Exploration input modalities for interacting with augmented paper maps

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Exploring input modalities for interacting with augmented paper maps


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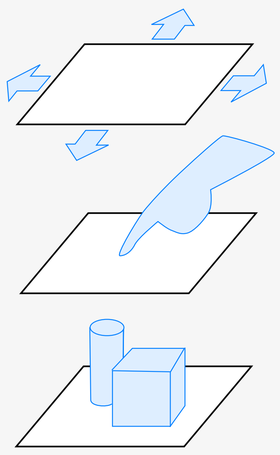
Objective

Comparing different modalities for different functions of a spatial augmented reality map.

Modalities

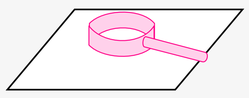


Spatial

Touch based

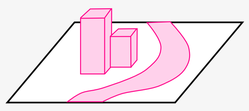
Object based

Functions



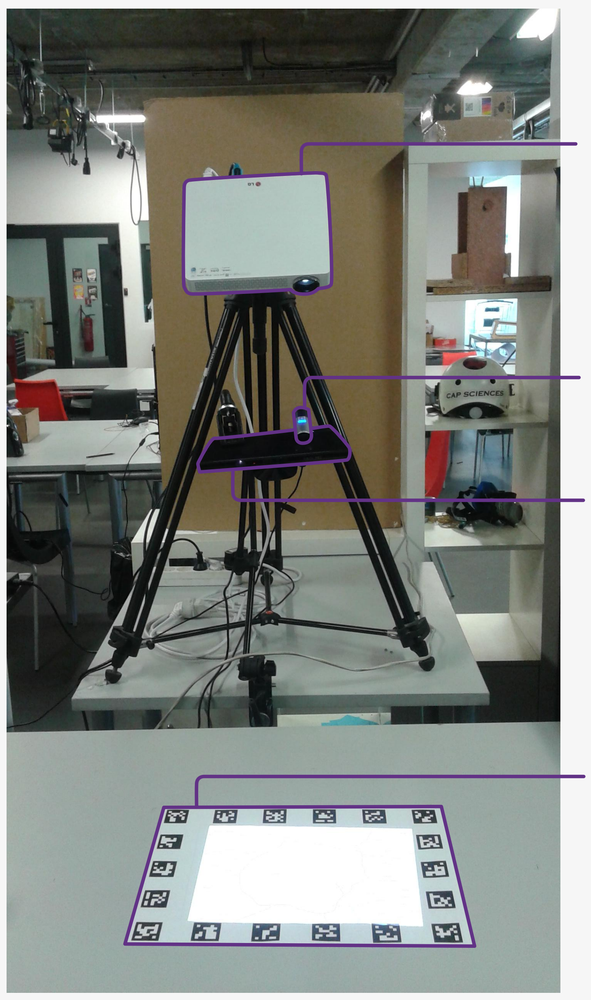
Zoom

Pan



Basemap Change

System



Libraries

PapARt

unfolding

AR Toolkit Plus
Augmented Reality Tracking Library

Basemaps

Experiment

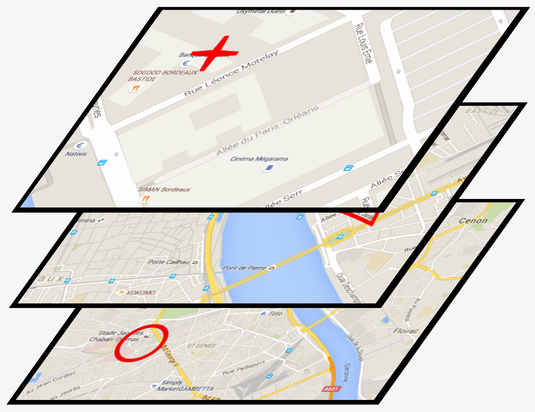
Task For 1 function, for 3 modalities: Find a maximum of hidden red figures in 3 minutes.

Evaluation Appreciation: Likert scale (0: very bad to 10: very good)
Efficiency: number of figures found (max 13)

3x3 min

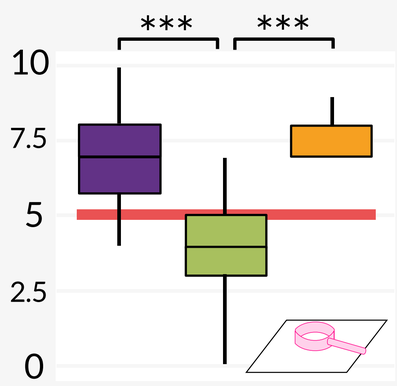
4 evaluation questionnaires

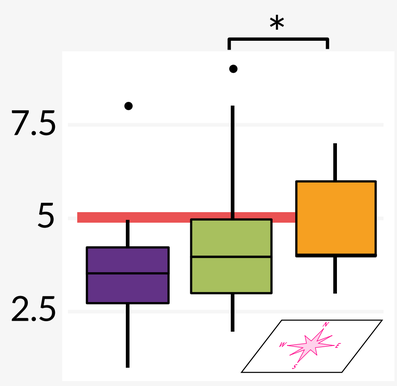
3x12 users



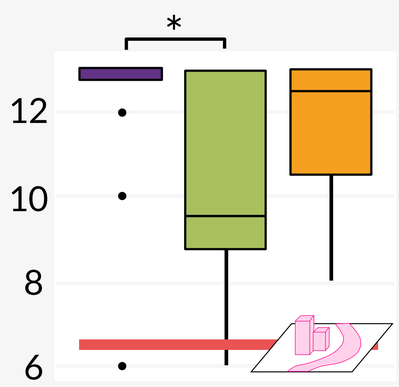
Results

Appreciation

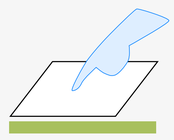




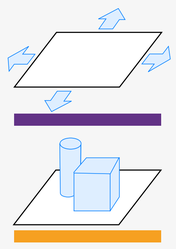
Efficiency



spatial touch based object based

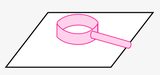


Users expect touch-based techniques to react as well as on their touch screens which is currently not the case.



Spatial and object based techniques were appreciated. This result for object based techniques is in line with the literature.

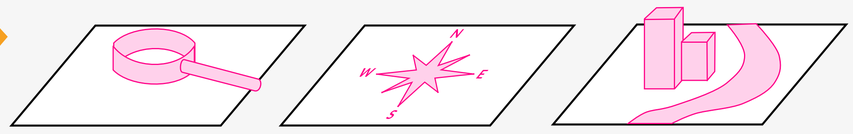
Users felt lost when using panning techniques because there is no overview.



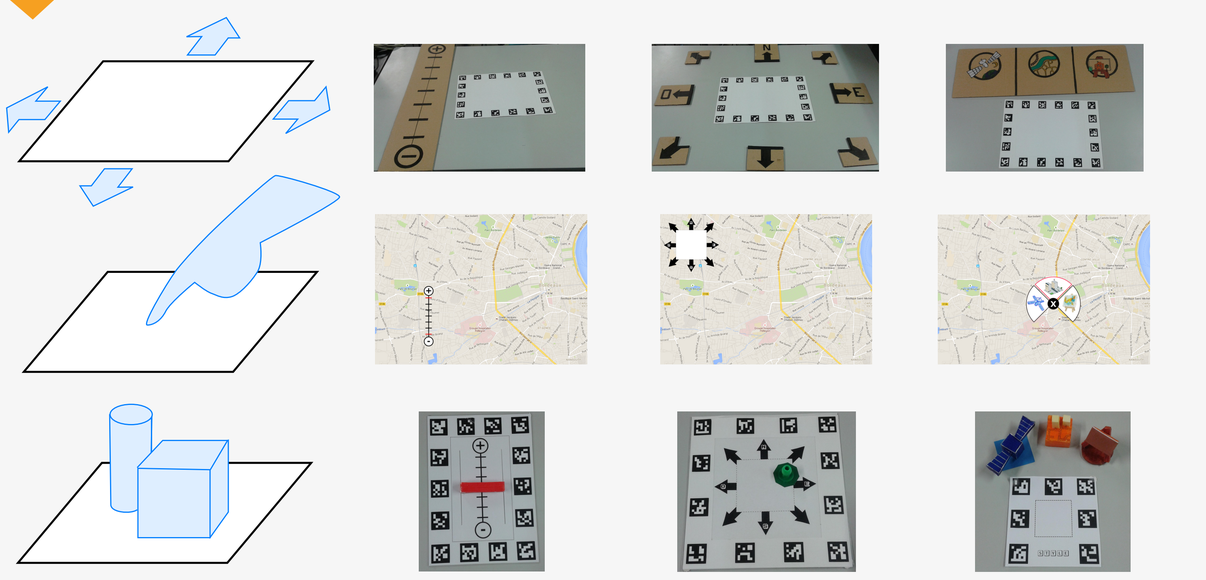
The zoom function has lower efficiency scores due to imprecisions.

Interaction techniques

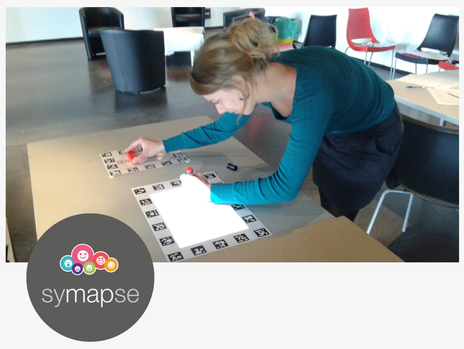
Functions



Modalities



Next steps



- Exposition at Cap Sciences museum to let visitors express their views and stories of Bordeaux
- Use of the prototype with geography students
- Exploitation in a Smart City context

- Designing new interaction techniques
- Providing focus and overview
- Combining paper and digital maps

References

Laviole, J., and Hachet, M. PapARt: Interactive 3D graphics and multi-touch augmented paper for artistic creation. Proc. of 3DUI 2012, 3–6.

Nagel, T., Klerkx, J., Vande Moere, A., and Duval, E. Unfolding - A library for interactive maps. Dans Human Factors in Computing and Informatics, vol. 7946 LNCS, Springer (2013), 497–513.

Wagner, D., and Schmalstieg, D. ARToolKitPlus for Pose Tracking on Mobile Devices. Dans Computer Vision Winter Workshop (2007), 6–8.

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