

Department of Computing
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Augmented Reality Navigation System for Commercial Spaces

Proposal
Software Projects

by

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Abstract

Frustration and confusion are common emotions that are apparent at large shopping centres. After analysing recent studies, it is evident that shopping centres have a huge role to play in the overall retail experience. In order to provide greater value to both consumers and retailers, retail settings are being challenged to become smarter. One approach that is becoming increasingly recognised is mobile augmented reality (MAR) apps. Many consumers have difficulties in locating the store which satisfies their needs. In this research, we endeavour to outline the market requirement of developing an application that allows for smart retail and describing how additional value is created to customers as well as benefiting retailers. It is proposed that the application will implement a 3D model of various shopping centres, featuring navigation functionality to assist users in finding their desired store.

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Chapter 1

User Need Overview & Concept Introduction

The main concept for the project revolves around the user of augmented reality on smartphones. Augmented reality (AR) is the superimposing of a computer-generated image onto a user's view of the real world [1]. This technology first came about in the 1960s but has recently gained consumer and wide-spread industry attention after the use of it in Snapchat filters and the 2016 game *Pokémon Go* for example. There have been many times where people get lost in unfamiliar spaces such as a museum, where they are immersed by culture and their sense of direction. This project aims to tackle this issue by allowing the users to restore their orientation by having a mobile platform to route users to their destination, using AR. The platform will use the device's camera to work out its surrounding, and will produce a highlighted line on the screen to their destination in real time.

This concept has other various applications to other similar scenarios such as finding products in a supermarket, books in a library, or even valuable items that people own that can emit an electronic signal for it to be tracked down. Further, the concept could also use machine learning (ML) in identifying user's traits in places visited in a museum for example in order to give personalised recommendations at other similar exhibitions.

Chapter 2

Data Gathering and Requirements

Chapter 3

Functional Specification

Chapter 4

Ethical Audit

The field of augmented reality (AR) and virtual reality (VR) is currently not heavily regulated in the UK owing to the emergence of this new technology in recent times along with others such as blockchain and machine learning. There are certain areas such as data protection, intellectual property (IP), and security that need to be strongly factored in and considered during the development lifecycle. It should be noted that AR will involve collecting an extensive amount of data per user such as names, age and email address, but also appearance, real time location, and their interaction with other users. Since the concept of the project relies on the user's camera, accelerometer, and location data on their smartphone, ensuring that this data cannot be obtained unlawfully and fits the scope of the Data Protection Act (1998) along with the EU General Data Protection Regulation (GDPR) is of most importance.[2]

Based on large VR companies such as Oculus, these obligations are addressed by the form of a privacy policy in order to detail how data is collected, used and if it is shared with third parties. Since GDPR presents many pitfalls for developers, it is critical these regulatory issues are addressed before the completion of the product and not after. Penalties for non-compliance can be up to £17 million or 4% of annual turnover. [3]

Another regulatory standard is the intellectual property (IP) of the app. The source code and object code that serves as the underlying foundation of the app will be original and qualify for copyright protection. Since computer software is usually excluded from patentability in the UK, any ideas that uses AR producing a technical effect, and its associated hardware can be protected by patents. Based on our competitors, it is important that we do not infringe on their patents owned by third parties. Equally, if the concept makes new technical developments in the field relating to AR, then it should be considered whether it would be eligible for patent protection.

Given that the AR experience is built using a database of information about the real world, the database can be protected by copyright. The concept could take on a machine learning viewpoint by recognising third party

logos captured on the user's camera. This could cause an infringement claim since AR could be replicating, replacing trademark or copyright works, or distorting the logo.

Chapter 5

Design

Chapter 6

Prototyping

Chapter 7

Technical Architecture

Chapter 8

Evaluation Plan

Chapter 9

Project Management

Chapter 10

Conclusion

Bibliography

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