

# The Interaction Design Research About 3D Demo Animation in Smart Home

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**Abstract.** In recent years, with the rapid development of technology, people's living standards are generally improved and have played a very important role in our future life. Nowadays, we live in a fast-paced era that led by information, the heavy and boring instructions inevitably become a kind of burden before using appliances. In addition, it is a painful sorrow among the children, the old or the special people. However, the rise of 3D demo animation solves the problems very well. It exhibits the products from all aspects by the form of animation. Besides, in order to make users have more direct experiences, some film design companies put the interaction technology into it. It is direct interaction that brings users a combined feel of novelty, favor and trust, at the same time, it reduces the distance between products and users. So, products made by animation as well as interaction design should be explained from users' view when design the 3D demo animation of smart home, which can make demo animation be more functional and interesting through some simple actions such as click, lither to let users know and use the appliance cheerfully. The interaction design of the 3D demo animation not only pay attention to the different gender region different requirements of age groups, but also study the different needs of special populations. It notices their needs on the basis of general design. This article lists some excellent 3D animation works at home and abroad, which display the products and the unique cultural image of the corporate by the way of interaction. This passage researches the physiological and psychological characteristics of the users when they touch the new product, then, it analyzes the design principle of the 3D demo animation as well as the users' experiences. In the end, this paper not only make a analysis but also make a summary on the shortcomings of the interaction design. At the same time, it puts forward direction and suggestions for improvement of interaction design.

**Keywords:** Interaction design · Demo animation · Users' experiences

## 1 Introduction

### 1.1 The Objective and Significance of Topic Selection

In this informational era, owing to rapid technological advancement great changes have made on our life as unnoticed, which was obviously embodied in the citizen's

household equipment. Under the background of fast-paced lifestyle and high-intensity work, people all pursue for a more intelligent, safe and comfortable household circumstance, undoubtedly raising new requirement to our current living space. In China change happens from the refrigerator, TV, washing machine at the beginning to air conditioner, computer and video, then to the smart home as the current focus, which could be called seeing the whole from the part. While the smart home whose has bright prospects in people's eye cannot take high ground rapidly. It's bound to say that casting the industrial situation, product development and technical trend aside, the main reason for this situation is because most manufacturers has insufficient promotion and improper propaganda key impeding the further development on smart home.

The research purpose of this essay is based on the three-dimension virtual animation for smart home. The humanization interaction offers the consumer a communication way to get a more comprehensive recognition to it, not just stopping at its meaning level any more. For the time being, the smart home as an emergency industry has a promising future. Though immature its market industry chain is, it with infinite market potential attracts large number of consumers. After then new products appear constantly, of which just few get really recognized by most consumers. Nowadays the promotion demonstration for the smart home on the market is always the unilateral information output, while this method has some problem and insufficient. It is unavailable for the client and consumer to gain what they need from the huge amount of information rapidly and accurately resulting in the loss of users to some extent. Thus this essay aims to introduce the interaction technique to the 3D animation for smart home in order to resolve these shortcomings. By the interaction the distance between product and consumer could be narrowed, really benefiting the mass a lot.

## **1.2 Analysis on the Home and Abroad Situation for Topic Selection**

In 1984 the first smart building in the world has sprung up in Hartford, America, subsequently it has been promoted in Germany, Canada and Japan and other developed countries, among which the X-10 for North American Airlines, "Smart Home" in MICROSOFT and "Home Director" in IBM has gained tremendous influence in the world. In order to lively show the function and feature of smart home, some relevant promotion strategy has been tight with the pace of development. If now you are in the experience shop, the predecessor of the colorful advisement video has been the inconspicuous poster. Compared to aboard, China starts late in the smart home industry, so as to its propaganda demonstration. In recent years some domestic enterprises with forward-looking vision gradually has their own representative solution referring to the advanced technology and concept aboard. The domestic development trend for interaction design is excellent as well, applying to the interfacial design on website and APP. However in a broader sense there are few research and practice which the interactive design is in real combination with the demonstration solution for smart home.

## 2 About 3D Animation

### 2.1 Brief Introduction to 3D Animation

Animation as a comprehensive art includes drawing, cartoon, film, photography, music, literature and other arts kind, among which the 3D Animation (three-dimensional animation) is an important type for animation form and also the mainstream for the animation development later. Following with the rapid development on three-dimension video technique for computer, the 3D Animation has got mature day by day and gradually applied to the wider filed in daily life.

**The Feature of 3D Animation.** Through the three-dimension software the designer completes a series of operations including modeling, material, lighting, rendering, animation and special effect, then the final animation could create on the computer. The creation method different from the traditional one makes the 3D animation special, while also makes the demonstration effect unique.

1. Realistic visual effect originates from reality while being higher than the real.
2. Be available for the shoots with high difficulty and high cost that filming could not get.
3. New performing form in order to attract audience's attention.
4. Bring audience real and profound reorganization in face-to-face way.
5. Be convenient to broadcast and promote.
6. Save cost and enhance efficiency to a larger extent.

### Manifestation of Demo Animation

1. *2D Demo Animation.* The 2D demo animation is mostly applying to the completion of Flash and Adobe After Effects with short running cycle and easy making, which is the first choice meeting the requirements being short time and low cost. This favors the narrative on plot. Every demo animation is like a story with strong interestingness. Additionally its image focused on flat sense with bright color. Its subject matter does not aim at realism but at motion law. In recent years owing to simplified style being fashionable the 2D animation has come to alive on the screen.
2. *3D Demo Animation.* The 3D demo animation is mostly applying to the completion of Autodesk Maya and 3D Studio Max with moderate running cycle and exquisite making, being the mainstream for the animation home and abroad. It focuses on exhibiting model and presents the audience content subject's detail information and overall effect one by one in a unique view, which creates a stronger visual effect. For the 3D demo animation, it is with stereoscopic picture and realistic special effect. It is famous to be generous and delicate, paying more attention to lens language. As the main demo animation it gains relatively higher recognition. Meantime owing to the constant development on technology the 3D demo animation will be with larger improvement space.
3. *Combine 3D demo animation with actual shooting technology.* 3D demo animation combines with people shooting technology, then editing and composing by Adobe Premiere and other software, the final animation forming. The whole making

progress is with long period, high cost, great difficulty and exquisite effect. Thus some excellent products has brand influence in this field. The combination of these two could not only embody the advantage for each other but also make the 3D demo animation be with less cold mechanical feeling and expansiveness to the advertisement by actual shooting, adding a little cordial feeling and credibility. This new manifestation method is with rich pictorial language to cover large information amount, better mixing the art with technology together to gain mass media's attention. The 3D demo animation, as the pioneer in demo animation field, by mastering the advanced technology in the future and constant innovation combines with actual shooting technology to drive the development on the whole demo animation.

**The Application Field on 3D Demo Animation.** As the 3D animation technology develops and promotes continuously, the 3D graphics technique gains more and more consumers' attention and starts to go deep into all fields, from the plot animation that is popular with the children to film, game, construction, advertisement and industry etc. In the future its application range will continue expanding.

1. *Television Animation.* The television animation here means the well-known animation movie spreading relatively high and being famous. The technologies on making include special effect originality, early shoot 3D animation, special effects composition and drama with special effect animation. As a branch of movie, the television animation combines with 3D where the art and technology become one. Some vocal stories as 3D animation have been showed on screen gaining lot of popularity. And its accessories have gradually transited to commercialization stage.
2. *Architectural Animation.* The period from the end of last century to the beginning of this century has been the most prosperous for urban and rural construction in China. There emerges a scene of flourishing on building and real estate market, which virtually facilitate the development of architectural animation. At the moment the 3D technology has gained wide application on construction field, of which the architectural vagile cartoon and garden landscape animation standing most. The exquisite model and rich lens language restores a real landscape scene on the computer scene, which is incomparable to the traditional effect picture. In recent years the 3D panoramic technique as a branch of virtual reality has sprung up gradually and will lead the 3D architectural animation to a new level as well.
3. *Production Animation.* The main reason for the product animation being enduring is the competitiveness in cruel market. The enterprise hopes to show the audience the product more specific, more complete and more interactive in order to drive them to introduce by themselves. The production animation mainly introduces product's structure, feature, function, production process, usage method and some notices, being the best way to do product research, test, advertising and exhibition, which applies to several fields like industry, electron and machinery. For example the usual telephone, car, aviation and component etc.
4. *Preamble animation.* Preamble animation plays the role to preview in advance, showing the core part in short time. Its time is concise, with colorful picture and numerous special effects. Generally it has been mostly applied to TV Column Packing, game promotion and movie trailer etc.

## 2.2 The Advantage that 3D Animation Applying to Smart Home

The animation makes consumer intuitively and elaborately know the main technique and principle, and also makes them remotely control the facility at home by Client, which has not only saved the long and tedious interpretation time intriguing consumer's interest but also gained experience effect leaving them deep impression. Meanwhile the enterprise also gets rid of the constraint for advertisement time and experience room so that lots of expenditure has been saved for continuous research. In addition demo animation could be applied on advertisement injecting, company websites, industry association and press conference for display, enlarging propaganda. The excellent demo animation could demonstrate enterprise's special cultural image automatically and raise awareness of the product, then gaining larger advantage on competitiveness.

## 3 Research and Development for Demo Animation in Smart Home

### 3.1 Analysis on Smart Home Demonstration Scheme

**The Objective and Significance for Demo Animation.** Smart Home has developed several years in China, while its market recognition and consumer acceptance has not kept up with pace, for which the loss at propaganda strategy is the main reason. According to the investigation analysis by Tencent at the end of 2014, 95.19 % of the consumers have showed great interest to smart home while being not clear about its concept. And they also say that the smart home at this stage cannot achieve their expected value. The later could be solved by technical innovation while the former could be done by appropriate propaganda to guide the consumer in order to improve current situation.

Based on the specificity for smart home industry and its product, its demo animation should made relative change, which not only should be the broad sense of product animation relying mainly on introducing product information and marketing for communication but also should enhance corporate image, disseminate scientific knowledge and publicize correct opinion. Meeting consumer's requirement to gain information and consume, to some extent guiding the progress on consumption concept. Demo animation has greater influence playing important role on consumer's attitude and behavior to know new product from the view of objectification. It makes product meaningful and maps the fashion element in the market with its development. In a higher level this encourages the innovation industry to continuously growing, renovating the technology, driving the development of market and pushing the advancement of society.

**The Current Situation and Trend for Demonstration Scheme on Smart Home.** So far smart home's demonstration technique has been mature gradually, evolving from the original static brochure to dynamic all-around video presentation. It also evolves from the beginning that there is the notice board on Demo site saying "valuables, please do not touch" to consumers first-hand trying in the experience shop with crowds. Additionally it evolves from consumer going to demo site knowing details to being seat at home browsing on the Internet. It's bound to say that this is a huge progress, while only for demo animation disadvantage still exists: the reality in the three-dimension model remains to be raised. For example, the furniture sense and people's motion law; inexact

angle location resulting in being short of expounding on product from users' view with the need to enlarge demo animation's functionality and interestingness; The demonstration scheme for animation form is with low interactivity so according to consumer's physiology and mental characteristics their experience feeling should be enhanced. Through communication and research with enterprise extension worker and animation designer there problems should be perfected one by one.

With technology's progress Demo animation must develop an intelligent, automatic and humanized way. The interactive experience for 3D demo animation is the trend. Under the past circumstance to study various display platforms and systems the demo animation from now on will focus more on its experience optimism.

1. Abandon numerous and take simplicity, making the whole demonstration more clear.
2. Add vocal and gesture control making it convenient to demonstrate content.
3. Set virtual image, strengthening the interaction with demonstration object.
4. Add emotional design and elevate the degree of demonstration friendly.
5. Connect with Internet and smart home.
6. Combine with advanced technology, for example virtual reality technology and augmented reality technology.

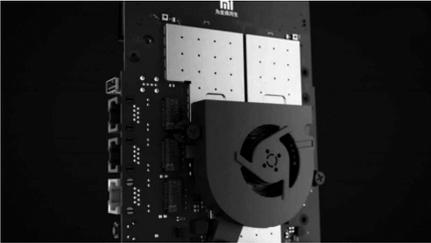
**Research and Analysis on the Demonstration of the Domestic and Foreign Smart Home.** Nowadays, smart home become well known, and more attention has been put into the scientific and technological development of the product, but there is no big breakthrough in the study of the demonstration program.

Related demonstration programs of foreign countries have been becoming more mature. In terms of smart home, both online demonstration and offline demonstration are performed excellently. Demonstrations are in various forms and individuality as well as innovation are promoted. They are strongly supported by technology, but they can obey to the products themselves and they are not for the purpose of performance. They are good at disseminate corporate culture in the demo. Taking Apple's official website as an example, it is a web platform using for products sale, however, it shows the company's unique humanistic feelings through interesting dynamic effects or a tender document.

Due to a relatively late start, research on demonstration program of smart home in China is still in the stage of development. Some Chinese scholars have got a forward-looking vision. Based on related demonstration platform of smart home and virtual human interaction as well as somatosensory interaction, it made a great contribution in academic research. But owing to kinds of reasons, lots of researches are still at the theoretical level and have not been realized. From the aspect of form, domestic smart home are conventional, occasionally, they appear to have the national characteristics of the demonstration program, which enlighten us. In technology, they have an open mind to learn from others and so does in the demonstration concept. In addition, they are good at making innovation on the basis of original technology. For example, a kind of app designed for controlling smart home not only introduce the corresponding functional properties, but also make the spread of smart home be more convenient.

### 3.2 Excellent Cases of Smart Home Demonstration Programs at Home and Abroad

**XiaoMi—Demo Video of Router.** At the same time, owing to the popularity of the hot fever phone M1 among people, XiaoMi has been favored by lots of people in China. So, the scope of its research expands to more and more fields, such as smart home. When it comes to smart home of XiaoMi company, XiaoMi router must be mentioned, which was issued in April 2014. It has two animation, one is a 3D demo animation and the other one is a real video combined by two-dimensional animation.



**Fig. 1.** The 3D demo animation



**Fig. 2.** The real video combined by two-dimensional animation

The demo video in Fig. 1 conforms to the popular presentation forms, it presents exquisite screen effects by realistic models, mature screen languages and fluent actions. Without commentary, the whole video elaborates the most important technology and the internal structure of the product in a short period just through key pictures and key words.

The demo video in Fig. 2 pays more attention to the performance of stories. It mainly introduces the wonderful experience of the virtual cartoon characters, who climb out from inside of the router. They use the smart home secretly when the master left. It indirectly shows the company's other smart home around router. The rabbit with a Lei Feng hat in the video not only serves as the leading role, but also serves as the company's mascot. The video puts the demonstration of the products and the company's image together in a pleasant atmosphere.

**Samsung—Smart Things Smart Home Demo Video.** After being purchased by Samsung company, Smart Things launched a propaganda film, which exerts a great influence. The demo video pays more attention to creativity, it describes one day's life of a three-people family in the form of micro film and it subtly introduces the free operation of smart home under Smart Things platform. For instance, in Fig. 4, lamps, curtains open automatically and the coffee machine already has been ready for a cup of coffee when the morning comes. Also, it can monitor and control everything in home after leaving. This kind of animation reflects the idea of Smart Things—try to connect internet of things with smart internet. It not only emphasizes on the introduction of the function of the product, but also describes a scene of better future life from the view of the users' psychology (Fig. 3).



**Fig. 3.** A day living with smart home



**Fig. 4.** The family environment showed by smart things

**Apple—TV Demo Video.** Apple TV is released by Apple company in 2015, which is the key element of the smart home. Apple TV is expected by many people before its production because there are lots of IOS users and the advantage of its mature voice controls. Then, Apple company released a new propaganda video “the future of Television”. As shown in Fig. 5, it originates from the initial colorful logo of Apple company, at the same time, it salutes the early television debugging methods—SMPTE. It looks back the past and thinks freely about the future.

The propaganda video focus on post production. It is a combination of nowadays popular film and television works. For example, Mind Agent Team, Budapest Hotel, A Song of ice and Fire. It not only shows its new powerful features, but also grasps the demands of customers of different levels to interact from these different tapes of film in Fig. 6, which creating a brand image that takes knowledge well of customers. In addition, it makes a perfect combination of lively background music and pictures with fast rhythm, making the whole atmosphere be more relaxing and thought-provoking.



**Fig. 5.** Colorful creative idea



**Fig. 6.** Apple TV's propaganda video

## 4 The Design Research of Interactive 3D Demo Animation

### 4.1 The Analysis Based on Smart Home Research

From the aspect of designation, demo animation not only should pay more attention to the functional introduction of the product and the animation of its usage. It also should take the experience design of users into account, which designed by the designer according to the feeling of users in the process of using the products. The importance

of the research about users is beyond all doubt. In fact, the research about users and interaction design are in purpose of improving users' experience. An excellent interaction demo animation should not just pursue the superficial beauty, but also should meet the users' needs hidden gorgeous special effects.

The research about users is an important step in the design of animation. Combined with the present research on psychological and physiological characteristics of smart home users, it is not difficult to find that the users prefer to focus on high-tech fashion rather than focus on practical function. Therefore, when design the demo animation, in order to increase the credibility, designer should weigh the advantages and disadvantages of the presentation like science fiction movies and the introduction of functional usability. Meanwhile, users' habits, hobbies and their track all may determine the length, expression and presentation of the animation. So, in order to reach the final purpose, the design of this interaction demo animation should meet the users' needs and expectations.

#### 4.2 Research on the Presentation Design of Interaction Animation

Interaction demo animation should keep the original dynamic performance and demonstration function. At the same time, combined with more conditions, it also needs to fully achieve the interaction between users and products. That is to say, users can make control of the demo animation according to their own demands and different situation. Of course, the operation should be fully considered by designer at the beginning of production, then, the program can be finalized.

**Virtual Image Design.** The short length and professional explanation of demo animation always make some customers puzzled on the content. Although it says to be able to play again and again, it cannot solve the problem thoroughly. If confronted with a problem that can't be solved by ourselves, it is a good choice to possess a virtual image with the explanation. It should be defined as a virtual image with a kind of competence to interact emotions. To some degree, it is a simplified "virtual human".

The reason why to introduce the concept of virtual image into the demo animation of smart home is to add users' experience feeling of demo animation, so as to control the content in the form of communication. The establishment of virtual image does not break the integrity of demo animation, it can give a detailed explanation of the content after receiving the help order from users. Moreover, connected with the system of smart home and internet, it can know the users' situation timely and consult the custom service correspondingly when encounter problems. Using the virtual image will drive the development of voice control technology. Meanwhile, it should add some kind of emotional design to enhance the experience effect by meeting users' psychological characteristics. From the aspect of appearance design, it can use virtual image or mascot to promote the spread of corporate culture. Also, it can be defined according to users' preferences to promote the individuality of the product.

**Interaction Gesture Design.** About interaction gesture design, maybe the majority of people would firstly think of the control of touch screen such as mobile phones and panel computer. And the scope of users' gesture still stays at the fingers and cannot expand to general body language. Just try to image, in the rapid development of science and

technology, only a wave can control the progress of demo animation when the sensor technology becomes mature. But how to redefine the interaction gesture design. The present picture angles in demo animations are all pre-set by designers before showing to the audience. It doesn't really make a full presentation. If users can control the perspective and dynamic preview in demo animation according to their own minds, gesture control system would be better than voice control system. It not only promote the development of gesture recognition technology, and to a great degree, it makes users achieve a more deep experience and improves the understanding of the product.

### **4.3 The Demo Animation Design Based on the Smart Home of the Special Crowd**

In order to make users be convenient to use it, at the beginning, the design should take account for some parts of special people, for example, the old, the children, color blindness, physical disability and illiteracy. Designers should think about others and consider their feelings and then satisfy their demands. In the design, designers should pay attention to the different characteristics of different special people. Take the screen for instance, demo animation should carefully use color, size and perspective, meanwhile, it should be combined with diversified form to get information. And in purpose of taking care of the special crowd, it should improve its universal property and be more friendly to make it gradually tend to be more reasonable, cordial and humanized.

### **4.4 The Possibility of the Combination of Virtual Reality and the 3D Interaction Animation**

In recent years, virtual reality technology is a hot topic, which is a three-dimensional virtual world build by computer. It make users indulge in the corresponding observation and operation through simulation. It is similar with 3D demo animation to a great degree. Just try to image, they may be combined together in the future, which is of great significance in military, medical, entertainment and games, so does in demo animation. The immersive experiences make users can have a comprehensive understanding only on the screen. Even in the animation, users are able to finish the related whole process by themselves through virtual operation, which greatly enhances the effect of animation. It is easy for us to imagine, this kind of technology may have a striking influence on many industries in future life.

## **5 Summary**

### **5.1 The Main Research Results of This Article**

In this paper, the summary and induction of smart home creatively and purposely put forward the interactive 3D demo animation in order to deepen the experience of users. According to different needs of different customers, animation is fully studied in users' view by analyzing their psychological and physiological characteristics. Take advantage of 3D technology, domestic and foreign outstanding cases and advanced technology, it makes a description of the future trend of 3D demo animation. At the same time, it analyzes the current situation of domestic and foreign demo animation and proposes the

corresponding deficiencies and suggestions. In the end, the article make a deep discussion and analysis upon fashion interaction technology of 3D demo animation. It hopes to benefit the public by shortening the distance between products and users.

## 5.2 Future Research Prospects

In the past decades, demo animation has achieved a rapid development. With the great progress of 3D technology in recent years, the scope of demo animation is expanding gradually a. It has already used in our daily life and make our life be more convenient. Interactive 3D demo animation not only brings users a direct experience, but also promotes the company's development as well as the communication between customers, products and enterprises. With the growing of new industries presented by smart home, the production industry of 3D demo animation is also bound to lead the development and will play a great role in future demonstration.

All in all, the development trend of interactive 3D demo animation is obvious, the technology will be in a smart, automatic and humanized way. Combined with art and technology, it will present a multi-dimensional interactive display among designers, products, customers, enterprises.

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