

Citizen's Artsembly was built using p5.js [6], ml5.js [5], c2.js [1], Express [2], and Socket.IO [7]. Each feature (display, drawing, voting) is a separate webpage running a p5.js canvas and communicating with one another via an Express server through Sockets. The base p5.js libraries were stored locally; ml5.js, c2.js, and all fonts and icons were loaded via a content delivery network; and all other packages were loaded through node package manager.

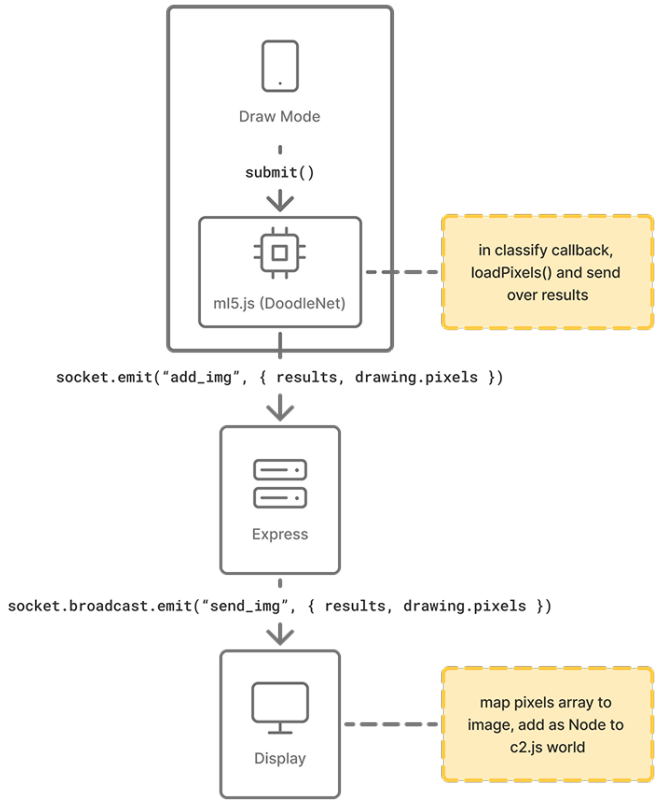


The c2.js [1] *Spring* example used as boilerplate for displaying the drawings.



The c2.js [1] *ConstForce* example showing the library's collision interaction functioning. Code from this example was attempted to be used with *Spring*'s graph for the final display in Citizens' Artsembly, but it never worked.

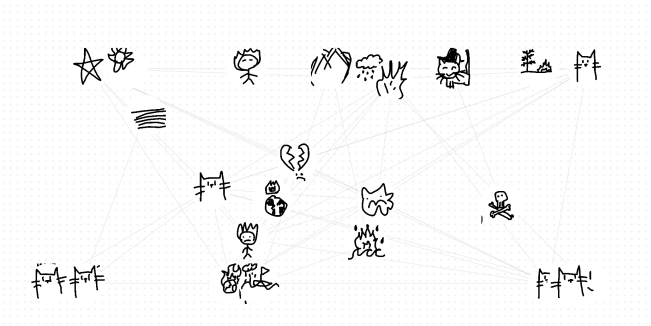
Upon submission, the drawing page classifies the drawing with an ml5.js ImageClassifier running DoodleNet [22], a Convolutional Neural Network trained off of Google's Quick, Draw dataset.



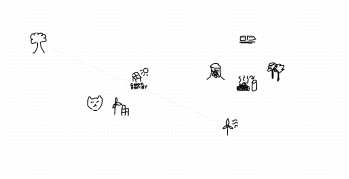
A diagram outlining the communication between devices when a user submits a drawing to the display. The ml5.js classifier is called directly on the drawing sketch, meaning the drawing is classified on the participant's phone prior to emitting.

Communication between the systems was the most satisfying part of development. The use of Socket.IO made this communication simple, as the server was able to handle any form of JSON-formatted data, including the ml5.js results and a p5.js pixels array of the image. Working directly with the pixels array rather than converting the canvas to an image enabled seamless reconstruction of the image on the display side.

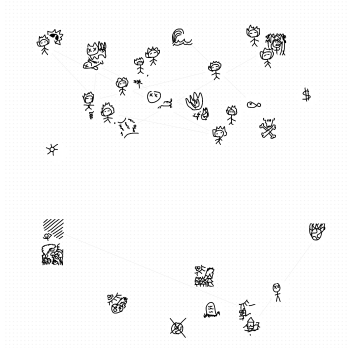
However, displaying the drawings on the canvas proved tough. With the goal of ambiguity of information [13] in mind, the drawings were to float along the canvas, vaguely connected in a graph by shared classifications with no additional explanation to the users. To construct a graph visually, the c2.js *Spring* example was used as boilerplate, however, collision between images was not able to be fully accounted for. When added to the c2.js World, the images would begin to glitch and clip out of bounds, so it was left out for consistency.



The resulting canvas for the prompt "What does climate change look like to you?", displaying a highly connected graph and multiple drawings obscuring one another. The graph functionality was handed by a c2.js World, where each Node is an superclass of c2.Particle, adding a drawing, confidence, classes, id, and votes.



The resulting canvas for the prompt "What does a climate-resilient city look like to you?"



Additional resulting canvases for the prompt "What does climate change look like to you?"

Discussion and Future Work

Citizens' Artsembly is an example of an digital tool used to support arts-based interventions in deliberative processes. Resulting from the tool's development, we can discuss some design implications directed towards HCI researchers in digital civics.

The resulting canvas for the prompt "Draw the thing you think is most impacted by climate change". Of note is one of the drawings is the word "me", an unambiguous answer to the question.

In the creation of technologies for assembly-style or group deliberation, researchers should consider the explicit inclusion of ambiguity of information [13]. *Mégaphone* [12] expressed this ambiguity by not explicitly displaying full sentences, however other interfaces tend to be explicit in both prompting and responses [14, 20, 21], even if artistic. By not including space for text-based responses and not explaining the source of connections between drawings, Citizens' Artsembly enhances this ambiguity of information and theoretically leads to more sense-making among participants. However, as the system involves no moderation, some users at the exhibition were still able to draw words onto the canvas, reducing the level of ambiguity intended; thus future explorations could involve a degree of moderation similar to Schroeter's [21] *Discussions in Space*.

Furthermore, researchers within digital civics could look towards arts-based inquiry [11] as guiding additional work in civic engagement. By using visual inputs rather than textual, Citizens' Artsembly is able to allow for a broader perspective; whereas some people are not able to describe their ideas using words at length, constraining everyone to submitting a simple doodle can level the playing field with respect to participation. Further research should explore the use of other visual methods in digital engagement, such as digitizing the Photovoice [15] experience.

In terms of next steps for Citizens' Artsembly, a formal evaluative study should take place. Collaborating with local governments (as in [21]), community organizations (as in [15]), or activists (as in [13]), the platform can be used during a deliberative process and paired with focus group interviews from the participants to give rich qualitative data of the experience. To formally evaluate the tool's effectiveness, there exist a set of evaluative guidelines for these processes by the OECD [18], including evaluative questionnaires and surveys. The results of this formal study will inform future work in visual arts-based deliberation and work towards making democracy more approachable through technology.

Links

The accompanying video can be found at: https://drive.google.com/file/d/1yPUMSrewGxX-XUt-cMNvomba3tYGz42b/view?usp=sharing.

The code for the project can be found at: https://git.uwaterloo.ca/amaochei/citizens_artsembly.

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