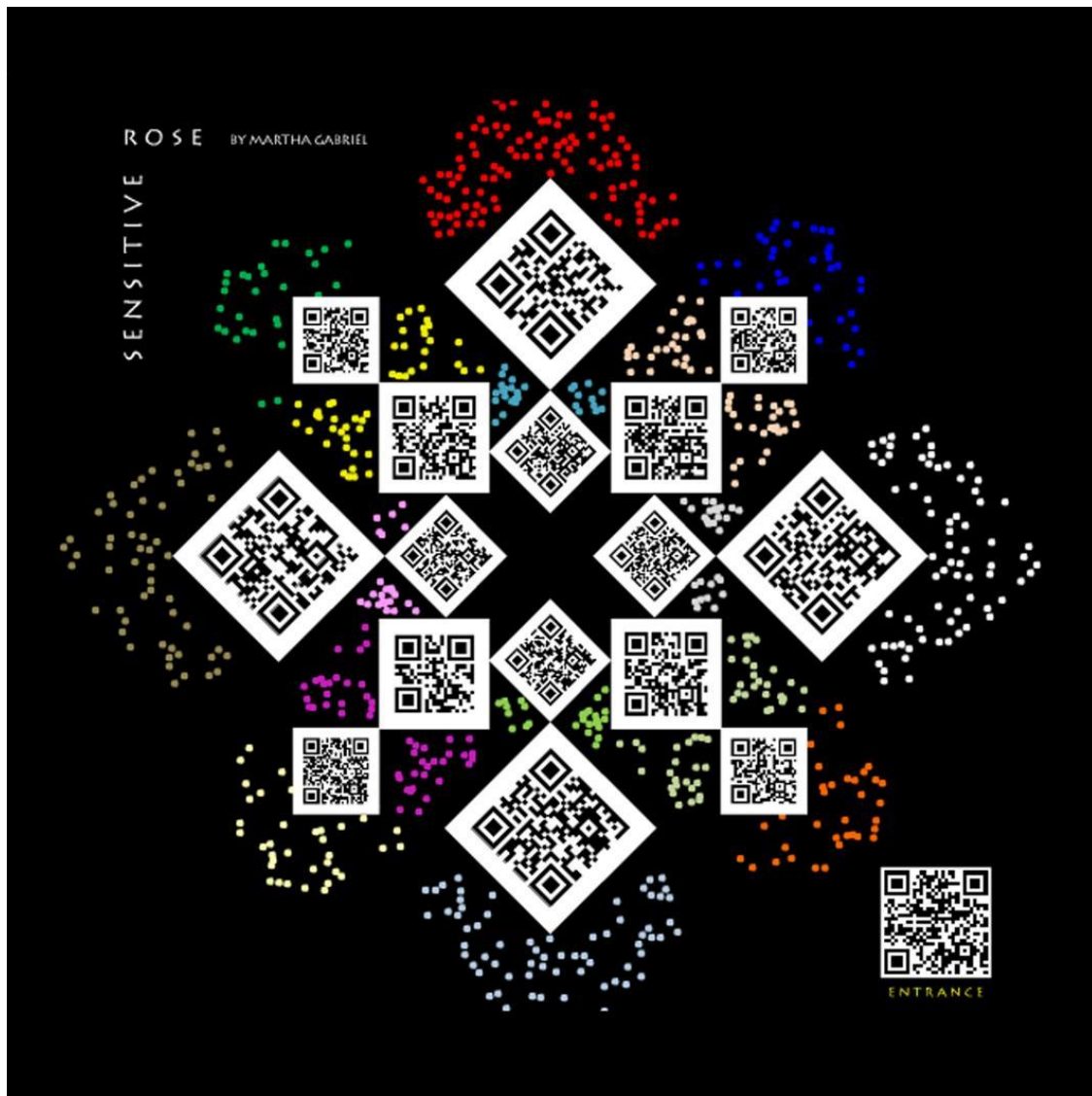


MOBILE TAGGING AS TOOLS FOR AUGMENTED REALITY

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The objective of this paper is to describe the potentialities of Mobile Tagging (2D barcodes like QRcodes) as a tool for increasing and spreading the effects of Mixed Realities in Art. In this sense, we will start introducing the main concepts and some examples of Mixed Realities followed by the concepts and examples of Mobile Tagging, showing that they are connected and benefit each other.



SENSITIVE ROSE artwork screen shot (Copyright - Martha Gabriel)

INTRODUCTION

The objective of this paper is to describe the potentialities of Mobile Tagging as a tool for increasing and spreading the effects of Mixed Realities, including in the field of Arts. In this sense, we will start introducing the main concepts and some examples of Mixed Realities followed by the concepts and examples of Mobile Tagging, showing that they are connected and benefit each other.

Mixed Reality (or MR) refers to the fusion of the physical and virtual worlds to produce new environments and visualizations where physical and digital objects co-exist and interact in real time. On the other hand, mobile tagging is the process of reading a 2D barcode using a mobile device camera. Allowing the encryption of URLs in the barcodes, the mobile tagging can add a digital and/or online layer to any physical object, providing so several levels of mixed realities related to that object.

The uses of these levels of mixed realities have applications in several areas going from medicine and engineering to arts. This paper/presentation will use some artworks as examples to illustrate the functionality of the mobile tagging for creating mixed reality.

MIXED REALITY

According to the Virtuality Continuum concept (MILGRAM, 1994), the mixed reality is anywhere between the Virtual Environment and the Real Environment, comprising stages of reality, augmented reality, augmented virtuality and virtuality.

Examples of Virtual Reality are the immersive caves, where the interactor dives into the virtual environment. Some examples of mixed realities applications are:

- MINI Cabrio – car advertisement (Youtube, 2009-2).
- SPOILER - game (Youtube, 2009-1).
- BMW - engine maintenance (Youtube, 2009).
- Arcane Technologies - educational and military applications (Arcane, 2009).

Several kinds of devices and technologies can be used as tools for mixed realities, such as glasses, gloves, monitors, computers, cameras and mobile devices (PDAa and cell phones). Due the pervasive nature of the mobile devices, their potentiality for increasing the dissemination of mixed realities is enormous and can be leveraged by mobile tagging as described next.

MOBILE TAGGING

Mobile tags are 2D-barcodes that can be scanned by mobile devices in order to decode the information kept in the barcode.

There are many types of 2D-barcode (tag) and it is possible to encrypt many kinds of data into them. However, regarding mobile tagging, the most common encrypted information is URLs. The process of mobile tagging consists of scanning the tag with a mobile device camera using a mobile tag reader, which decodes the tag, opening the decrypted information on the device screen.

The most used patterns of 2D-barcodes for Mobile Tagging are QR Code (Quick Response Code) and Datamatrix. While conventional bar codes are capable of storing a maximum of approximately 20 digits, a QR Code, for example, is capable of handling up to thousand characters and all types of data, such as numeric and alphabetic characters, Kanji, Kana, Hiragana, symbols, binary, and control codes (Denso-Wave, 2009).

According to (Denso-Wave, 2009), the capacity of storage of a QR code is:

QR Code Maximum Data capacity

Numeric only - 7,089 characters

Alphanumeric - 4,296 characters

Binary (8 bits) - 2,953 bytes

Kanji, full-width Kana - 1,817 characters

Nowadays, although mobile tags are still a novelty for most of the countries, they are starting to spread as the 3G mobile technology get available around the world. The QR codes use is very common already in Japan and Datamatrix is more used in Europe, especially in UK. Most of the new models of mobile devices come already with the mobile tags (QR code and Datamatrix) reader. Older versions of devices can install a QR code reader, such as i-nigma (www.i-nigma.com), becoming so able to scan them.

A very interesting use of mobile tagging as mixed reality is the Semapedia.org (www.semapedia.org) that stimulates the use of in physical places that are present in the Wikipedia, mapping them. In this sense, each place is provided with a new layer of dynamic information coming from the digital online world, increasing so their use.

MOBILE TAGGING IN ART

There are several interesting examples of exploring mobile tags in Art. We will present three artworks using QR codes that range from traditional arts to electronic interactive arts. The first example is the work STILL by Frabrice de Nola (2011) that uses 2D and liner barcodes to build the image and links.

We can mention as one of the first interactive digital artwork the SENSITIVE ROSE (Gabriel, 2008) artwork, which builds an interactive compass rose formed by QRcodes that navigates into people's desires (figure 1). The work is a big projection (3 meters x 3 meters) and all the interactions happen through this projection by scanning the dynamic QRcodes for participating. The work was launched in November of 2008 and has received already more than 800 interactions (May.2009).

Figure 1 – Screenshot of the artwork Sensitive Rose (GABRIEL, 2008)

Another interesting artwork that uses QRcodes is the "Suite 4 Mobile Tags" (Beiguelman, 2009) which proposes an exercise of random and anonymous collective musical composition. By pointing a phone w/ QR-reader to a display, participants play a ringtone. The result is a sudden and temporary suite that plays with hi and low tech, the portability, the confusion between public and private, music and noise.

CONCLUSION

Since the mobile tags are simple tags that can be placed in virtually any physical object or person, added to the fact that the cell phones with camera have become a very inexpensive and pervasive device, the mobile tagging process can be said as one of the easiest and simplest way of creating mixed realities.

The use of mobile tagging can range from expanding the information on packages, bus stop routes, museum objects, to art.

Mobile Tags work like physical links to the web, allowing so that virtually anything can be part of an expanded mixed reality environment.

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