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Sensor-supported game mechanisms for augmented reality

Bachelor’s Thesis

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**Abstract.** bla

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# Background

## Introduction

Augmented Reality is bigger than ever before. The recent success of the game Pokemon Go, coupled with advancements in the related domain of Virtual Reality, has spurred popular interest in the combination of real and virtual content which has long been an area of academic interest. Microsoft’s Hololens, a Mixed Reality HMD (head-mounted display), a development version of which was released in 2016, shows great potential despite a currently high price point.

This research paper seeks to provide an introduction into Augmented Reality and sensor technology and applications, with a special focus on video games, before attempting to design and implement in the Unity game engine a framework for sensor-supported Augmented Reality games.

## Motivation

This paper builds on the work the author performed during an internship at the Open University of the Netherlands, as part of the WEKIT project. WEKIT (Wearable Experience for Knowledge Intensive Training) is a European research project that aims to develop a new approach to expertise transfer by means of wearable technology, by means of task-sensitive Augmented Reality. During this internship, the author was able to familiarize himself with topics such as Augmented Reality and the combination of various sensors.

A focus group survey (see appendix) was conducted in preparation for this paper with 18 participants – current and former game design students, as well as one professor for game design, with at least one year of game development experience each. This revealed interest but inexperience in the usage and development of augmented reality applications; although all but one of the participants knew the term Augmented Reality, only half of them reported having used AR applications before and only three out of the 18 participants had experience developing them, 12 of the remaining 15 expressing interest in doing so. Despite this, the participants showed mixed (though generally positive) expectations of the field in regards to both the gaming industry in general and education in particular: When asked whether Augmented Reality games would be important in these domains in the future, both averaged a score of 3.388… on a Likert scale from 1 (disagreement) to 5 (agreement). The response to whether they thought using additional sensor data could improve Augmented Reality applications, especially data relating to the user such as data on movement or body posture, was more uniformly positive, averaging a score of 4.388…, although some participants noted a lack of knowledge of sensor technology.

This combination of interest offset with lack of experience and skepticism towards the future suggested that an investigation into the prospects of augmented reality gaming could prove beneficial to current game design students.

# Literature review

## Augmented Reality

### Definitions and taxonomies

### Applications

#### Industrial

#### Education and expertise transfer

#### Augmented reality games

### Current technology

### Outlook

#### Possibilities

#### Limitations

## Sensors

### Overview – sensors and actuators

### Sensors in games

### Sensors in augmented reality

# Development of a framework for sensor-supported augmented reality games

# Declaration of authenticity

# Appendix