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# Augmenting Cities and Architecture with Immersive Technologies

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**ABSTRACT**

Immersive technologies such as augmented reality (AR), virtual reality (VR), and mixed reality (MR) have the potential to augment experiences within cities and the process of designing architecture. However, more work is needed to understand specific applications within these areas and how they can be designed. Therefore, the main aim of the workshop is to discuss and ideate use-cases for creating situated immersive AR, VR, and MR applications for the purpose of making cities more engaging and to help design the cities of the future.

**KEYWORDS**

Augmented space, smart cities, augmented reality, virtual reality, mixed reality, spatial projections, public displays, media façades, future cities, urban informatics, media architecture

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**INTRODUCTION**

Public displays and media façades have long been the standard of displaying digital content in cities [8, 15]. Recently however, the use of immersive technologies (AR, VR, and MR) has started to become increasingly common in cities globally.

In the case of AR, films like *Minority Report* (2002), *Ghost in the Shell* (2016), and *Blade Runner* (2017) have long predicted its future emergence in public spaces and cities [3, 7, 9]. These films featured AR advertising and information holograms in public spaces, enabled by smart contact lenses and holograms. Although such devices are not available today, they are gradually becoming a reality as hardware form factors increasingly become smaller.

While science fiction has depicted future cities imbued with holographic advertisements, recent work has shown that AR has promise toward other aspects related to cities, such as engaging communities [6], heads up display navigation [10], enabling personalised public displays [13], visualisation [11, 14], remote collaboration [16], and enhancing the design of architecture [2, 18].

On a consumer level, AR is most common on smartphones, particularly after the release of ARKit and ARCore - improving the functionality. Smartphone AR apps have primarily consisted of location-aware smartphone AR apps, like *Pokemon Go* - bringing people outside and having ripple effects on the physical space through physical signage [1, 4]. Smart glasses are also becoming more accessible and bring with them the possibility of more natural integration of virtual content into our daily lives.

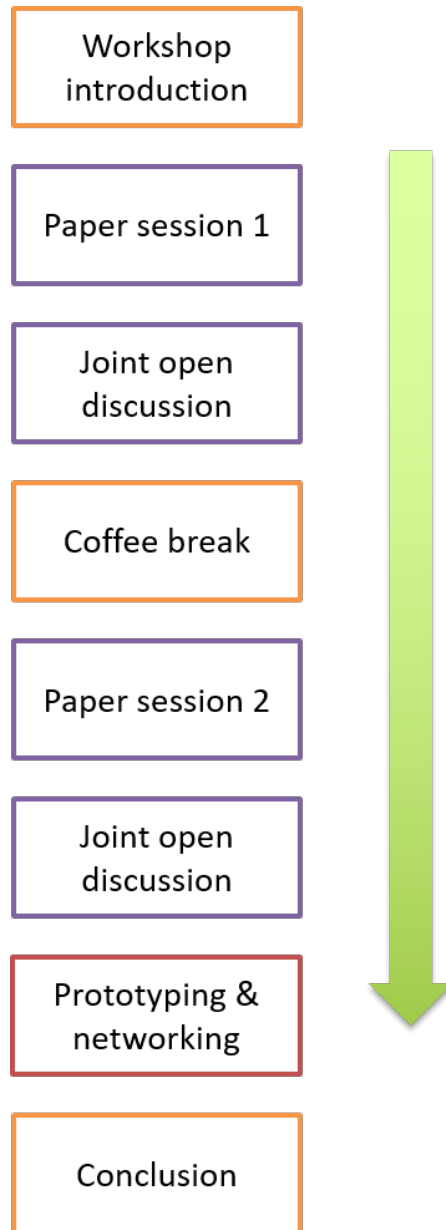
Along with the growing prevalence of AR usage in cities, VR is becoming increasingly accessible [19] and used in the design process of public spaces and cities [5, 17]. It enables designers to visualise building concepts for clients to view and walk around in before they are even built.

While these immersive technologies are becoming more advanced and accessible, further understanding is needed of the potential benefits these technologies could bring to cities, communities, and individuals. This also raises the question of how the virtual and physical spaces co-exist - creating an augmented space [12].

Therefore, the overall goal of this workshop is to discuss and ideate use-cases for creating immersive applications for the purpose of making cities more engaging!

**TARGET AUDIENCE AND TOPICS OF INTEREST**

We welcome researchers and practitioners working on engaging experiences using AR and other immersive technologies within the context of enhancing cities. Specific topics of interest include:



- Virtual Reality
- Augmented Reality
- Mixed Reality
- Spatial Projections
- Public Displays
- Media Façades

### WORKSHOP PLAN

Figure 1 shows the brief plan of the workshop. After each paper session, we will have an open discussion where all the presenters will be invited to the front of the room and discuss key challenges, research gaps, and opportunities with the other attendees.

Once all the paper presentations are over, we will run a prototyping session, where attendees will be asked to form groups and prototype solutions with immersive technologies tackling different problems. This session also serves as an opportunity for attendees to network in a casual setting.

Times are tentative and will be refined in alignment with overall MAB workshop schedule and after the number of participants are known.

### POST-WORKSHOP

The papers submitted to this workshop can be accessed and downloaded here:

<https://mab18vrarmrworkshop.wordpress.com/workshop-papers/>

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Figure 1: Workshop plan overview.

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