Augmented Reality (AR) is a grand vision where the digital domain blends with the physical world. Computer generated graphics is presented to the user overlaid and registered with the real world and hence augmenting it. Promising intelligence amplification and higher productivity, AR has been intensively researched over several decades but has yet to reach a broad audience.

This thesis studies AR on mobile phones, addressing some of the technical obstacles that must be overcome before mobile AR becomes commonplace. The research arises from the motivation that this range of devices is now increasingly capable of AR and is likely to become the dominant AR platform. The rapid evolution of mobile phones with cameras and 3D rendering capabilities has made it attractive to migrate AR technology to this platform and conduct research on how to best exploit its capabilities. This thesis contributes to advance the area of mobile phone AR by presenting novel research on the following key areas: tracking, interaction, collaborative applications and Ubiquitous Computing applications.

Cover images
From left: ‘Animal’ application used in a pioneering AR ad campaign. Scene assembly using the phone as a 3D interaction device. AR Tennis: a two-player tennis game where phones are used as rackets. Browsing an intelligent environment where sensor data emerges as pixels to visualize humidity.
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