

# Participatory Mixed Reality Space: Collective Memories

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## ABSTRACT

This project focuses on creating a participatory mixed reality space, situated in social contexts within urban smart cities. This study explores audiences' social interactions and experiences with tactile engagements from their smart devices and a form of interactive media façade. The association between NodeJS, Websocket.io-to-OSC and TouchDesigner designs integrated with the developed computer projection mapping system supports the participatory mixed reality environment. A framework is also developed from the concepts of the viewer as co-creators, the interactive system as facilitator and motivation as creating a sense of belonging: "being connected" – social presence. The framework is to seek new perspectives from the recent growing trend of participatory culture in public spaces. This project supports the collective interaction to redefine and reshape to whom, with how and what we are sharing together in the co-creation through social interaction and experience. It is vital that people learn how to engage when engaging with each other – together within the participatory mixed reality space.

**Keywords:** Mixed reality space, Public space; Participatory art; Participatory design; Social memory; Collective interaction; Co-creation; Co-creativity; Co-design, Social interaction; Social experience

**Index Terms:** I.4.8 [Image Processing and Computer Vision]: Scene Analysis—Motion; H.5.1 [Information Interfaces and Presentation]: Multimedia Information Systems—Artificial, augmented, and virtual realities

## 1. INTRODUCTION

### 1.1 OBJECTIVE, CHALLENGES AND MOTIVATIONS

The aim of this project is to explore the potentials of participatory mixed reality environment, situated in social contexts in urban smart cities. The recent widespread use of participatory approach influenced on not only public art but also design practice such as a form of interactive media façade as well as mobile interface design into design thinking on collective audience contexts, unlike a traditional approach of interacting an individual experience. Participatory approach also brings creative challenges for artists and designers how to promote motivations for a large-scale audience to participate in social interaction, play and experience that can form a community as "being connected" – social presence.

The first important challenge is to have a holistic view on understanding the relationship between urban public spaces, audiences, and creative projects. Kwon's notion of 'art [creative project] as public space' means a more site-conscious and integrated artwork which responds to its context. Kwon's

definition of 'art [creative project] for public interest' focused on social issues relevant to the audience, rather than a physical environment [1]. Thus, this consciousness of a creative project as a public space and for public interest has the potential to bring new meaning to a socially engaged mixed reality environment.

The second one is how to keep audience simultaneously interested in an individual level as well as engaged with a group of others. Morley analyzed contemporary participatory artworks and mentioned the key pattern is the advancement of technology and digital media as to why participatory art practice has progressed [2]. It is interesting to study how can innovative technologies transform traditional passive viewers into active collective participants. McLuhan regards new media as new forms of communication, and argues that the "new forms of communication are only partially determined by their technology and are shaped from social and cultural conditions." [3] Therefore, the combination of new media and communication technologies can be considered as mixing participatory cultures to support collective interaction that is constantly and extensively evolving one by active users participation to express social interactions and experiences.

The last one is how to translate the concept of social object into urban public spaces and how to promote audience interact with one another. Engeström coined the term "Social Objects" is defined as "the objects that mediate the ties between people" in the context of social networks. He argued its fundamental basis to spark social interactions and build connections between users [4], leading to the success of the social network space. However, the concept of social object can be applied public spaces as the social context of what makes an object to be social by the public participation so that can form a social space.

### 2. Field Study

In contemporary era, public spaces are used in a range of different purposes with new technologies, challenged by artists and designers to create unique public interactions and experiences such as entertainment with others, digitally enhanced physical objects through media facades [5], interaction via public display screens [6], and mobile networks and the Internet of Things [7]. However, analysis of collective interaction through co-creation in the art and design for social spaces has not been effectively defined the chaining role of participation and what that means for the social interactive experiences that are made possible by modern interactive technologies, especially within digitally networked public urban environments.

For one similar instance, the interactive artwork, "Drag A Star" used mobile interface for allowing audiences to send wish messages and to catch a shooting star, by dragging the star, integrated with the large display [7]. In order to promote user participation, the artwork focused on creating scientific and artistic design contents. However, our project focuses on creating user-generated contents and the co-creation contents sparks social connection through users mobile phones and interactive media façade system.

### 3. DIGITAL PARTICIPATORY CO-MEMORIES

#### 3.1 Artwork Concept

“[A] part or an aspect of group memory, since each impression and each fact, even if its apparently concerns a particular person exclusively, leaves a lasting memory only to the extent that one has thought it over – to the extent that it is connected with the thoughts that come from us from the social milieu.”

- Maurice Halbwachs (1925).

“[S]ocial or collective memories are no fixed entities: their content will change over time, because they are contingent on societal norms and power.” - Eric Ketelaar (2005).

These statements suggest the investigation of how participatory culture can convey social memory of individuals or/and groups’ that creates emotional climate by social sharing in public spaces. This participatory experience is an evolving one, such as the imaginations and memories inside a human brain, which is constantly affecting and transforming over time and space.

#### 3.2 How this works?

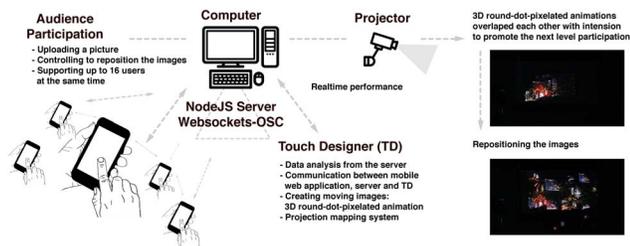


Figure 1. Workflow of Interactive Projection System.



Figure 2. Still Cut of Active Participants Controlling Pictures.

Audiences are invited to participate in uploading their pictures to the interactive projection system from their smart phones (Figure 1). The system displays round-dot-pixelated patterns of the pictures to overlap intentionally with each other (Figure 2). This system provides participants uploading pictures function as well as the interface making connection between user-generated contents and audiences in control the positions of the mediated pictures with social play together at the same time.

The users interaction model is designated from the inspiration of sharing contents via social media such as uploading images in blog posts, Facebook and Flickr. To support the collective interactions and experiences, NodeJs server with Websocket.io-to-OSC is essential for real-time communication technologies among

users from mobile phones. In order to design the interactive system between users smart phones as *inputs* and the media façade as *outputs*. TouchDesigner (TD) provides not only a high quality of performance but also as a tool for the analysis of data users inputs and outputs. This workflow is useful in social contexts in public spaces because it supports the transportable and scalable system to deal with multi-audiences in real time, giving unique interactions and experiences through social play and entertainment (Figure 1). The system is very effective for quick prototyping to utilize a range of multimedia assets such as sounds, 2D or 3D graphics, animations and videos.

#### 3.3 Evaluation and Future Work

It is observed that the users participation contributed the shift, between the three levels of participation (Table 1.), can be promoted by their individual feelings or/and through their collective experiences as social play which enriches “being connected”. Future research will investigate to identify the design factors to improve social interactions and experiences as well as to deploy the project in urban public environments.

Table 1. Three Levels of Audience Engagement.

First level	Mid-level Engagement	Fully Engagement
Spectators	Start-content-generators	Active-control participants
Just watch and see what others doing, but there is possibility for moving forward to the next level or conceptually engaged with individual level	An audience get started to participate by uploading a picture. Then following others.	Continual try to control all possibility of position to create new visual expression. After that passing the experience to others with verbal communication

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