

CSS-AR: Style Sheets for Mobile+AR Web Browsing

Emmanuel Pietriga and Caroline Appert
emmanuel.pietriga@inria.fr caroline.appert@universite-paris-saclay.fr

Internship starts March 1st or April 1st, for a duration of 5 to 6 months.

Research team: ILDA, Inria/CNRS/Univ. Paris-Saclay (Building 660) - <https://ilda.saclay.inria.fr>

Augmented Reality Head-mounted Displays such as the Microsoft HoloLens 2 are too bulky and awkward for people to use in many situations. But these will soon be replaced by more lightweight, inconspicuous devices known as smartglasses, eventually leading to interactive AR eyewear whose form factor will match that of regular glasses that people can wear for longer periods of time.

This new generation of AR displays will not replace but rather complement other personal devices such as smartphones and tablets. Preparing for this future, the HCI research community is actively investigating interactive systems that combine a phone – or a tablet – with an augmented reality display [1, 2, 3]. Researchers design novel interaction techniques based on the idea that “one [device]’s strength is the other’s weakness” [4]. For instance, the phone’s screen has a high definition but is of limited size, while an AR display has a lower resolution but covers a broader field of view.

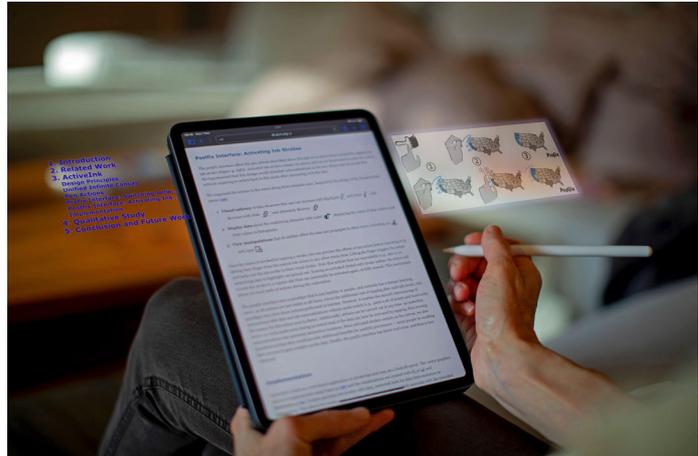


Figure 1. Displaying a Web document with some content offloaded to the air around a tablet using AR: document outline on the left-hand side, and a floating figure on the right-hand side.

Following-up on a preliminary study in our lab about how an AR+phone setup can enhance the Web browsing user experience, the goal of this internship is to design a first, simple extension to the CSS language that will let Web designers specify styling and layout rules for static HTML content display in AR. For instance, to display portions of Web documents in the air around the handheld device running the Web browser, as illustrated in Figure 1 above. The work during this internship will consist of:

- literature review about Web document styling, and phone+AR research prototypes;
- design of an extension to the CSS language [5] and proof-of-concept implementation based on an existing CSS parser such as Rework CSS¹ or LESS;²
- demonstration/validation of the language extension with use cases implemented in a phone+AR Web browsing prototype developed using Unity³ or possibly A-Frame.⁴ Hardware: HoloLens 2.

Bibliography

1. E. Brasier, E. Pietriga, C. Appert. AR-enhanced Widgets for Smartphone-centric Interaction, In *Proc. MobileHCI '21*, page 1--12. ACM, 2021.
2. F. R. Di Gioia, E. Brasier, E. Pietriga, C. Appert, Investigating the Use of AR Glasses for Content Annotation on Mobile Devices, In *Proc. ISS '22*, ACM, 2022.
3. J. Grubert, M. Heinisch, A. Quigley, and D. Schmalstieg. Multifit: Multi fidelity interaction with displays on and around the body, In *Proc. CHI '15*, page 3933–3942. ACM, 2015.
4. Fengyuan Zhu and Tovi Grossman. Bishare: Exploring bidirectional interactions between smartphones and head-mounted augmented reality, In *Proc. CHI '20*, page 1–14. ACM, 2020.
5. W3C, Cascading Style Sheets, <https://www.w3.org/style/CSS/>

¹ <https://www.npmjs.com/package/css>

² <https://lesscss.org>

³ <https://unity.com>

⁴ <https://aframe.io>