

# **ARticulate:**

## A tool for sharing museumgoer commentary

Audrey Cui - UI/UX lead

Georgia Van de Zande - Background and research lead

Trevor Morrissey - Technical lead

### Concept Overview

As museums target new, diversified audiences, there is a need to show increased viewpoints in their exhibits (Hollander 2019). Curators can only show limited viewpoints, which can lead to bias unintentionally. Visitors themselves have contemporary, diverse viewpoints, but do not always participate in the public discourse of artwork. Further, museum staff do not have a way to access the private commentary that visitors engage in with their friends and family. Yet, museum staff see the value in hearing this commentary to assess how well exhibits meet their goals.

ARticulate is a mobile tool and accompanying website that allows museumgoers to share their thoughts publicly with other visitors. In the mobile app, visitors can provide a response to artwork in the form of an augmented-reality (AR) sketch and a text-based comment. In the app, users also have the chance to view others' responses and react to them with a predetermined set of emojis. The app is accompanied by a website that shows all sketches, comments, and responses. While this website does not provide a way for visitors to interact, it does allow them to enhance a pre- or post-museum experience by viewing others' responses.

## Background Research

ARticulate involves visitor participation by sketching in AR. The team looked for existing projects that incorporated these two aspects. First, *Just a Line*, was our main inspiration for AR sketching. Second, *Mutual Muses*, informs on the digital visitor participation. Additionally, the team wanted to engage local museums to improve ARticulate's ability to fill a real need. We worked with the MFA Boston and tailored the tool to their needs. Because a different type of museum would have different needs, we have attempted to keep ARticulate flexible in some aspects.

### Existing projects

*Just a Line* (Figure 1) is a mobile app that allows users to draw in three-dimensional, AR space (Just a Line 2021). Our team used *Just a Line* for inspiration on the user interface features of drawing and viewing sketches in AR.

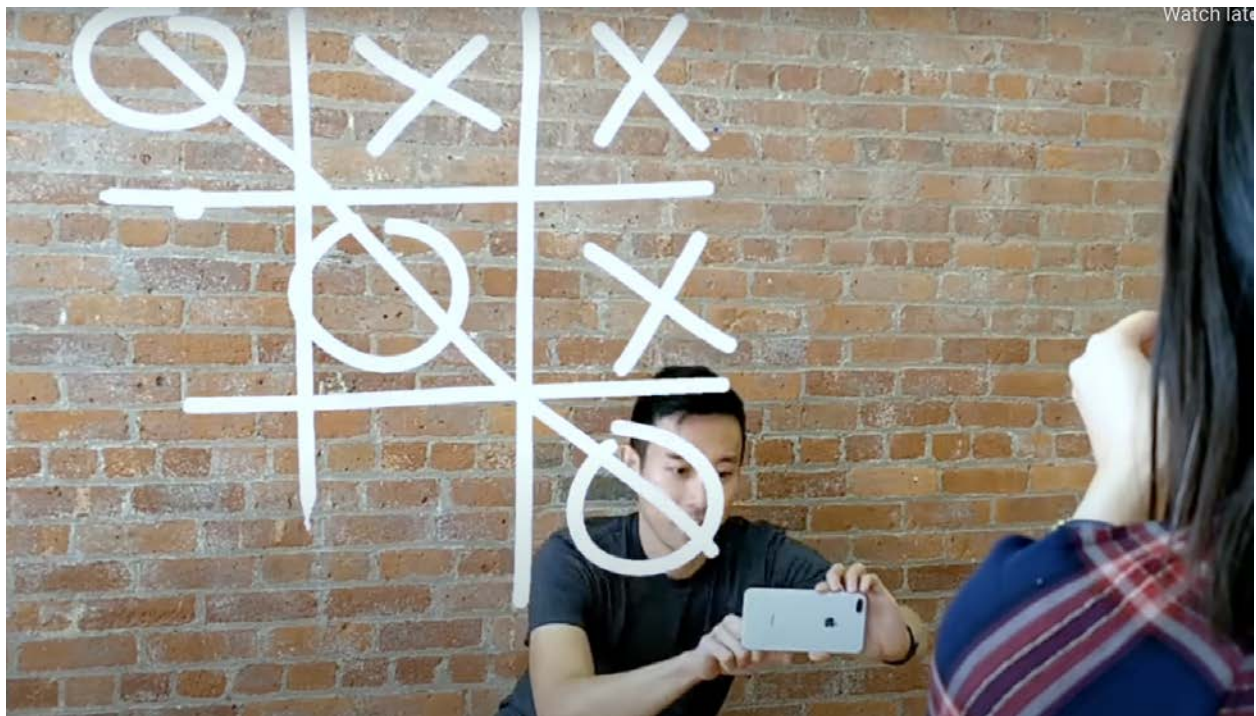


Figure 1: Two users of *Just a Line* are able to play Tic Tac Toe with one another. The white sketches are visualized for us, and are viewable in AR from the users' phones.

*Mutual Muses* (Figure 2) is a project that engages the public by asking them to transcribe letters between two artists for archival purposes (Getty Research Institute 2021). The goals of this project are to:

1. “Enrich the research value of an established digital collection from the Getty Research Institute by aiding access and discovery, and creating a resource that facilitates use and interpretation through digital methods.
2. “Provide users with new opportunities for meaningful engagement with digitized special collections materials.”

While ARticulate does not have a research-focused goal, it does resonate with *Mutual Muses*' second goal to provide a new way to engage with museum pieces. The participants in *Mutual Muses* do not have creative expression in this project, so ARticulate aims to integrate that as well.

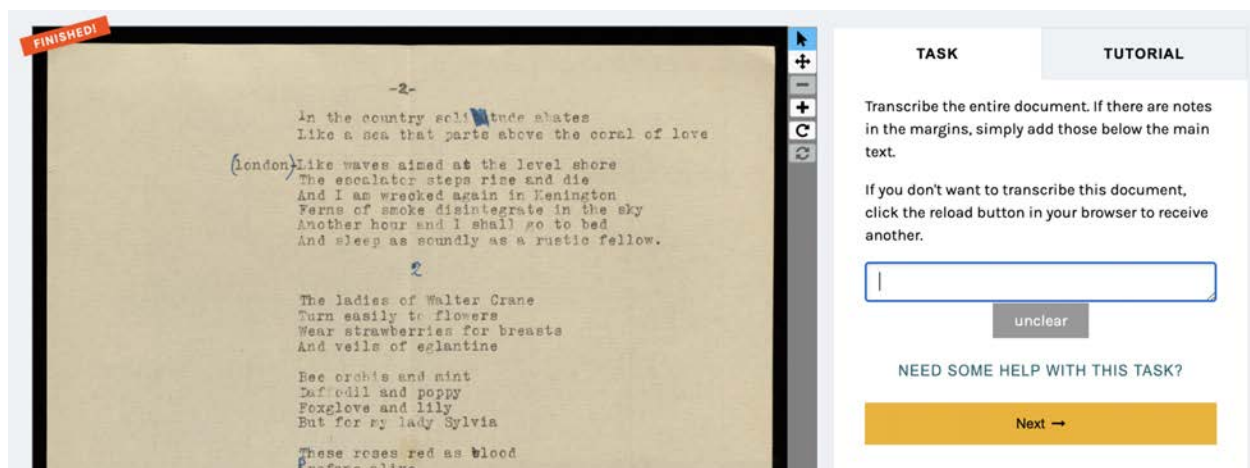


Figure 2: In *Mutual Muses*, participants are asked to transcribe historical letters between two artists. Their crowdsourced work is beneficial to art historians and allows users to engage with the personal correspondence of these two figures.

### Interviews with Museum of Fine Arts (MFA) Boston staff

Our team conducted six in-depth interviews with staff members at the MFA. All interviewees mentioned that the museum is seeking ways to highlight more diverse viewpoints in their museum experiences. This encourages us to see how ARticulate could be a useful tool to a museum like the MFA.

Early on in the concept development process, we interviewed Christopher Atkins and Kristen Gresh. Atkins, the Van Otterloo-Weatherbie Director of the Center for Netherlandish Art, and Gresh, the Estrellita and Yousuf Karsh Curator of Photographs, highlighted how the data that ARticulate generates could provide valuable data to the museum. It is often difficult to collect

data from visitors on how well an exhibit or piece accomplishes its goal. Sometimes, curators will walk around a museum to hear what visitors are saying to one another, and sometimes surveys can capture aspects of visitor feedback. However, these methods do not provide the amount of qualitative data that a tool like ARtificate could. With ARtificate, we hope to provide museums with short text blurbs from each visitor that they can save and process. The blurbs might contain the same information that a visitor would say to friends and family but are saved in a single database. This eases the data collection burden on museum staff while providing richer data than a quantitative survey would. Even a qualitative survey removes the visitor from a piece or exhibit by one step. ARtificate will keep the visitor focused on the artwork while collecting these data.

In the concept refinement phase and when we were defining the user-generated content moderation process, we interviewed Olga Khvan. Khvan, a Content Manager for the MFA's social media platforms, informed how her team currently moderates and responds to comments from the public. They interface with the MFA's social media platforms through Sprinklr (Sprinklr 2021), which allows them to sort and filter "positive" and "negative" comments. The MFA's content team responds to certain pieces of negative feedback (e.g., if a visitor claims they have made a mistake or misrepresented a piece), but they do not respond to all comments as it would put too large a strain on their team.

In the late stages, we interviewed Kristen Valenti, Sophia Walter, and Emily Scheinberg. Valenti, an Audience Experience Evaluation Associate, provided insight on how to increase ARtificate's accessibility to a wider range of museumgoers. Currently, the MFA has a goal of increasing the number of underrepresented minorities they highlight to visitors. They also have a goal of increasing the number of underrepresented minority visitors. Valenti also gave her perspective on the comment card walls that the MFA has previously run. For these activities, a curator posed a question, and visitors were provided index cards and pens with which to respond. The cards could be posted on the wall for other visitors to view. Moderation proved to be a large undertaking on these projects. On busy days, Valenti would visit the wall twice a day to remove hurtful or disrespectful words or drawings. These examples informed the ARtificate team on how to approach content moderation.

Scheinberg, the Head of School Programs and Teacher Resources, and Walter, Learning and Community Programs Project Manager, informed how teachers and students might use

ARticulate. Due to permissions and privacy rules, the mobile app would not be able to be promoted to students in its current form. However, ARticulate's web app could add value to teachers preparing lessons and students working on projects. Scheinberg and Walter also echoed the content moderation and accessibility feedback that Valenti introduced. Valenti, Scheinberg, and Walter all gave valuable feedback on how to make ARticulate a more welcoming experience for the visitors to whom we hope ARticulate will give a voice.

## Enabling Technologies

This section gives an overview of the technologies used to create a prototype of ARticulate. This prototype was shown to MFA staff to gain feedback throughout the development process.

### **Tools Used in Current Prototype**

The primary tool we used to build our prototype was Unity. Unity was originally developed as a tool for the videogame industry but has become a popular choice for software development in general. It's especially popular for the development of augmented or virtual reality and mobile applications. Since ARticulate is both of these, Unity seemed like the clear choice.

We looked at a couple frameworks that would help us quickly get generic augmented reality features up and running. The main two were Vuforia and Unity's native tool, AR Foundation. Vuforia turned out to be better documented and also had far better image tracking. The only drawback was that Vuforia has a license fee while AR Foundation is free. However the license fee only applies when a project is released, not during development. Furthermore, the part of the codebase that interacts with Vuforia could easily be swapped out to work with a different tool later in development if desired with minimal impact to the rest of the project.

Finally, we used an asset called Free Draw as the basis for the sketching feature. We ended up rewriting a lot of the code from Free Draw to fit our specific use. While the asset is free to license, it would still make sense to fully replace it at some point later in development to prevent risking code rot for an asset that's playing a fairly small role in the project.

### **Next Steps in Technical Implementation**

If development continues, the next step on the technical side will be database integration. Currently the example annotations, painting information, and other data are hardcoded into the

project. The codebase is set up so that the links between the classes holding this placeholder data and the rest of the code should mimic the links that would be used with actual databases. As a result, it should be fairly easy to make this switch. Integrating real databases is likely the last step that would be needed before a pilot program for the app could be run with a museum partner.

After that, the next two steps would be to develop a functional web app based on the prototypes and to add some form of user authentication. This could use accounts linked to a museum or could use Google's or Facebook's authentication services. With these two steps complete, the app would be ready for a wider deployment.

## Mobile App Journey Map

The following section will go over the features and intended user experience of the ARtificate mobile app, as well as the rationale behind some of our design decisions. The mobile app is meant to be used during the museum experience, as some of the features are only available when the user is standing in front of a specific artwork. Our working prototype of the mobile app is not yet published, but a Figma prototype that simulates the app experience can be accessed at this link: <https://tinyurl.com/articulatemobile>.

## **Begin Page and Data Policy**



Upon opening ARtificate, the user is greeted by the screen on the left with a brief introduction to what ARtificate is. If they are concerned about data use and privacy, the user can open and close a data policy, which is to be provided by the museum. Pressing “Begin!” leads to the Artwork Identification screen as follows.

### Artwork Identification





Before an artwork has been identified as part of the ARtificate artwork database, a full screen camera view is displayed. We envision ARtificate-enabled museums to have some physical indication (such as a marker or icon) for whether a certain exhibit is in the ARtificate exhibition database. Once the user points the camera at an identifiable artwork, a 2D view of the artwork is shown (left). From this screen, the user can decide to view other people's responses, which will be discussed later in the user journey, or to respond to the artwork themselves.

## Respond



Submitting a response requires the user to login in order to limit each user to one response (and one reaction, to be discussed later) per artwork. After the first login, the user is prompted to create a “profile,” consisting of a displayed name and an optional background/identity answer box. The MFA said that they are interested in demographics such as race/ethnicity and sexual orientation, as one of their goals is to reach more people from underrepresented communities. As museumgoers, we feel like it may be too intrusive or uncomfortable to be asked for these demographics directly, so we purposefully kept the background/identity question open ended and optional.

We define the AR drawing aspect as a “sketch,” and the written aspect as a “comment.” The combination of a sketch and comment constitutes a “response.” The user creates the sketch on a static 2D version of the artwork to avoid possible distortion from moving around. The user doesn't have to stand in front of the artwork to create their sketch either; they can sit on a nearby bench if they wish. After the user completes their response, they are prompted to tag their response under several predetermined categories. This enables both the user to later filter



for responses they're interested in, and the museum to assess what kinds of responses their exhibitions are eliciting and more broadly the success of their exhibitions. While sentiment analysis prediction AI is a possibility for automatically tagging these responses, they may not capture the full nuance of the response as well as the user themselves. Submitting the tag concludes the Respond experience and returns back to the default 2D view of the artwork, where users can choose to view others' responses.

A component that we've discussed but haven't yet implemented is moderation. In order to keep ARtificate and the broader museum community a welcoming place for all, responses should be moderated. We envision that after a response is submitted, it first goes to a moderator 'purgatory,' where museum staff members choose to either reject or accept the response to be displayed by other users. We think that letting the user know that responses are moderated will dissuade users from purposefully submitting profane or discriminatory responses.

### View and React to Others' Responses



Unlike submitting one's own response, viewing others' responses does not require logging in. While sketching occurs on a 2D view of the artwork, others' sketches appear as augmented reality overlays over the artwork in 3D space. Users can react to responses using one of the five given emojis as shown in the second screen. The top two reactions are displayed on the bottom of the comment; the exact number of reactions for all reactions can be viewed by clicking the comment. We chose to limit these reactions to emojis (as opposed to verbal commentary) to

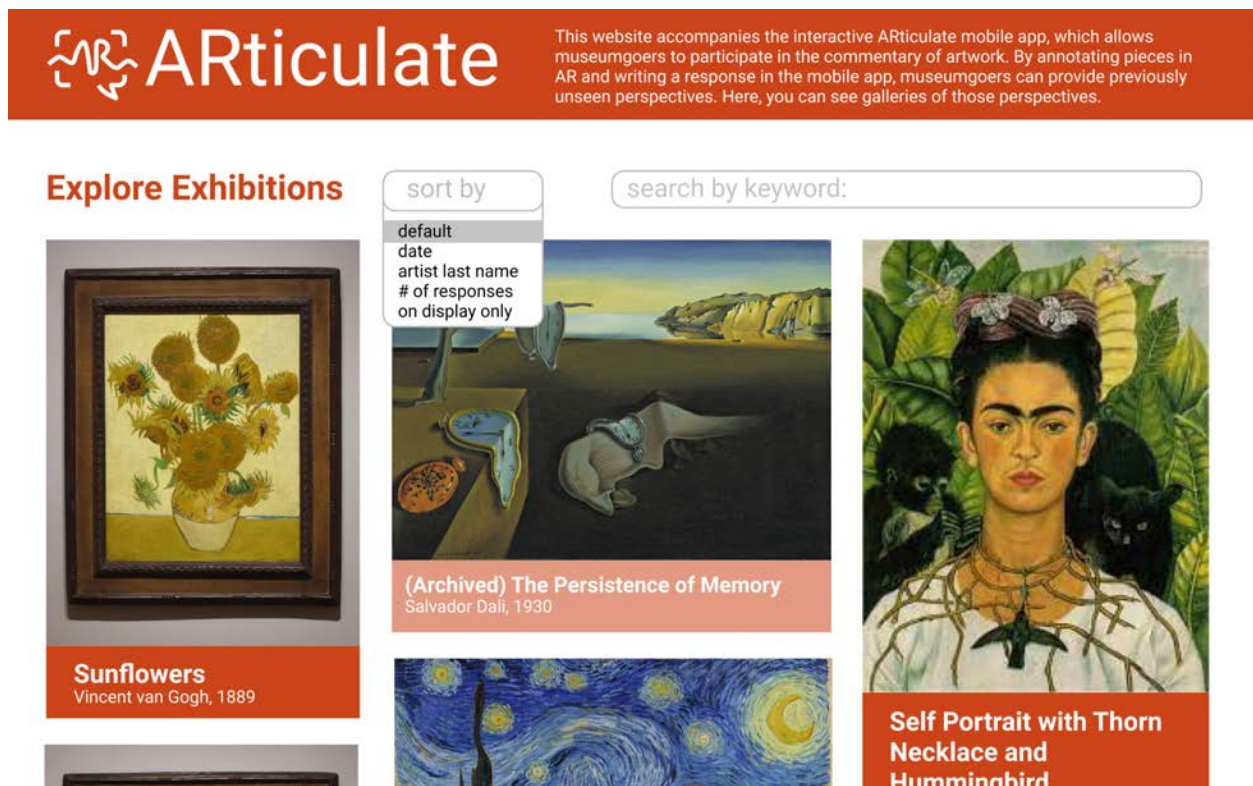
limit the amount of moderation needed. Responses can be filtered by the tags chosen by the original responder.

## Web App Journey Map

While the mobile app requires the user to physically be at the museum to interact with its content, the accompanying web app serves to supplement the pre or post museum experience. The web app is designed to be mostly static, but can be accessed at any time or location. For example, if a museumgoer found a specific artwork particularly fascinating and wanted to revisit its responses after returning home, the web app would allow them to do that. The following section will go over the features of the web app. We haven't coded the web app yet, but the Figma prototype that simulates the user experience can be accessed here:

<https://tinyurl.com/articulateweb>.


## Explore Page



The web app experience begins with this explore page, which displays all the pieces in the ARTiculate artwork database in a scrollable gallery. The 'default' view is customizable by museum staff, as museums may be interested in highlighting the works of underrepresented

artists or curating this gallery with other intentions. The user may also choose to sort by other attributes or search by specific keywords. Clicking on an artwork leads the following galleries:

### Sketch Gallery



# ARTiculate

Show commentary tagged with any of the following:

- personal story
- connection
- musings
- question
- positive feedback
- quote
- negative feedback
- humor
- poetry
- supporting information
- other


View options:

- Sketch Gallery
- Comment Gallery
- All Responses


< Explore Exhibitions






Vinny G. • 4/13/21



Zuko Z. • 4/13/21



Asami S. • 4/13/21



## Comment Gallery

# ARTiculate

Show commentary tagged with any of the following:

personal story connection **musings**  
question positive feedback quote  
negative feedback humor **poetry**  
supporting information other

View options:

Sketch Gallery

Comment Gallery

All Responses

< Explore Exhibitions



this is so overrated, it's literally just a vase of flowers. idk why this is so famous. like it's not much more than a pretty picture.  
Karen D. • 1/04/21

bowing face down, golden radiance  
dripping down your petals  
Vinny G. • 3/24/21

wow I love the use of the color yellow here. yellow is usually such a bright and happy color; yet why do I feel sad looking at this painting? well not exactly sad, but a strange sense of longing and emptiness, the kind where you pass by a random stranger on the street and realize that they have an entire life story that you will likely never get to know.  
Bee C. • 4/13/21

this is so overrated, it's literally just a vase of flowers. idk why this is so famous. like it's not much more than a pretty picture.



## All Responses Gallery



Show commentary tagged with any of the following:

personal story connection **musings**  
question positive feedback quote  
negative feedback humor **poetry**  
supporting information other

View options:

Sketch Gallery

Comment Gallery

All Responses

< Explore Exhibitions



wow I love the use of the color yellow here. yellow is usually such a bright and happy color; yet why do I feel sad looking at this painting? well not exactly sad, but a strange sense of longing and emptiness, the kind where you pass by a random stranger on the street and realize that they have an entire life story that you will likely never get to know.  
Bee C. • 4/13/21



bowing face down, golden radiance dripping down your petals  
Vinny G. • 3/24/21



The Sketch gallery features just the sketch of each response, the Comment gallery features just the comment, and the All Responses gallery features both sketches and comments in random order. Adjacent sketches and comments are not necessarily corresponding to one another, as we think this additional degree of randomness makes scrolling through this gallery more interesting. In each gallery format, responses can be filtered via tags or viewed in more detail by clicking on the response component.

## Detailed View



The detailed view of a response features the sketch, comment, reaction, and tags.

## Future Directions

In order for ARticate to become a platform that is usable by several museums without much or any intervention needed from the ARticate team, there needs to be a museum facing interface. We envision that through this interface will allow for customization. One crucial feature of this museum interface would be a moderation panel, where museum staff would accept/reject recently submitted responses to be displayed to the public. Other features may include selecting artwork to be added or removed from the database of works identifiable by ARticate. Specific questions for responses to certain artwork can be posed, replacing our generic question of “What do you think about this artwork?”. Particularly interesting or thought provoking responses can be ‘pinned’ by museum staff such that it becomes the first response that is shown when the user is scrolling through others’ responses. Tags can be added/removed based on the kinds of responses the museum finds useful to analyze.

A potential direction for ARticate to expand in is for it to become an educational tool. We believe educators may find it as an interesting way to preview museum pieces and their surrounding discourses with students prior to their museum visit. We haven't extensively explored this potential use yet, so the first step would be to talk to primary or secondary educators about what features they would want from a pedagogical perspective.

It would also be interesting to expand ARticate into a cross museum platform. By aggregating responses and artwork from different museums, ARticate could recommend new museums to frequent museumgoers or allow people to virtually 'visit' new museums without having to take long/expensive trips. This may help foster virtual community amongst all museumgoers and museum enthusiasts, regardless of which museums they physically visit.

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