CityTracing

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Abstract
This poster will speculate on the potential to combine location-based arts projects with the design and planning process to create a game in which participants learn to imagine their world differently.

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Augmented Reality; Mixed Reality; Planning; Games; Parametric Architecture; Open Data; Sustainability; Learning

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction
Artist groups such as Blast Theory have established a decade-long history of "mixed reality" fictions which happen in urban space and exploit the potential of portable digital devices and computing as ways to create theatrical experiences [2]. Researchers [1] and commercial game developers have experimented with location based mobile phone games, such as Google's recent Ingress game, in which players compete to control territory in fictional worlds overlaid onto physical public space. At the same time, there has been considerable research interest in both virtual reality and augmented reality as a way to aid the planning process [4], not least as a way for the public to see proposed

new buildings in situ, as a digital layer of augmented reality overlaid on existing space.

This poster speculates on how we might bring these two strands together, by proposing a mobile game called CityTracing, in which players can build a virtual layer on physical space according to rules of parametric architecture.

Overlay Technique

The graphic method which constitutes the basis for CityTracing is the overlay technique: this consists in using series of transparent layers, each one of which is a workspace to draw; the final image is then composed by the view through all the layers overlapped. This has been used in landscape design and architecture since the 19th century, when sieve mapping from hand-drawn sun prints produced on windows was used to produce surveys, analysis, and plans for new projects. A critical contribution on the use of the overlay technique was made by the English educator and planner Jaqueline Tyrwhitt, who inserted in her book about planning four maps showing different aspects of a territory, and made them interact by overlapping them, giving a more complex picture. She started an academic discussion on that method, probably for the very first time [6].

Building Information Modelling

The CityTracing game is informed by the Building Information Modelling [BIM] software that is increasingly used by architects and planners. BIM translates into a digital representation the functions and physical characteristics of a place and is used by professionals to design and control buildings across all the phases of their lifecycle. BIM enriches every representation in 3D, augmenting the primary spacial dimensions with additional information: time, costs, pollution etc. BIM software is created to improve the sharing of information of complex projects, representing a design as combinations of "objects" and defining objects parametrically, that is, putting them into relation with other objects.

CityTracing

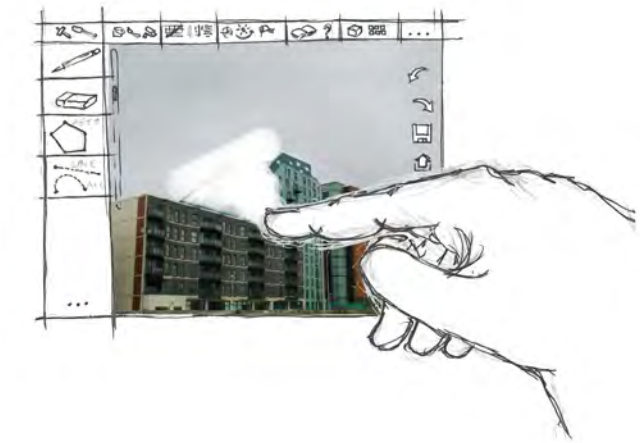

Figure 1. Choosing a building to trace over, using Augmented Reality on a tablet or mobile phone. Image by Paola Zanotto.

The first stage of playing CityTracing is to find a building, or plot of land, to trace over. Participants use their phone or tablet to look through an Augmented Reality view at the existing building, and then rub out the area they want to change. This rubbing out gesture leaves a blank white space on the screen in place of the existing building, and participants can then freeze this view and save it to return to later.

The next stage of the game is to choose a number of parameters to inform the construction of a new building to replace the existing one. This is informed by the principles of parametric architecture: "Parametricism is based on the term of parameters understood as variables." [5].

The purpose of CityTracing is not to design buildings, or even primarily to teach design skills, the purpose is to make explicit and visible the process by which buildings get built. One of the challenges of location based games is how to encourage and maintain participation [3]. Using parametric variables to generate forms is a good way in which non-architects can populate the game with interesting buildings, and so keep players engaged.

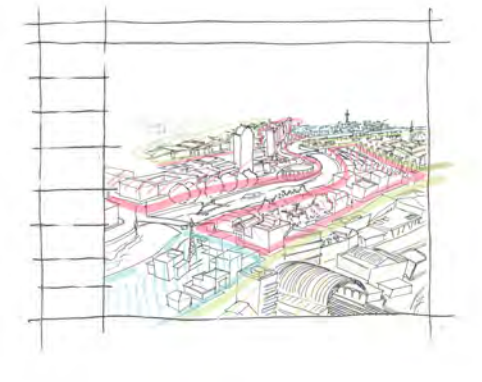

Figure 2. Reviewing environmental and political variables. Image by Paola Zanotto.

In CityTracing, players can adjust the design and construction variables of their new building, for example materials and shapes, but also the environmental and political variables, which might include land prices, zoning laws, environmental cost and social inclusion. Environmental and political variables might draw on open data sources such as planning application and stamp duty data [8]. Political variables, especially parameters such as "inclusiveness" are highly subjective, so it is important that the source code of the game is open source so that the variables are open to challenge.

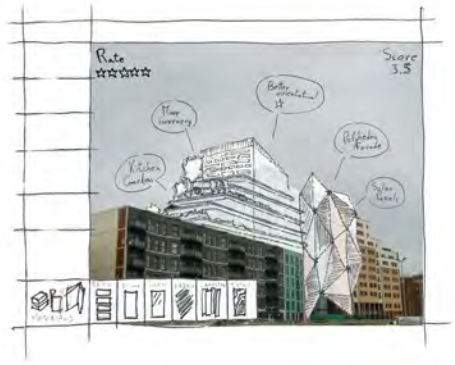

Figure 3. Using Augmented Reality to view and rate another participant's building. Image by Paola Zanotto.

Once parametric variables have generated a building in the space chosen by the player, both the lines and the parametric variables can be tweaked by the player to fine tune the design to their own satisfaction. As well as

seeing their own buildings, players can also see and rate buildings by other participants, including ones on the same site, and this exercise of judgment is part of the learning process for players[7].

Conclusion

Every action of this game is a very common one in people's everyday life: using the camera of their mobile phones, using graphic tools with their touch screen, playing games. CityTracing puts all these actions together to generate something that is more than the sum of the three individual ones, a support to share imagination and potentially construct a ground for debates for urban growth and evolution.

We suggest that rather than commenting on preexisting designs as happens during the current planning consultation process, CityTracing will be a mechanism by which participants can teach themselves to imagine their world differently. Paradoxically, a virtual reality can help people to feel more involved in the process of transformation of the real space around them.

References

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