

Novel approach to shopping experience

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ABSTRACT

The paper deals with application of new technologies for virtual shopping which is a part of the international project titled Internet of Things in Future Stores. The project aims to bring many novelties from the field of automatic identification and smart sensors into the shopping processes. One of the project results is also a retail store model created in 3D, designed to go through using virtual reality.

The main purpose of this concept is to bring buyers a whole new look and experience of shopping compared to regular e-shops. Besides the experience for the consumer, the scientific potential is also hidden in this result. By analyzing the movement of individual shoppers in a virtual store, we can monitor their behavior, whether they shop in groups, where they look while shopping and which paths they take. Additionally, the virtual store model can be easily customized based on customer behavior analysis and serves as a product placement and arrangement of store layout tool.

CCS CONCEPTS

• **Software and its engineering** → **Software creation and management**;

KEYWORDS

Virtual reality, Shopping, Industry 4.0, Unity 3D

ACM Reference format:

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1 INTRODUCTION

At this time of rapid technological development, we are witnessing that the SMART technologies become more significant part of our lives. In the European industry field this transition is called Industry 4.0. Basically, there is a higher level of automation and implementation of the Internet of things and smart sensors that communicate with each other.

Transformation of long time established services such as taxi or hotel services was also induced by these technological changes, and new companies enter the market supply of shared services among customers. We can mention e.g. Uber which enables sharing your own car, or Airbnb which allows you to offer your own home the same way as a hotel room. We have seen a lot of similar changes in the formerly established economic and social models in the last decade and the pace of these changes is increasing.

In the world of shopping centres, many innovations have recently appeared. There has been also very intensive penetration of augmented and virtual reality into retail [1]. Typical examples of the use of augmented reality in retail are smart mirrors and changing cabins where shoppers can try out 3D clothing models. Thanks to the Kinect depth sensor technology and the high-quality RGB camera, the 3D model precisely surrounds the customer's body model in front of the mirror.

Nowadays, online shopping is on the rise. It has many advantages, it is fast and ships directly to your doorstep, sometimes overnight. "People are already shopping through virtual reality, but it's still in its beginning stages. In late 2016, China's Alibaba launched Buy+, a virtual reality experience that could be accessed with a virtual reality headset. With Buy+, people could wander around a store, look through items, and add things to a cart by staring at a product for long enough. According to vice, 30,000 people had already tried Buy+ an hour after its launch." The Buy+ app is different from ours by including the video directly from the

real store and adding to them additional interactive elements, so they are so-called mixed reality. In our concept, the shop is completely virtual. We do not exclude, however, that in the future we will move towards mixed reality. [2]

There are many similar examples of the upcoming Economy 4.0 pilot applications in Europe, including the customized ads based on a typical or current customer's shopping cart, automatic cash desks or utilization of a customer's mobile phone for scanning of the goods and presenting the goods list at the cash desk using QR code. There is also boom in the e-shop services and rapid development of drone delivery service that will change the established shopping habits.

2 VIRTUAL REALITY APPROACH

The motivation for our research was twofold. On the one hand, we are working with the ECR (Efficient Consumer Response) platform, whose analysis shows that the customer of the future will be interested in these technologies. The second pillar of our motivation lies in the love of virtual reality with its applications. Motivation is thus both business potential and our scientific focus.

The next step is to use modern virtual reality tools for visualization of retail data. Business chains, through various marketing tricks and discount actions, have been able to guide shoppers fairly well in what they want them to buy. Recent research shows that customers want a new experience while shopping and that induces a growing desire to use virtual reality.



Figure 1: Virtual shop created in Unity 3D environment

To make this desire possible, we use the Unity 3D gaming engine which we have connected to the HTC VIVE's virtual reality glasses. In the program environment, we place 3D elements in the scene and assign certain properties and behaviours to them. The customer can then walk through this interactive virtual scene and have the impression that he is in a real store. You can imagine the system as a shop in a regular e-shop on the website. The difference, however, is that you are going through the virtual space here, and purchasing the goods using handhelds and placing them in a virtual basket. You can take models from shelves, rotate and view them, develop additional information and movies. Added value in this case is an interesting experience rather than a significant functional benefit. The customers purchase is then transformed into a real order which can then be sent to the customer by a delivery service.

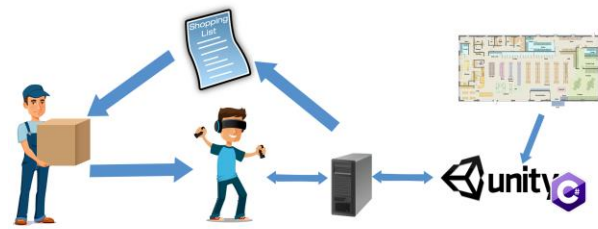


Figure 2: Virtual store principle

Avatar moving in a virtual store performs shopping using interactions with 3D objects in the virtual scene. He can take the goods out of the rack and place it in a virtual shopping cart. These actions generate a list of variables describing its purchase in Unity 3D. Furthermore, these variables are sent from the Unity 3D program to the MySQL database on the university server. An appropriate set of data are then transformed into form needed for import into ordering services commercial vendors.

3 CONCLUSIONS

Consumer behavior, along with technological advances, is changing. The role of e-shops and online shopping gains in popularity, the role of the Internet of Things in People's daily life is getting stronger, as do the stores of the future gradually adapt to the modern customer.

The system is not yet in a state that it can be shown to real customers. So we use our academic environment and test it and improve it on students in subjects connected with virtual reality to get feedback. It can be assumed that our students are buying from time to time, and it is an emerging generation for which such systems will be primarily designed.

Both virtual and augmented reality has great potential in itself. An application of the augmented reality, for example, can show the quality of food, allergens, nutrition values, or provide information about the use of genetically modified organism in its production.

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