

## Access Experience Design: Designing for access management system

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**Abstract:** The study of access experience design tries to apply the design methodology to review the Intelligent Access Management System and create a new design in the perspective of industrial design and humanity art. A whole investigation and product analysis is conducted before the specific design, including the product characteristics, spatial planning, enterprise notion, color selection, user behavior, and user desire and so on. This paper integrates the qualitative research of industrial design and ethnology, uses the virtual reality computer technology to simulate product environment and lead user's experience. Authors try to design a simulate product environment to user experience and establish an appropriate research platform to research & development staff. In the access moment of user, the Intelligent Access Management System provides an effective interaction and collects large data on the behavior and habit of user. The article analyzes the Intelligent Access Management System experience design from multi-dimensional perspective to generate a pleasant and humanized interactive design. There are several design methodologies and principles that summarized in the case study of Huishengtong Intelligent Access Management System, which can be applied in the related products design and user behavior analysis.

**Keywords:** Intelligent Access Management System, Experience Design, User Research, Interaction Design

### INTRODUCTION

#### Analysis of Product Background

Huishengtong Intelligent Device Co., Ltd. is a China-based leading supplier specialized in intelligent system of "One card (smart card)". As a high-tech enterprise in IC (Intelligent Card) and Security Industry, it gathers Research & Development, production, sales and service together. It successfully launches various large-scale intelligent access management system (IAMS) and truly achieves "one multi-application card, one card unblocked", secure, time-saving, convenient, efficient and humane management platform on the basis of various users' needs. With a bran-new idea technology serves for life, the products of Huishengtong are being widely employed in national society, government offices, financial institutions, SOEs, transportation, hospital, school, real estate and so on.

#### Experience

"Experience" means "go through", "undergo" or "insight about the world around" as a noun in English. However, "Erlebenis" in Deutsch originates from "Arlee", whose primary meaning is "go through", "empirical" and "deal with". Thus, "experience" refers to "go through" but more than "go through". That is the feeling and insight gained through the process, a distillation of emotion. Just as Joseph Pine states, "experience" is a wonderful sense generated by consciousness when human reaches a certain level of emotion, strength, intelligence or even spirit [1].

It can be seen from above that experience is a

high-level psychological activity. Accordingly, experience is subdivided into two levels, namely sensory experience and peak experience. Sensory experience is usually thought to be the feeling response to external stimulations by the five sensory systems (hearing, sight, smell, taste and touch) and the result of sensory-system satisfaction. It is regarded as parts of common experience. On the contrary, peak experience is interpreted by its proposer Abraham H. Maslow as instantly-appearing and overwhelming reverence, fleeting and strong happiness or even ecstatic and intoxicated sense [2]. People in peak experience tend to feel surprised and unexpected. Compared with sensory experience, peak experience often brings about profound understanding and comprehension. In sum, sensory experience is the basis of peak experience while peak experience is the sublimation of sensory experience. Therefore, it is challenging but significative for designers to think through the ways to provide experiencers with sensory experience and peak experience alternately and to arise interest and guide a well-organized experience at the same time.

#### Experience Design

Born out of experience economy, experience design is soul and core of experience economy. Essentially, experience design, one of the most typical design disciplines, creates an opportunity for designers to review for the first time two-dimensional, three-dimensional and environmental design issues from the point of design philosophy. Meanwhile, designers not only blend service into design gradually, but also focus

on integrating art, technology with marketing organically. Design becomes an effective way for firms to obtain economic benefit. Nathan Shedroff provided an overview of experience design in “experience design” that it is a process that enterprises transfuse consumers’ participation to design take service as stage, product as prop and environment as scenery, in the end lead consumers a nice experience feelings in commercial activities [3].

The fundamental goal of experience design is to blend more components along with consumer psychology and behavior in relative products, environments and services , providing a more accessible, pleasant and humane experience. Every relative task, for example, script arrangement, stage layout, experience prop and role assignment, all determines whether the experience design could leave consumer an impressive and enjoyable memory. In addition, experience result is also greatly affected by the attributes of consumers, like social identity, income, interest, height, age, etc. Start from consumers’ individual difference and demands, enterprises are supposed to create a user-friendly experience via excellent product, environment and service design. The brand culture and identity, which are something intangible and subjective, could be maintained, enhanced and expressed well [4]. Then sales follow.

#### Features of Experience Design:

First, immateriality: due to immateriality, experience design is no longer conducted around the tangible product but the intangible world behind the product and every possible event caused by the product as well. Second, people-oriented: experience design does encompass people’s experience demands. Consumers’ behaviors, psychological traits and experience requirements should be all deeply studied and analyzed before actual design. Similarly, it is a great breakthrough for modern corporations to lead users’ involvement in design & evaluation and in directive participation (for instance, through ergonomics experts) in the whole procedure. Third, process: experience design cares more about the product’s using process rather than the exporting outcome. Taking public telephone design as example, the problem designers should deal with is “how to call” rather than “can call”. In one word, experience design is the result of combining experience economy with commodity market strategy. With consumption experience as core, it is a guideline reference for modern corporations to develop and market commodity. Four, the necessity of interactive experience design: with the development of science & technology and the increasingly competition among businesses, consumption habits are changing gradually[5]. However, beautiful design doesn’t mean efficient information-transfer and communication which are the determinants of consumers’ appreciation. It is significant that experience design could provide a virtual using

environment to users. Good experience design could highlight company ideas and products advantages, convey relative information to consumers vividly through the process instead of the boring thick instruction books. Meanwhile, there is no doubt that the adjustable experience design would be very helpful for developers to test and improve products in certain simulation environments. Faced with fierce competition, the trend of experience design is irreversible.

#### RESEARCH INTENTION

Going through the agricultural, industrial and service economy, we are heading for a new stage experience economy [1]. In the period, consumers eagerly long for further experience (physical sensation and high-level psychological sensation as well) in commercial activities and the completely new consumption patterns make higher design-demands on corporations gradually. Regarding service as stage, product as prop and environment as scenery, the commodities’ exhibition design ought to take advantage of experience to satisfy people’s emotional needs and fulfillments, achieving the highly-unity of humanity and commercialization. Particularly, under the drive of technological development (For example, multimedia and virtual reality technology etc.), exhibition design has been disaffiliated from traditional static mode and extends to dynamic interactive multimedia form, greatly smoothing and accelerating the user-product communication.

In perspective of user experience , this essay studies deeply on intelligent access control management system(IAMS) experience design based on field investigation. Experience design is suggested to emphasize on the efficiency and attraction of user-product interaction and the test trait of experience procedure. What’s more, a goal-oriented consideration is used to explore ways to communicate information effectively.

1. Theoretically, the project applies cognitive psychology correlation theory to experience design research, avoiding a common preference for VC (Visual Communication) to experience design in design practice.
2. The perspective of users. The further high-technology develops the more users request for products. Nowadays, users generally begin to attach importance to experience rather than confined to operation alone, for instance, experience satisfaction, reality, pleasure, amusement and enlightenment, aesthetics etc. No doubt an excellent user experience design would highlight the product and lead user a comfortable and pleasant time with vast significant messages.
3. Combination of theories and practice. In the case of Huishengtong IAMS, the authors search for series of continuous, effective and attractive experience modes with feedback

according to user experience.

Applying the design methodology of product experience to IAMS, the essay aims at exploring a new design method and perspective for intelligent community-relative product design and raising product design into a multi-dimensional level of experiential aesthetics, thus enhancing residents' life satisfaction and subjective well-being (SWB) in the process of urbanization.

## DESIGN RESEARCH

### The Intelligent Control Equipment of IAMS

Along with the development of national economy and the acceleration of globalized economy, more and more demands are made by consumers on the way high technology serving life. China security products industry is booming and expanding rapidly. IAMS timely comes into being in that background, not only the management of gateways and keys. Actually, it has grown up to a complete access-control system. IAMS is a multi-disciplinary comprehensive high-tech muster, involving Electronics, Mechanics, Optics, Computer Technology, Communication Technology, Biostatistics and other fields of new technology. It's worth mentioning that IAMS plays an enormous role in administrative tasks (such as working conditions' security, attendance management). Nowadays it is also added with relevant auxiliary functions (for example, elevator control, vehicle access management, fire monitoring, patrol management, sales-charges management), truly realizing "One Card" intelligent management in a certain district. Based on the identification patterns, contemporary, IAMS is categorized as three types: password identification, card identification (magcard, radio frequency card) and biological recognition (fingerprint identification, iris identification etc.).

Obviously it is an irresistible trend to integrate IAMS with monitoring, burglar alarm and intercom system. Meanwhile, IAMS provides a platform for multi-functional softwares, multi-interface management and other single systems, resulting in IAMS as the best choice for basic platform among the four security systems. Besides, the integration with IAMS, OA (Office Automation) and SMS (Short Message Service) platform start to gradually emerging. It can be concluded that the tendency of IAMS is heading for intelligent integration under the support of technology's reformation and innovation.

### The Shortages of IAMS

In spite of all this, IAMS is still confronted with many obstacles. 1. "The castle in the air". As we all know, IAMS's chief role is "on-off". However, the current IAMS is attached to kinds of functions to satisfy different requirements (as network alarm, information collection, emergency calling etc.). Because of the dizzy redundant functions and the main parts' overshadow, the existing products still meet with a low

market share. 2. Low purchase intention for troublesome operations. With the bundling functions increasing constantly, higher demands are made for use. The majority of consumers prefer to reject those multi-functional but unfriendly electronics as a result. 3. Lack of maintenance, Uselessness of facilities. Even though IAMS is connected with monitoring, burglar alarm and intercom system together in most circumstances, the lack of strong technology and maintenance costs support invariably leaves the expensive high-end IAMS that totally useless decoration. Therefore, it is essential to carry on effective improvements on the issues above during the IAMS's development and market.

As Industry Design blossoms rapidly, most enterprises at present fails to pay attention to products' humanism and experience design (high-tech products in particular). Designers and programmers research and develop a designing scheme together. After engineers materializing the idea, a series of product would be labeled and placed in glass cases one by one [6]. It seems that it is a product's whole development process. Actually it is true for a large proportion of business, especially in China. Nonetheless, product's real value is much more than what is reflected in the glass box—usage modes, features and built-in systems cannot be presented to consumers directly and vividly in that case. So, when engaged in interaction design of the product itself, enterprises ought to create a pleasant experience environment for developers and consumer at the same time—taking service as stage, product as prop and environment as scenery. Firstly, product can be further perfected according to researchers' and consumers' experience feedback in time, guaranteeing it fits the market well. Secondly, it could attract consumers and potential customers to experience and understand product in the simulation environment, greatly driving the product success.

### Designing Ways to Visualize the User Access Experience

In real life, it is shown in consciousness directly that people reflect to outside objects. Feeling is the fundamental condition to form consciousness and it exists in consciousness. Perception is composed of feeling and consciousness [7]. People get perceptual knowledge of outside objects via perception, but it isn't the end. There is still a process of rising from perceptual knowledge to rational knowledge. Based on this process, people can make judgment and decision on outside objects to exceed the perception. Cognition is the summary to kinds of knowledge. Cognition psychology defines Cognition as processing the outside information, which includes the process of consciousness, superficials, memory, thinking and language etc [8]. Users acquire the perceptual knowledge of product from perception system when they use the products, and obtain the interest to use other products. It can motivate brain to think and communicate with others after experiencing series of

products by themselves. Finally, the rational knowledge is formed when users integrate the knowledge experience of company culture and products. As Figure 1 shows, one of this article's intentions is to improve the efficiency and amusement of product to user experience through the multi-dimensional design based on perception theory, as well as the effective transmission of company notion and products feature.

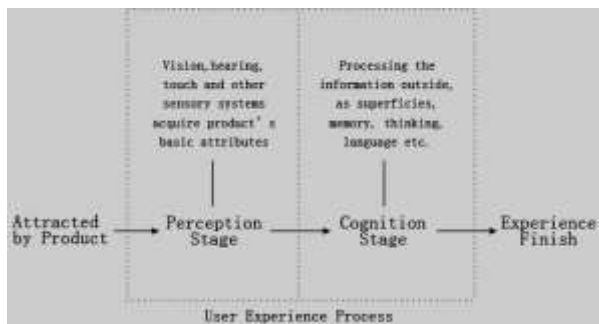


Fig-1: User Experience Design Process

**Case Study**

**Relative Factors Analysis of Huishengtong IAMS Experience Design**

User Requirement Analysis refers to conduct particular investigation and analysis before detailed design and design process [9]. It is the base of detailed design and design improvement. In short, requirement analysis is to solve "what to do", that is, understanding users' diverse requirements comprehensively and expressing them. Experience design is a process of organization around experiencers. So before the real design, it is essential to decide the appropriate technology, integrate product, display content and experience mode aimed at actual budget. As is shown in the Figure 2, the main factors of IAMS are function, height, feedback and materials. Taking Hunshengtong experience design as example, the designers make large quantities of all-sided requirement analysis on the company, IAMS and consumers to make sure of effective design and theme.

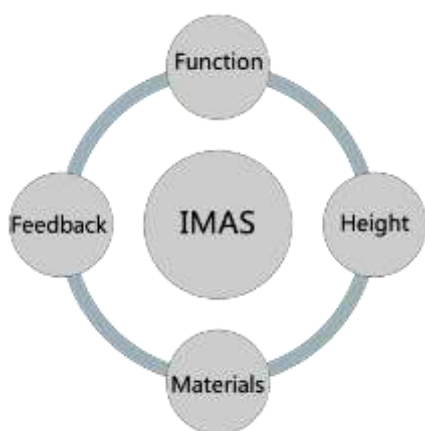


Fig.-2: The Main Factors Of IMAS

They are sorted as below: IAMS install location (on real wall, virtual wall, reconstructive); IAMS

feedback mode (prompt for operation, feedback ways, different); different recognition pattern (button, card, biological recognition); ways to build a good experience (move locations, diverse feedback sounds, chain experience); in view of different heights and ages (location, volume, color); identification (virtual door: sounds, music, image, light[8]; real door: shrink, magnify; move forward, back, alongside); sound(long, short); door (transparent, non-transparent); experience process (experience one by one, by partitions, by chains); stand out design features(color, form, materials, craft etc., for example ).

Feasibility analysis and summary: Analyzing the feasibility of the costs, technologies, spaces and other actual problems, the points of design requirements are summed up as five tips below: First, feedbacks: Sounds, lights, movements and curtains (virtual wall). Second, feedbacks: light switches, light-oriented. Third, feedbacks: extension of doors (shrunken door, contractible door, screen, curtain). Four, different heights (rails on the wall and pillar, as the Figure 3 shows). Five, recognition mode (by card: cards' store; by fingerprint: fingerprints' entry; by password: initial codes and change). Then IAMS experience design could be carried out deeply in the basis of requirement analysis and feasibility analysis.

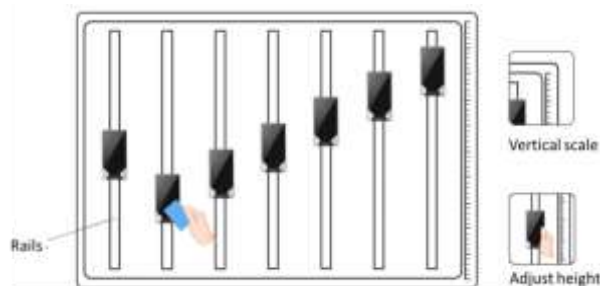


Fig- 3: Rails On The Wall

**The Analysis of IAMS Products**

Huishengtong is always concentrating on IAMS development. This paper mainly studies the latest series product for the experience design. The fourth generation IAMS includes two recognition modes separately for ordinary card and VIP card as the Figure 4 displays.



Fig- 4: The Fourth Generation IAMS



The Figure 5 below is the common working process for the fourth generation product.



Fig-5: The Common Working Process Of IAMS

**Ensure the Theme of IAMS Experience Design**

An explicit theme is the first step to carry out experience design and the theme is always core of experience design. In the early stage, designers should determine the experience theme based on corporate culture and product features. A unique and well-positioned theme helps to consumers’ cognition about the board and environment, leaving a pleasant and impressive memory. Good theme is conducive to a good brand impression and positive evaluation while a fuzzy theme makes it difficult to integrate all sensory factors, resulting in a scattered experience and ineffective communication [10].

The selection of experience theme usually requires operators and designers to analyze market trends, corporation culture, source, product value, and make exact market position, decide the design theme and direction eventually. Once the theme is confirmed, all the design activities about product, service and environment later must be expanded around it. The Figure 6 below is about the image LOGO of Huishengtong, the main colors of which are blue and yellow and the design is made up by circle and lines. As

an intelligent technological product company, the high-technology and modern ought to be emphasized with functions, colors and materials. Thus the company’s experience design could inherit and learn from the LOGO’s elements, forming a unified style experience modes and environment.



Fig-6: The Logo Of Huishengtong

**Detailed Experience Design of IAMS**

The field investigations have been made before design. After the site’s actual measurement, the space is divided into four parts by function (shown in Figure 7): meeting room, the area for IAMS experience design, the area for simulation car and the area for elevator control (they are the main products in Huishengtong). Therefore, the shade area in the Figure 8 is the available space for IAMS experience design.

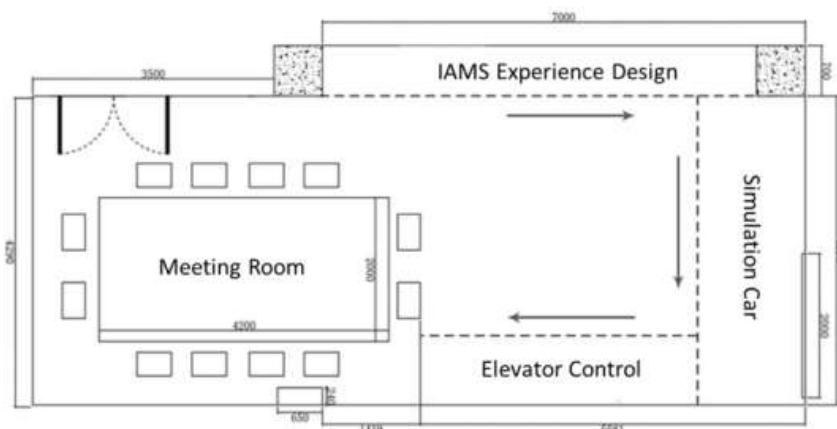


Fig-7: Spatial Distribution

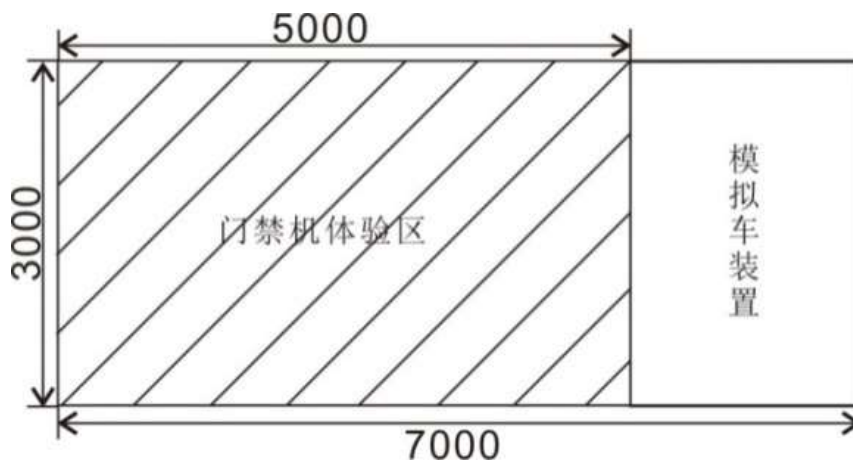


Fig-8: The Available Space

In the next stage, the IAMS experience space is partitioned according to the conclusion of requirement analysis and feasibility analysis above (shown in the Figure 9 and 10).

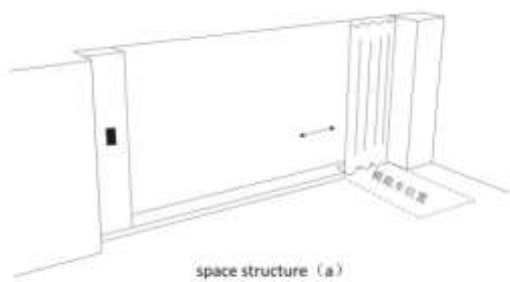


Fig- 9: Space Structure(A)

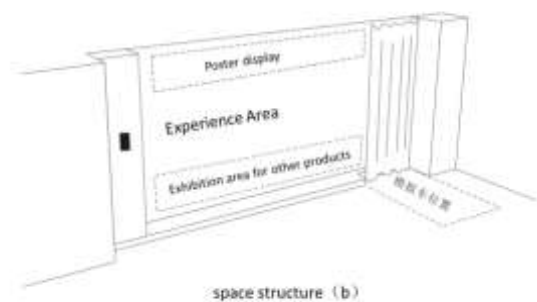


Fig-10: Space Structure(B)

It is vital for enterprise to arrange corresponding experience ways with different series in the IAMS users experience design. In the case of Huishengtong Co. in Shenzhen, the products are mainly classified into three groups: button recognition (password), card recognition and biological recognition. As is known to all, the access control machine has the traits of small size, large quantity and diverse models. Therefore, differentiating the experience process by recognition modes is the most effective way to obtain satisfying experience results.

The usage results of all heights need to be compared in order to test and explore the most appropriate height for different users. Synthesizing all aspects, IAMS could be installed on vertical rails, moving up and down (as shown in Figure11), or hanging IAMS with threads of various lengths along the wall to form unexpected decorations (Figure12).

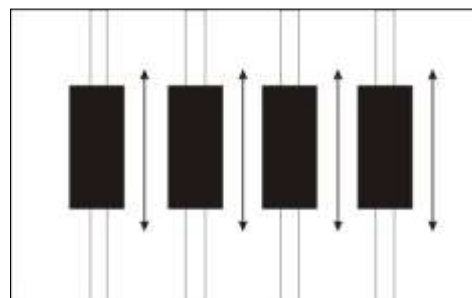


Fig-11: Vertical Rails

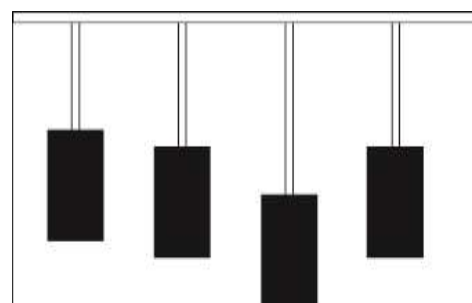
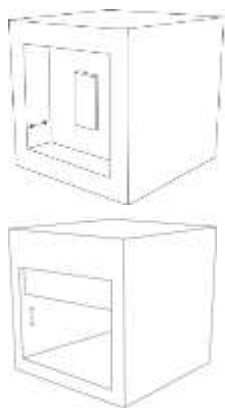
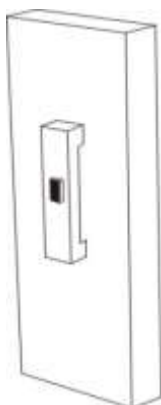


Fig-12: Various Lengths Of IAMS

As the limitation of exhibition's space and budget, mechanical structure is much more preferred than electrostatics force during the experience device design [11]. The structures shown below shown in Figure13 are possible options to display IAMS) after identified, the board moves back and forth, up and down, vividly simulating the real door's on-off result. Simultaneously, the various small wooden boxes could be grouped and separated in place, contributing to chain experience and attractive diversified interaction environment.



**Fig-13: Vertical RAILS**



**Fig-14: Scheme**

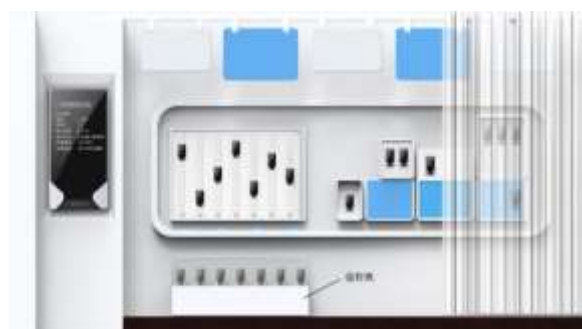
In addition, it is nearly impossible to fix a real-size door and open it in a restricted circumstance. The scheme above (shown in Figure 14) is a good choice for stimulating real door's using environment.

**RESULTS AND DISCUSSION**

This essay conducts the design of Huishengtong IAMS around several aspects. First, it is the combinational results of experience economy and market strategy to IAMS experience design, which emphasizes the participation of consumer in design[12]. In order to bring the consumer a wonderful feeling of experience in commercial activities, IAMS experience design put the service as a “stage”, the product as a “prop”, and the environment as a “scene”. Experience design focuses on consumer experience and has become the important basis during the products’ development and market. Second, the requirement analysis of IAMS leads decision-making, directionality and strategy. It should be taken into account many related factors such as technology, human, product, spatial environment and so forth before design. The comprehensive requirement and feasibility analysis are applied in design research to ensure the efficiency and direction of design. Third, there are two types of IAMS experiencers: research & development staff and consumer. The experience design in Huishengtong IAMS follows three principles, namely experience ways of regularization, feedback ways of

diversification and adjustable experience environment. Last, it is significant to identify the interactive experience between product and user, emphasize the communication of sensory stimuli and emotions, and integrate the knowledge, entertainment and participation that integrate the perceptual experience of diverse sensory perceptions. To understand and improve the products further, it should arouse users’ rethinking action in experience practice and inspire the users’ surprise, interest and thinking about problems solution.

The Figure 15-18 are about the final rendering product of IAMS design. This provides the three-dimensional virtual environment for users to experience the interaction process. While, it has been pre-produced and experienced by some users.



**Fig-15: IAMS Products**



**Fig-16: IAMS Products Group**

Chain experience for series of IAMS, password-recognition especially:

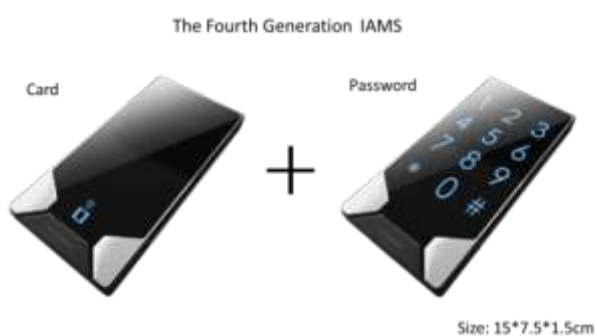


**Fig- 17: IAMS Working State(A)**



**Fig-18: IAMS Working State(B)**

The Figure 18 is about the two working conditions rendering of the product. The whole experience design rendering is shown in Figure 19.



**Fig-19: IAMS working conditions**



**Fig-20: Whole Experience Design Scene**

User experience should be regarded as a design methodology throughout product design research & development, rather than a single step. According to above, it can be seen that experience design intends to conduct further design specifically based on the experience feedback for the finally best experience, and guide user to make choice on pre-purchase experience in simulation environment.

The paper tries to indicate that user experience design should understand the enterprise culture, product feature, and the strength and weakness of competition products so that a better interactive relation between human and product can be established. According to the characteristics of IAMS, it can be summarized the

principles of IAMS experience design are: first, experience ways of regularization. Most intelligent IAMS at present are controlled by internet control center. Due to the development of technology and the improvement of security requirements, especially the increasingly diversity of recognition modes —button, magnetic card, fingerprint, iris etc. The intention of user experience design is to provide user and researcher a better experience of the IAMS’s intelligence and convenience. Therefore, a regular product experience can optimize user experience design greatly, not only acquiring better feedbacks but also delivering product idea at the same time.

Second, diverse feedback ways. Since the various types of IAMS, changeless feedback ways is easy to be bored with by users. This article tries to rich the feedback ways through five senses and materials, such as music, light brand and so on, not just the simulate door’s open-close[13]. The diverse feedback ways could make IAMS much more vivid and attractive to users. To be exact, diverse feedback modes not only increase the entertainment and pleasure of users, but also attract and guide users to participate in experience positively, which embodies the humane tendency of user experience design. Third, experience environment adjustable. IAMS experience design is not just for increasing sales. It is significant to create a simulate environment to acquire the feedbacks from researchers and users. The installation site (up/down, right/left, front/back), installation environment (metal, glass, board etc.), and feedback effect of IAMS should be optimized directed every test. Therefore, all the relevant factors of IAMS should be designed as adjustable as soon as possible. Meanwhile, it could not be overlooked to record and track the experience feedbacks.

During the IAMS experience, it can be induced that experience design does affect users in many aspects, such as Attention-Action-Interest-Desire-Memory-Action [10]. Nowadays it is has formed a new trend to promote the product market via the design-oriented innovative experience design.

**CONCLUSIONS**

The research goal of this article is to design user experience ways of Intelligent Access Management System (IMAS) along with the emerging of the experience economic. This essay analyzes the conception of experience economy, experience design and human access behavior, explores the process and methodology of IAMS interactive experience design based on the requirement and feasibility analysis, and summarizes the design methodology and principle of IAMS user experience. In the paper, the subject methods of ergonomic and recognition psychology are applied into IAMS experience design, which could provide a reference for related research and design.



## ACKNOWLEDGMENT

The authors would like to thank Huishengtong Co. in Shenzhen for their great support of Intelligent Access Management System experience design project. We would also appreciate to Liangzhen Qu, Ting Yu, Yao Zhang and Chuchi Zhuang for their passionate collaboration and discussion during design research.

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