

# ARcetate: Augmented Reality with Acetate Paper

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## ABSTRACT

After fifteen years of academic research, the notion of “Augmented Reality” (Caudell and Mizell, 1992) has caught the public attention and attracted lots of interest from media and mobile phone companies. So much so that augmenting anything now refers to overlaying computer-generated graphics on top of the physical environment.

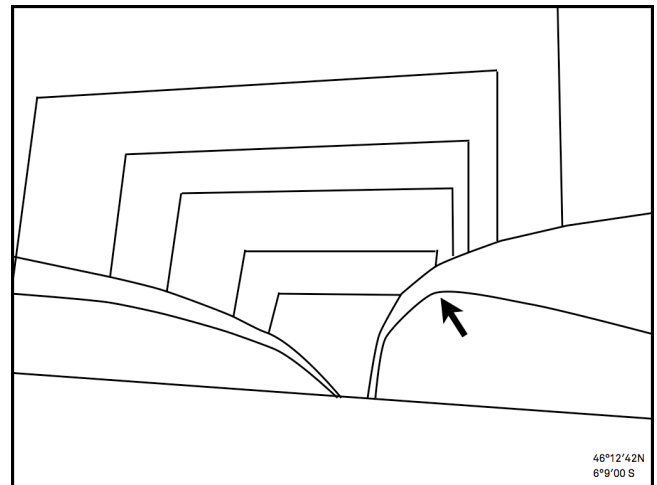
Interestingly, most of the projects about Augmented Reality (AR in the remainder of this document) are rarely built upon existing techniques to augment and modify people’s perception of the environment. Techniques such as distorted glasses, mirrors or kaleidoscopes have for instance enable to produce curious ways to engage people with visual observations of the physical environment. In all those cases, artifacts have different affordances that can lead to a various interactions with the environment. Think about how a kaleidoscope, being used with one eye, can foster a different experience of augmentation.

Back to the workshop theme, we became curious about how a non-digital technology such as paper could be employed to produce Augmented Reality experiences. Adopting a similar approach as Looser’s “Magic Lens” notion (2007), we wondered how a technique as basic as paper could enable AR? In order to investigate this issue, we built a physical prototype in the form of a location-based game called ARcetate. It corresponds to a deck of A5 acetate cards represented on Figure 1. Each card is made of three elements:

- A frame that correspond to the main features of the physical environment (building shapes, window frame, etc.). This is meant to help the user positioning the transparent overlay.
- GPS coordinates (latitude and longitude) and conventional bearings that indicate the direction to the North. This information indicate where the user is supposed to stand in terms of position and direction so that he or she is able to position the card correctly on top of the physical environment.
- An arrow that points to a specific feature in the environment that the user should notice to participate in the game.

The game mechanic is similar to geo-caching where participants employ positioning techniques such as GPS to hide and seek artifacts hidden anywhere in the physical environment. A deck of card is created for a specific city

and the purpose for each player consists in wandering around the city and locate the places where to use each card. When at a specific location indicated by GPS coordinates, the user holds the acetate overlay in the direction indicated by the bearings and make the card coincide with environmental features represented on the acetate overlay. The goal for the player is then to notice a cue pointed by the arrow (a word, a peculiar object, a specific color) to compose a rebus. Collecting all the cues indicated by the arrows then enable players to complete the game by finding the rebus made of each of the elements pointed by the arrows.



**Figure 1.** Example of the acetate sheet with the Augmented Elements.

The prototype is currently under development and will be tested empirically to understand how participants can appropriate this kind of activity and how this sort of cards can expand the role of maps in urban environments.

## REFERENCES

1. Caudell, T. P. and Mizell, D. W. (1992). Augmented Reality: An Application of Heads-Up Display Technology to Manual Manufacturing Processes. Proceedings of 1992 IEEE Hawaii International Conference on Systems Sciences, 1992, pp 659-669.
2. Looser, J. (2007). AR magic lenses: Addressing the challenge of focus and context in augmented reality, Master’s thesis, University of Canterbury, 2007.