ArtBytes: A Mobile App for Mixing Art Appreciation with Art Creation

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ABSTRACT

ArtBytes is a mobile app designed to accompany art seekers and makers to museums and galleries. The app emphasizes continuity and dialogue across a museum goer's visits to different galleries, museums and exhibitions over time. During the visit to an exhibition, the app allows visitors to archive works of art they appreciate, in addition to specific elements within each work that are meaningful to the viewer. After the visit, the app provides opportunities for creative interaction with the specific visual elements within an art work; this opportunities include composition of new works through collages, as well as curation and presentation of these compositions to other users, in-real-life (i.e. not online) and outside of the gallery or museum space, using augmented reality techniques. The app aims to help art seekers better understand their own taste, increase access to works of art, extend art consumption activities to by engaging art seekers art making activities, and leverage crowds in helping art seekers discover new aesthetic experiences within and outside of the museum context.

ACM Classification Keywords

H.5.1. Information Interfaces and Presentation: Artificial, augmented, and virtual realities; J.5 Arts and Humanities: Fine arts

Author Keywords

Museum, Art Gallery, Public Art, Augmented Reality, Mobile Computing, Ubiquitous Computing

INTRODUCTION

ArtBytes is a mobile app designed to accompany art seekers and art makers to museums and galleries in order to enrich their experiences and to generate opportunities for new experiences with art. The app allows users to capture visual elements of interest from works of art at an exhibition, to mix and layer elements from different works to create new compositions (See Figure 1). The app also allows users to share their new creations with a broader public by curating an augmented reality show in public spaces using image targets associated with specific compositions; other users using the app can then point their mobile phones at said image targets and see the virtually placed compositions in real-time.

ArtBytes has four goals:

1. Help art seekers in developing a better understanding of their aesthetic preferences through creating connections across various museum and gallery experiences
2. Increase access to works of art by bringing them outside of the controlled space of the museum and galleries with private collections, and into public spaces through augmented reality technologies
3. Engage museum and gallery goers into an active experience that combines seeing art and creating art
4. Leverage crowd experience and taste in order to create new opportunities for art discovery for broader audiences

BACKGROUND

With over 850 million visits per year in the United States[1], museums are a significant site for public education and entertainment. Museums have also been a fertile ground for a wide range of research. Many researchers have focused on improving the museum guide and using the museum experience as a laboratory for measurement. For example, [6] instruments visitors to a museum and classifies different crowd behavior. Support for participatory mark up of existing exhibits is studied in [8] where visitors are asked to design a personalized experience of an exhibit piece for another member of the visitor's social group. Related work studies a networked community annotating works of art [4], or collaboration on the audio text provided with art pieces [10]. A related area of active research entails the use of augmented reality to enable science education [15] or art education [1] in a museum setting.

The phenomena of private art collections developed during the Renaissance and continues to dominate the art world today. According to [11], over $11 billion worth of work exist exist within just five of the most valuable private art collections in the world. While there is a long standing of tradition of private art collections that are open to the public (The Frick Collection's in New York and Philadelphia, or The Boros, Haubrok and Hoffman Collection in Berlin to name some prime examples), public display of private collections is the rare exception

[1] http://www.aam-us.org/about-museums/museum-facts

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[12]. With the contemporary art market increasingly serving a purpose beyond the aesthetic experience–i.e. as an investment diversification method [3]–the general public risks loosing access to art works.

A long history of research supports the use of technology for bringing people together (e.g. [2], [7], [5]). More specifically, the crowd and museums have been the subject of a variety of work. To place ArtBytes in context, we consider a taxonomy of related work ranging from interfaces that are participatory or more passive, generative or consumptive, and collaborative or solitary, multi-site or site-specific (see below); each dimension of the taxonomy has related issues. In our approach, we posit that creative and interactive systems designed for broad public use creative systems must generally be usable by the non-expert, that participatory approaches provide advatages, generative interactions create new possibilities for novel interactions and meaningful experiences, and multi-site applications are accessible to a broader group of users. ArtBytes is therefore designed to be participatory, generative, collaborative and multi-site.

Some research work has combined the museum as a place to present augmented reality art and engage the public with the idea of the public as artist [9]. Simon [14] provides a guide book for museum directors to modify the museum into a participatory experience. The work defines a continuum of classifications of different levels of visitor participation, ending with "hosted" classification where the least constraints are placed on the visitor. ArtBytes falls at this end of the continuum, or perhaps beyond since ArtBytes does not require participation by the museum organization. The ARtSENSE project [13] provides several examples of a participatory museum. In particular this paper describes a skywriting augmented reality project where a user "sky writes" and the results are visible in a single location–directly above the museum–through augmented reality.

In comparison to these works, ArtBytes is focused on improving the experience of visitors to augmented reality galleries. ArtBytes marks these galleries in the location chosen by the artist. ArtBytes considers traditional museums as raw material for the creation of visual elements that are then composed into works and placed into a gallery show. In a sense, ArtBytes leverages the intent of museums as a repository and preservation of art works and uses this repository as a basis for the creation of new work. ArtBytes is not limited to museum works, and in fact currently we are using images from many sources. ArtBytes also allows the integration of new art works into the museum environment, simply by using existing museum art work as image tags for augmented reality.

FEATURES AND USER EXPERIENCE

The current prototype ArtBytes implements the following features

- Login and Logout
- Image capture (from camera) and import (from gallery) (See Figure 3)

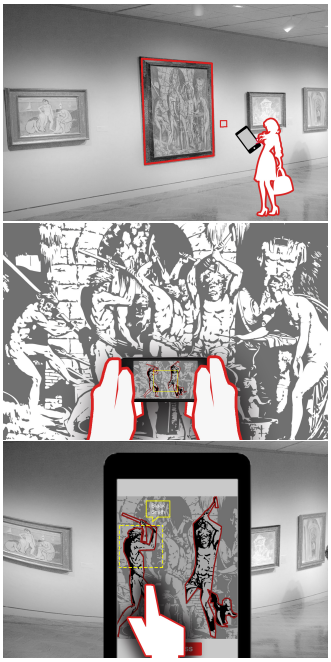

Figure 1. (top) User finds a work of interest at museum; (middle) User captures an image of artwork; (bottom) Using on screen interaction, user crops ArtByte from captured image.

- Course and Fine Cropping to isolate a visual element from an image (i.e. an ArtByte) (See Figure 3)
- Composition of new images by mixing and overlaying saved ArtBytes (See Figure 4)
- Augmented Reality Show (AR-Show) Creation (See Figure 5)

The sections below describe the user interface and interactions for each feature.

Login and Logout

A server based user management system keeps track of all registered users and gives them access to their personalized libraries of ArtBytes, compositions and AR-Shows.

Image Capture and Import

User captures an image of an artwork using the mobile's camera; alternatively, user can import an image from the local gallery of photos stored on the phone (See Figure 2), or acquire an ArtByte created by another user.

Cropping

Once an image is captured or imported, the user is allowed to crop the visual element of interest–an ArtByte–in two stages. First in the "Coarse Crop" stage, followed by a second round if "fine cropping" where the user is assisted by the system to follow along the desired contour, the user is asked to draw a rough outline around the visual element of interest. The interaction is performed with one finger tip to draw a curve, while the system automatically closes the curve to create an outline. Two-finger interactions allow the user to zoom in and out of the image, or recenter the image around the area of

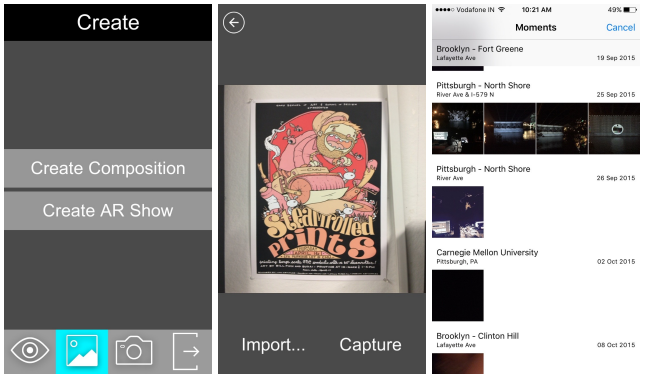

Figure 2. Screen captures of the image capture and importing interface; (left) the ArtBye app's "home" screen is the creation mode. by clicking the "camera" icon to the right of the highlighted button, the user enters the image capture mode; (middle) user can capture an image of art work using the mobile phone's camera; (right) selecting "Import..." allows the users to select an existing image from the mobile's gallery

Figure 3. Screen captures of *Cropping* feature; (left) user performs a *coarse crop* by drawing a shape around the region of interest; (middle) user performs a *fine crop*, assisted by machine vision based analysis of image content;(right) user names and saves the cropped ArtByte

interest. Lifting the finger off the screen and retouching resets the drawn outline (See Figure 3).

Composition

This feature allows the user to add multiple ArtBytes to a Canvas; scale, rotate and reposition each ArtBytes; and select the rendering order of each ArtByte. The final resulting collaged composition is then name and saved to the server (See Figure 4).

Create Augmented Reality Show

This feature allows users to create an AR-Show by associating a composition with an image target captured from the real world (See Figure 5). As this sequence of selecting a composition and associating it with something in the real world repeats, the user creates a AR-show comprised of several compositions associated with several real-world image targets in a particular location. One current design challenge regards how the curator of an AR-Show can make the image targets readily recognizable by another user. Using commonly found objects–e.g. mail boxes, door signs, traffic signs, etc–is one potential strategy but that can not be applied to every context.

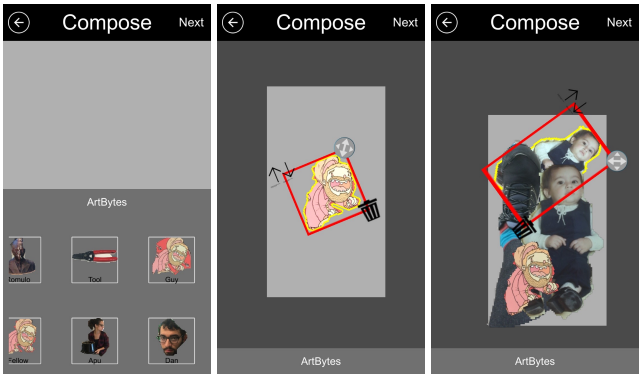

Figure 4. Screen captures of *Composition* feature; (left) user selects from the library of saved ArtBytes; (the rest) user iteratively places, scales, rotates and layers various ArtBytes to create and save a new composition

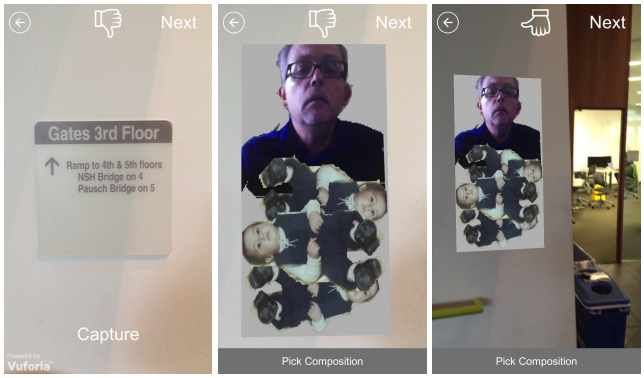

Figure 5. Screen captures of *Create AR Show* feature; (left) user captures an image target, in this case a signage for a classroom at Carnegie Mellon; (middle) user associates a composition with that target; the composition is rendered in real-time atop the image target; (right) persistent augmented reality tracking allows the created and other users to view the composition when the mobile phone's camera sees the image target

CONCLUSION

ArtBytes is a project focused on providing a new platform for both experiencing art and producing new art works. Using augmented reality in a mobile platform, users can create new ArtBytes (clips of images), compose these art bytes into compositions, and insert these compositions into an augmented reality image or collection of images (as a gallery show). Other users discover these augmented reality images also through the app. In addition, the crowd of users automatically share ArtBytes with each other through a shared library that is integrated into the experience. The goal of ArtBytes is to provide a new way to experience art, provide new perspectives on art, provide a forum for the expression of art by non-experts and provide a platform for both crowds of arts and art seekers to communicate through art. ArtBytes is currently partially operational - we are still designing and implementing a discovery mechanism for augmented reality shows. work of our field.

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