

*A Research on Interactive Augmented Reality Applied in Product Advertisement
-A Case Study of External Product Package*

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Abstract

Due to the rapid development and rising popularity of mobile device, product advertisements and marketing can be presented in a more creative way. Augmented reality can combine reality with the scenario of virtual world and bring more business value. This research proposes an interactive augmented reality application applying to advertising of external product package and develop a unique product propaganda that is different from traditional advertising and general digital advertising.

This research plans to apply augmented reality technology, interactive interface and 3D animation to product advertisement. We want to present lively and vivid 3D animation for products by using mobile device scanning the external package. Furthermore, users can touch the screen with interactive interface and scenario so as to express brand story and experience product flow. By this way, we can achieve the goal for promoting interactive advertisement.

The research method adopts literature review, system prototyping, questionnaire and interview to evaluate user's purchase intention and product satisfaction.

The research's expected result includes: (1) Implement of prototype for interactive augmented reality product. (2) Using questionnaire and interview to evaluate the prototype, expecting to achieve promotion of purchase intention and product satisfaction.

Keywords: Augmented Reality, Product Advertisement, Interactive Experience

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Introduction

The purpose of advertising is to convey a business operator's ideas to consumers. The publication of an advertisement can alter consumers' perception of a product and the enterprise itself, bringing profits to the publisher by eliciting purchase. In the beginning, advertising takes the form of signs that are being placed outside of stores, and as time goes by, they evolve into posters, pamphlets, and flyers. The way advertising conveys ideas has also shifted from "unilateral communication" to "bilateral communication" as core technologies advance with time.

The ubiquity of advertisement offers consumers a chance to receive abundant advertising information on a daily basis; however, not all messages conveyed will leave an impression on consumers. Since consumers have to process a colossal amount of advertising information every day, it becomes crucial to all advertisers to contemplate and investigate whether they are rolling out advertisements that catch consumers' attention. According to Lauterborn (1990), an advertisement's principal orientation should base on consumers' appeals and the advertisement should focus on bilateral communication. The theory Lauterborn proposed including the shifting from 4P (product, price, place, promotion) to 4C (consumer, cost, convenience, communication). Advertising is now transforming its previous pattern of focusing on the product to an interactive form that is consumer-orientated, which creates a role change for consumers (from passive to active). Through interaction, participation, and intervention, advertisers can increase the involvement and interaction model of an advertisement and significantly imprint the advertisement on consumers' minds.

One way to strengthen the impression an advertisement leaves on consumers is to increase the interaction model between the advertisement and consumers. The employment of augmented reality (AR) technology in advertising is proven to render them more effective (communication-wise) than conventional print advertising and advertising in other forms. In other words, dynamic advertising (such as VR advertising) can draw consumers' attention more extensively and elicit purchase. However, studies find out that although dynamic advertising, when compared to advertising in other forms, does increase the three dimensions of evaluation for advertising effects, there seems to be no obvious increase in "brand attitude" and "purchase intention." The result indicates even though contemporary advertising is offering various means of presentation than the conventional print advertising, and they are proven to catch consumers' attention, they fail to affect consumers' purchase intention and boost product sales.

The study will introduce the "interaction interface" to advertisement designs by using AR technology and analyze AR advertising and conventional print advertising to understand the importance of interaction to today's "bilateral communication" advertising. The study will also evaluate the designing interface in a bid to provide a reference of direction to the future design of interactive AR advertising.

The study compares "interactive AR advertising" as an advertising medium with conventional print advertising to understand whether providing different interactive advertising stimulus to consumers affects advertising effects (including advertising attitude, brand attitude, and purchase intention). Based on the said motive, two major research purposes can be induced:

1. Examining the difference in how advertising effects are affected by interactive AR advertising and conventional print advertising.
2. Examining the feasibility of and user's expectations for interactive AR advertising.

Literature Review

1. The definition and development of advertising

The American Association of Advertising Agencies has defined advertising as a mass communication medium that charges and whose ultimate goal is to convey the advertiser's information and ideas; the use of advertising as a means of promotion is to affect consumers' perspective of the advertised product or enterprise and elicit purchase or other behaviors to bring profits to the advertiser. The American Marketing Association's definition of advertising is "the advertiser's opinions, product, or service toward its enterprise or an individual; advertising is an activity meant for implementing promotion or conveying the adviser's appeals indirectly via communication media."

In 2003, Schultz & Barnes, starting from the perspective of "advertising and marketing," pointed out that the trait of today's market is to use the database, the Internet, or the global information network to prompt communication between buyers and sellers in an easy, rapid, and effective way. Advertisers should provide more advertising information to strengthen consumers' faith in them and increase interaction and real-time communication with consumers. For this reason, advertising has transformed from "unilateral communication" to "bilateral communication" that touts interaction.

According to Lauterborn (1990), the principal orientation of advertising should base on consumers' appeals and focus on bilateral communication. He further proposed the theory of shifting from the original 4P (product, price, place, promotion) principle to 4C (consumer, cost, convenience, communication). Advertising is now transforming its previous pattern of focusing on the product to an interactive form that is consumer-orientated, which creates a role change for consumers (from passive to active). Through interaction, participation, and intervention, advertisers can increase the involvement and interaction model of an advertisement and significantly imprint the advertisement on consumers' minds. The term "advertising involvement" refers to the extent of consumers' cognitive reaction or information processing when faced with advertising information, or simply put, it means consumers' level of care for the advertisement or the mental state they are at when seeing the advertisement. Generally speaking, higher advertising information involvement represents higher attention customers pay to the advertising information. Therefore, modern advertisement designers should have a comprehensive understanding of how to use new technologies to draw consumers' attention and evaluate whether the communication effectiveness of the advertisement qualifies as an effective advertisement design.

2. Advertising attitude, brand attitude, purchase intention

Advertising is a means of communication that aims at persuading target consumers. The purpose of communication is to make consumers understand the message given by the message giver and then offer opportune feedback. The lack of feedback is what

constitutes the measurement of advertising effects. According to Wilson & Akert (1999), advertising is capable of altering consumers' attitude toward the product. In academic research, the indicators for measuring advertising effects are advertising attitude, brand attitude, purchase intention.

The definition of advertising attitude is the audience's inclination of expressing consistent like and dislike of certain advertising stimulus under particular conditions, which helps us understand consumers' evaluation of and reaction to an advertisement. Under normal circumstances, a better advertising attitude produces a better advertising effect. As for means to measure advertising attitude, Shimp (1981) thought that it could be done categorizing these reactions into cognitive reactions and emotional reactions, the former is the perception of analyzing and processing advertising elements, such as the response of like or dislike of the advertisement due to its means or endorsers, and the latter simply refers to the emotional response aroused by the advertisement, which does not involve any processing of advertising elements.

Brand attitude means consumers' extent of like or dislike of a certain brand under the influence of advertising stimulus. According to Shimp (1981), consumers' preference for a brand has an impact on their trust in and judgment for the advertisement. Howard & Sheth (1995) used the concept of brand inclination to explain brand attitude. Brand inclination refers to a consumer's preference for a brand, which is built on the consumer's trust in and judgment for it. Higher brand attitude is more likely to produce a clear and stable brand preference. Brand inclination can directly affect brand attitude and then affect the purchase decision.

Purchase intention means a consumer's plan to purchase a certain amount/number of a product in a particular period of time (Howard, 1994). According to Kotler (1995), there are five stages in consumer's purchase decision process, which are: Need recognition, information search, evaluation of alternatives, purchase decision, and post-purchase behavior. Consumers form their purchase intention by evaluating possibilities, and the sources of information and environment can both affect consumers' purchase behavior. Reateix pointed out that products presented in an interactive scenario can effectively help customers identify the brand and remember it better, and this will boost their purchase intention as well as increase the chances of their revisits.

Today's advertisements are a combination of various interactive properties that aim at increasing consumers' attention to and involvement in them and enhancing advertising effects. Therefore, the term "interactive advertising" refers to the combination of multiple media and traditional advertising, and its ability to catch consumers' attention with its high interactivity is also the current trend of advertisement design.

3. Interactive advertising

Interactive advertising is achieved by adding interactive elements in an advertisement. "Interactive advertising" concentrates on the interaction between the adviser and consumers (William, Burnett & Moriarty, 1993). With the use of a media, users make in real-time engagement and alter the content and information of an advertisement (Steuer, 1992). Ruman (1996) thought that interactive advertising refers to the message carried by an interactive medium and its purpose is to promote

an idea, product, or service. Interactive advertising is capable of providing different options for advertising content according to individual needs. Ruman also pointed out that not all advertisements using interactive media can be called interactive advertising. Interactive advertising should be able to not only offer consumers the chance to select and adjust advertising messages but make it possible for consumers to respond to advertisers via interactive media. Skuba (1996) suggested that true interaction can only be achieved via in-depth involvement between consumers and advertisers. In short, the three prerequisites of communication through interactive advertising include:

- I. The advertising message must be sent to a particular customer group.
- II. During the message exchange, each side should adjust their replies appropriately based on the message received.
- III. Bilateral communication

In summary, conventional advertising is losing its ability to catch consumers' attention. What cries for a reflection from modern society is how to make consumers notice advertisements rolled out by enterprises in an environment where modern advertisements of all types are carrying excessive information and threatening to engulf everyone. To elicit consumers' attention, advertisers not only need new-fangled technologies to provoke consumers' curiosity and induce their interest but also provide advertising designs that allow consumers to actively engage in the interaction with the advertising content. After studying various cases, the employment of AR technology in interactive advertising is proven to be able to attract consumers' attention most of the time, creates actual engagement, and makes people stop by to watch others experiencing interactive advertising (Qiu, Wen-Yu, 2011). Therefore, one of the current trends of advertisement design is to combine AR with interactive advertising to convey advertisers' goals and enhance advertising effects.

4. Augmented reality

Augmented reality (AR) is a technique that is capable of superimposing virtual information on the real environment shown in a monitor. Though AR technology is derived from virtual reality (VR), there is a fundamental difference between them: What VR attempts to achieve is to create an environment that is similar to the real one and replace it while AR only adds extra information to the visual environment (Feiner, 2002).

The definition of AR, according to Azuma (1997), is an augmentation to real information instead of replacing the real environment. When doing research, Azuma had compiled available documents related to AR and its applications and thought that an AR system must include the following three characteristics:

- I. The combination of reality and virtual reality
- II. The ability to achieve real-time interactions
- III. The system exists in a three-dimensional space.

Judging from Azuma's definition of VR, we realize that VR is a technology capable of superimposing virtual information on the user's visual and engaging in real-time interactions. The working principle of VR technology involves image presentation by using the computer and its peripheral input/output devices. A camera is used to shoot a specific picture card and scan the space. The picture card will be transmitted to the database preset by the designer, and via the comparison of hardware detection, the user can see images of the combination of the image and the picture card or the combination of the image and the space.

AR has a wide and extensive range of applications and development, and in recent years, the number of cases where AR technology being used in interactive advertising has seen an increasing trend. There is a positive correlation between the use of AR technology in interactive advertisements and the consumers' attention as well as advertising effects. Therefore, the study will also use AR technology to introduce the brand story by means of guiding to enhance advertising effects and probe into advertising effects of employing interactive AR advertising.

The research methods of this study include document analysis, system prototyping, and experimental research. The study employs two types of advertisements with the same thematic appeal: Conventional print advertisement and interactive AR advertisement. The study will ask subjects to watch these two advertisements and hand out questionnaires to the two groups to test advertising effects such as advertising attitude, brand attitude, and purchase intention.

Prototype

By collecting documents to investigate the development trend of Augmented Reality technology and the summary of each application currently. Through the process of investing documents to sort out the techniques included in Augmented Reality and Virtual Reality, and the range of application and the variant of them.

Furthermore, by implementing and testing of programs and the feedback from the customers' experiences to clarify the limit of making the Mixed Reality. My research prototype will actual use in the exhibition hall. In the Augmented Reality interactive, cellphones to let people into the virtual environment. By playing interactive game, let users more close to the exhibition hall and more realize the brand story of the products.

As the Figure (1) and (2) shows. The consumer scan the ground of the exhibition hall. He will see a virtual space and he can walk around in the virtual space
As the Figure (3) shows. Through the cellphones to scan the products at random in the exhibition hall can appear the information of products and the related applications.
The development trend of technology combined with Augmented Reality provides exhibition hall and related applications has more multiple performance in the future.



Figure 1: Consumer scan the ground of the exhibition hall



Figure 2: Create a virtual space and consumer can walk around



Figure 3: The virtual character conducts navigation and introduction the brand story

Conclusions

Our research uses the technique of Augmented Reality to develop a set of interactive experience system to apply to products in the exhibition hall, and collect the feedback information after the experiencers interactive with the devices. Through the public exhibition and using the observational method during the exhibition to observe the act of experiencers interactive touch and make the items which are more interested by user to digitized bonus to establish two main elements below.

(1) The digital creative products

(2) The innovation experience of Augmented Reality

Through two elements to complete this innovative experience system, and using interview survey to analyze the fond of viewers about products. In the future, by the way of Augmented Reality interactive to develop more different exhibition hall products and through different content design to make the products interaction more diversification.

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