How AR Head-mounted Displays can Improve User Experience with Mobile Devices

Caroline Appert and Eugénie Brasier
appert@lri.fr
eugenie.brasier@inria.fr

Although we hope to be able to work at the lab, this internship can be done remotely if necessary

Internship period: start April 1st for 5- to 6-month duration
Supervisors: Caroline Appert and Eugénie Brasier
Research team: ILDA, Inria (building 660)

Augmented Reality Head-mounted Displays (ARHMDs) such as the Microsoft Hololens or the Magic Leap are becoming both affordable and increasingly powerful, promising a future where wearable Augmented Reality can be part of users’ technological environment. But as smartwatches have not replaced mobile phones or tablets, ARHMDs will likely rather complement our set of personal devices than replace them. It is time to anticipate how ARHMDs can enhance other devices such as smartphones.

The ARHMD-phone tandem has recently started to be investigated by the HCI research community. As highlighted in recent projects (e.g., [1,3]), "one [device]'s strength is the other's weakness" [1]. For example, the phone's screen has a high definition but is of limited size, while the HMD’s screen has a lower resolution but covers a broader field of view.

The goal of this internship is to focus on how ARHMDs can improve interaction with a mobile phone. While the BISHARE design space [1] organizes the relationships that can exist between the two devices, it describes them at a high level. There is a whole range of interesting design solutions when considering in more detail the case where the ARHMD enhances a phone-centric task. Beyond the straightforward solutions that enlarge a phone's screen using the air around it [2], we can think of many other options. For example, people could use their environment as an input space for the phone (e.g., take some notes on a paper around their phone and link them to the content displayed on that phone thanks to the ARHMD). They could also use images displayed on their phone as textures to apply on surfaces in their environment for, e.g., getting a life-size low-fidelity rendering of what is displayed on their phone.

In this internship, the student will:
- do a literature review of phone+AR solutions;
- identify one interaction design (or more) that is of particular interest and that can be studied within the timeframe of an internship;
- demonstrate/validate this design by means of a working prototype (typically using Unity).

Bibliography

DOI:https://doi.org/10.1145/3313831.3376233