

Hotel Customized Product Design and Implementation Based on Intelligent Hardware Devices

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Abstract

The vigorous development of intelligent hardware technology and the increase of customer's personalized demand will cause that hotel not only meets basic demand of customer's accommodation and food, but also provides customer with healthy, cheerful and novel hotel experience. The hotel customized product based on intelligent hardware technology which can provide customers with comprehensive experience of health and recreation turns to be the most importance choice for hotel. The purpose of this study is to design the four types customized products, including dotted, chain, modular and full customized products in the services of housekeeping, food and beverage and recreation according to customer demands, and then the implementation tactics from the point of technology and management are brought forward.

Keywords: *Intelligent hardware device, Hotel customized product, Design, Implementation*

1. Introduction

With the rapid development of intelligent hardware technology, virtual reality technology, network communication technology and the increase of customer's personalized demand, hotel product gradually becomes to the combination of intelligent hardware devices, information technology, artificial services and art. The modern hotel should meet the demand for customer's accommodation, food and beverage, aesthetic, health and recreation, and provide the pleasant and fancy hotel experience for customer. The hotel customized product based on intelligent hardware devices appears at the historic moment. In recent years, the intelligent hardware devices such as smart glasses, smart watches (bracelet), and intelligent home which are gradually applied in the service industry not only cause a new wave of intelligent hardware technology[1-3], but also bring new experience for customer, such as the design of wearable range-vibrotactile devices for the tourists and outdoor workers. That is a smart and convenient tool which can identify the direction to improve the tourism experience and productivity[4]. Smart glasses enhance the museum experience of customer[5], Intelligent wearable device are for healthcare services[6-7]and bring new benefits to continuous medical monitoring, physical activity assessment in real-time, baby monitoring and industrial applications[8-9]. At the same time with the Google AlphaGo (the artificial intelligent program of Go) beat human champion Lizai shi, everyone recognizes the artificial intelligence, and "can the robot be the master of human?" has become a hot topic[10-11]. Artificial intelligent technology is also increasingly widely used in the manufacturing, aerospace, environmental protection, nanometer[12]and healthcare[13], for example the development of mobile robot motion control system[14], hand gesture recognition strategy of philosophy[15], Hybrid intelligent system design using the grey system theory[16]. They will lead to industry transformation and service innovation, such as cancer treatment and participate in the library service based on artificial intelligence[17]. Virtual reality, face

recognition payment system and the service robot will make the hotel full of charm of science and technology[18]. The intelligent hardware devices not only change the lifestyles and consumption idea of customer, but also have an big effect on the product design and business mode of the hospitality industry. According to the European commission's investigation, the market value of service robots will reach 100 billion Euros in 2020. In consequence, the hotel which applies the intelligent hardware devices based on the artificial intelligence, virtual reality and wearable technology to services of housekeeping, food and beverage and recreation is especially important. This paper describes the application of intelligent hardware devices in the services of housekeeping, food and beverage and recreation, and designs the dotted, chain, modular and fully customized product according to customer demands and interests. Moreover we make a deep analysis of the implementation strategy from the point of technology and management.

2. The Application of Intelligent Hardware Devices in Hotel

Intelligent hardware devices can connect guest room, dining room and entertainment department together, and monitor body condition according to customer's requirement from the three aspects of sleep, diet and exercise in order to provide the integrate health solutions of rational diet, effective sleep and moderate exercise.

2.1. The Application of Intelligent Hardware Devices in Housekeeping Service

Intelligent hardware devices have been widely applied in housekeeping service, such as intelligent bed, intelligent robot (chatting, play games, cover with quilt and take things), intelligent commodity (electric toothbrush, smart makeup and smart toilets) and one-click control which can connect the electronic devices in room (television, air conditioning, lights and so on) to the smartphone. Among them, the intelligent bed is typical representative. The intelligent bed which has built-in biometric sensors can collect the customer's data of heart rate, respiration rate and degree of sleep, and adjust to the best supporting strength and the hardness of the mattress according to the height size, weight and sleeping position of sleeper^[19]. Moreover it can automatically record the best state of sleep, and pass the data to sleep analysis system, in order to provide professional health advice of sleep for customer. Follow the principles of "Sleep produce health" and "improving the life quality", the intelligent bed can give customer advices on the diet and exercise schedule of the next day which is based on the sleep data of last night by the adaptive algorithm. At the same time, the intelligent bed which connects to smart bracelets will adjust different hardness index of mattress on the basis of the body movement data from customer's smart bracelets, in order to help customer to enter deep sleep and obtain the pleasant sleep experience.

In addition, the intelligent bed not only has the function of automatically adjust temperature by the user's data (heart rate, breathing, body movement) and personal preference to make the exclusive "temperature curve of golden sleep" for everyone, but also has the function of warming bed automatically before sleep and "a key bask in the quilt". Meanwhile, the bed can also be connected to the service robot, when customer kicks a quilt, the service robot will gently cover the quilt for him like mother or spouse.

2.2. The Application of Intelligent Hardware Devices in Food and Beverage Service

Intelligent hardware devices build a healthy, comfortable and interesting dining environment for customer, and realize the desire of the people's rational diet. The intelligent food and beverage control system which connect the waiter, table, tableware, kitchen to customer by intelligent hardware devices should provide the food calories information, nutritional value and various dining scene of virtual experience for

customers, such as the characteristic scene of folk song and dance, work while dining, business talk, friends get-together. Intelligent hardware devices has been widely applied in food and beverage service, for example intelligent bracelets will record the customer data of heart rate, pulse and consume calories in the morning, when customer's wrists touch the intelligent table, the intelligent table can receive the data and automatically display the food nutrition of lunch which is customer needed to add. Moreover, it can rapidly take the food information from the menu system to help customers to have rational diet, and customer can see the dishes' taste, nutrition composition and calories by clicking electronic menu to select dishes. Moreover the selected dishes will be directly passed to the kitchen cooking, and the cooked dishes can be transmitted by service robot or a waiter to table according to customer's requirement. The dishes also show the calories and nutritional value of food through the sensor and liquid crystal display for customer.

Customers can be put into a particular scene and enjoy the meals by virtual reality glasses at meals. Virtual reality glasses are divided into two kinds, one kind is high-grade, such as "Google Glasses" which is a wearable computer. Customers can browse the web, take food photos and video which can be upload social platform, and complete all the missions of the smartphone by simple voice commands, in order to liberate hands to "focus" the food. The other kind is simple and interesting, such as "Google Cardboard" which can be used by collocating the smartphone and the corresponding app. The cardboard includes double convex lens, magnet, magic stick, rubber band and NFC *etc*, which can be assembled a simple glasses of virtual reality by customer according to the introduction in a few minutes. The customer will acquire the double pleasure of tasting food and making toy at mealtime.

2.3. The Application of Intelligent Hardware Devices in Recreation Service

The intelligent hardware devices build a healthy, comfortable and funny recreation environment to relax body and mind of customer. Intelligent recreation system connect the waiter, coaches, fitness equipment, intelligent wearable devices to customer, and dynamically adjust the exercise intensity and fitness training plan according to constantly monitor data of customer's sleeping, dining and physical condition by intelligent hardware devices. Intelligent hardware devices have been widely applied in recreation services, such as intelligent fitness equipment, 7D movie theaters of virtual reality and intelligent wearable devices.

The intelligent fitness equipments include three kinds: the first kind is a multi-media treadmill which is equipped with music, video (film) and WIFI can make customer to run more simply. At the same time, the customer can choose the program of running training according to the condition of age, weight and personal preference, and automatically adjust the speed of treadmill. The second kind is wearable muscle stimulator which is lightweight and portable. It can be posted at any place where you want to get fit, you can view degree of each muscle exercise in real-time and daily exercise muscle by Bluetooth and the corresponding App. The best benefit of wearable muscle stimulator is making user to exercise at anytime and anywhere. The third kind is the exoskeleton equipments which imitate nature become the extension of human body to help mankind to fulfil the tasks which can't complete before. There are different kinds of sport experience modules in the exoskeleton equipment for customers, such as imitating space walk, flying in the air and climbing mount. And the exoskeletons equipment is equipped with standardized connector, customer can load all kinds of wearable devices what he needs or interested.

In addition, intelligent fitness equipments which using artificial intelligent control system can help customer to find like-minded training partner to share the achievements of their own training. As the combination of fitness and entertainment, the intelligent fitness equipments can make user to get the pleasure of sweaty hard and interesting game. Meanwhile, the intelligent robot which replace coach provide customer with professional

coaching course. The intelligent robot will monitor the customer's exercise situation in real-time, when the customer reached unsustainable gravity, the intelligent robot will automatically reduce the suffering force of training to provide secure and comfortable fitness experience for the customer.

In short, the intelligent hardware devices are developing towards the trend of more human, high efficiency and operational convenience, the form of dynamic engine evolves from traditional motor driven to new flexible materials, and gradually become a part of the human body extension.

3. Design of Hotel Customized Product based on the Intelligent Hardware Devices

The customized design of hotel product based on intelligent hardware devices doesn't simply attach the intelligent hardware devices to the traditional hotel product, but find a new perspective from the people's physiological characteristics and psychological feelings, as well as the positive lifestyle of society and fashion idea of consumption. Therefore, the intelligent hardware devices are not the main problem, how to make the hotel customized product provide customer with pleasant and novel experience of intelligence on the basis of the hardware devices is the most important problem.

3.1. The Concept of Hotel Customized Product based on the Intelligent Hardware Devices

Hotel customized product is the comprehensive combination of intelligent hardware devices, artificial service and environment to meet the need of customer for pleasant experience in the hotel space. The intelligent hardware devices are the carrier, the artificial service and information are the core attributes, the environment is the catalyst, pleasant experience is the final goal. Hotel customized products which is on the basis of information platform (intelligent hardware devices and big data) provide customers with customized intelligent products, which including experience intelligent hardware device and virtual reality scenes, participation in improvement and innovation of the intelligent hardware device, exchange and learning of knowledge (learn cooking really in the leisure kitchen of hotel or with intelligent glasses virtually at home) and professional fitness solutions by experience all the intelligent hardware devices. The suppliers of hotel customized product are service robot with high intelligence quotient and staff with high skills and emotional quotient.

The hotel has multi-profit model, which including experience intelligent hardware device, professional services of staff, sales of the intelligent hardware devices and integrative information solutions of diet and fitness. Hotel intelligent information platform is the intelligent system which connects intelligent hardware device, staff, professional counseling centers to customer. It delivers the monitoring data of customer from the intelligent hardware device in housekeeping, food and beverage and recreation service between customer and professional counseling center according to customer demand. Therefore the customized product is the combination of intelligent technology and sincere emotion service which includes technical guidance, emotional support and moral encouragement of staff.

3.2. The Type of Hotel Customized Products based on Intelligent Hardware Devices

3.2.1. The Overview of Hotel Customized Products Type: Hotel customized product is exclusive for customer and reflect customer's personal demand by customer's participation in the design, composition, production and trading of product. Customers have different degrees of participation in types of hotel customized products. Hotel customized products are divided into four types: dot customization, chain customization,

modules customization and full customization along the products value chain. And the four types are based on management. Dotted customization indicates that the trading way of hotel product is customized, which including distribution channels and trading contracts. The trading contracts can be divided into standard and negotiation contract, diversified distribution channels includes direct sales, agents, and the third platform. Chain customization indicates that the combination method of hotel product is customized, combined programs include intelligent hardware devices or scenes, artificial service and information solutions. The combination channels are divided into hotel information platform which according to the selective results of most customers, customers self-select, staff's referrals and the third platform. Module customization indicates that the production of hotel product is customized, which is made up of three modules: food and beverage, housekeeping and recreation service. Each module has diverse hardware devices, such as intelligent massages bed, intelligent constant temperature bed and "fall in sleep" bed. When customers experience hardware devices, they can choose three control modes of the intelligent hardware devices, such as self-adjust, request the waiter to guide and automatically adjust by machine. The full customization indicates that the design of hotel product is customized, customer actively participate in the design of intelligence service, improvement and innovation of the dishes and so on. The four types of hotel customized product is shown in Figure 1.

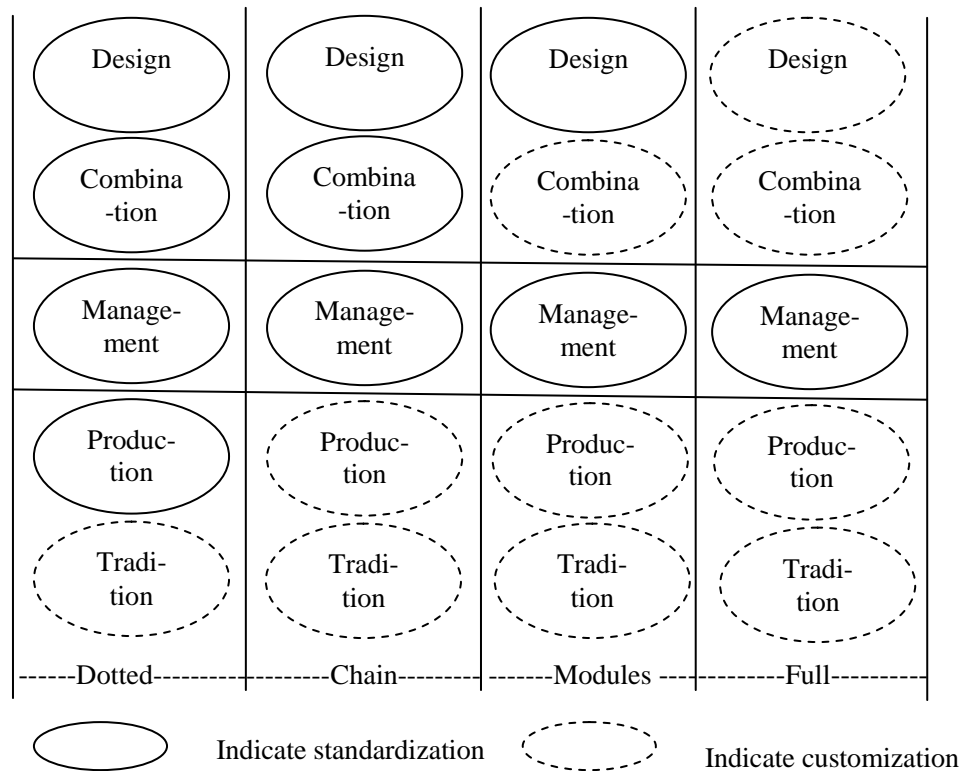


Figure 1. The Type of Hotel Customized Products

3.2.2. The Key Design and Management Point of Different Customized Products:

The key design and management points of the four customized products are different, as follows: dotted customization focuses on diversified way to trade, standard production of intelligent devices, standard artificial service and cost management; Chain customization focuses on the diversified combination method, construction of hotel information platform and the contact with the third platform; Module customization focuses on diversified design of the three modules which including food and beverage, housekeeping and

recreation service, the convenience of customers' choice, the communication with customer and the compound staff management; Full customization focuses on the design of intelligent services, improvement and innovation of dishes, the ability to guide and influence on customer, the development of new products and improvement of staff's quality. It emphasizes the integrated advantage of the product value chain. The four types of hotel customized products focus on different key points, as shown in Table 1.

Table 1. The Key Point of Different Customized Products Design and Management

The type of customization	Design	Combination	Production	Trade	Management
Dotted customization	Mass standardization	Hotel information platform /the third platform	Standard product/ Consistent quality	Direct sales /the third platform standard/negotiation contract	Standardization production /cost management
Chain customization	Mass standardization	Hotel information platform /the third platform/ customer self-select /staff's referrals	Standard product/ Consistent quality	Direct sales /the third platform/ partly negotiation contract	Construction of hotel information platform /connection with the third platform
Module customization	Diversified design of the three modules	Diversified combination	Module of diversified products / Consistent quality of the same product	Direct sales /the third platform/ partly negotiation contract/standard process/ personal order receiving and deliver	Convenience of customer choice/communicate with customer/ management of compound staff
Full customization	Design of intelligent services/improvement and innovation of dishes	Diversified combination	Individual needs	Personal order receiving and deliver /several process standardization /negotiation contract	Guide and influence on customers/ development of new products

4. The Implementation of Hotel Customized Products based on the Intelligent Hardware Devices

Implementation of hotel customized products based on the intelligent hardware devices should be support by intelligent hardware technology, information technology and relatively perfect hotel information platform. Therefore, built hotel information platform is the key point of the implementation. The Key technologies involved in intelligent hardware technology, virtual reality technology, multi-media interactive technology, voice recognition technology and cloud computing technology.

4.1. The Implement Process of Hotel Customized Product

Hotel information platform is the interactional interface which connects hardware devices manufacturers, hotel and other supply resources to customers. It depends on the Internet, the Internet of things and other advanced technology through inter-personal and

man-machine interaction. The platform includes two interfaces of physical and online store (Website, APP, Micro-store). The physical interface (hotel) can help customer percept intelligent hardware devices, communicate with employees in-depth and determine to buy the hotel customized products. There are some advantages of excellent geographical location, compound staff (knowledge, skills, emotional) and "see the material object" to improve the purchase rate of customer in hotel space. The online store is the virtual interface which can help customer conveniently search, compare product and trade in real-time. It can provide the exhibition space of all kinds of hotel products and services at any time and any space. The two interface are functional compatibility and complementary advantages, which can provide customer with efficient and high-quality customized experience.

4.1.1. The Function of Hotel Information Platform:

(1) The information media of intelligent hardware, health preservation and tourism and leisure. The hotel information platform is given priority to the hotel intelligent customized products, and the tourism and leisure services of destination are complementary. It provides customers with the information of intelligent hardware, health preservation and tourism and leisure which involves hotel internal and external aspects. There are the experience of hotel intelligent hardware devices and the scene in the guestroom, catering and recreation department, participation in the improvement and innovation of hardware devices and dishes, knowledge exchange and learning of fitness, as well as acceptance of a series of specialized fitness solutions in hotel space; The information consultation, planning and tips sharing of tourism and leisure resources involving accommodation, transportation, traveling, shopping, entertainment and sport of the destination can meet customer's demand outside the hotel. The implement of hotel customized product inside and outside the hotel needs to establish cooperate relations with the tourism and leisure enterprises of destination, such as manufacturers of intelligent hardware device, scenic spot, restaurant, transportation company, travel agency and shopping store.

(2) The experience sharing of intelligent hardware and tourism/fitness. The hotel information platform establishes virtual community of tourism/fitness and interest club to share the information and experience of intelligent hardware, health preservation and tourism/fitness, following the principle of "the more you share, the more you benefits" by the UGC (user generated content). It can collect massive supply resources to attract customer's attention, and then again gather a large number of suppliers to join ecosystem provide rich, diverse and high quality services for customer. Social network can gather popularity and get a lot of hits for the hotel information platform, at the same time, the products trading and the user's experience provide the hot topics for the social network, accordingly form the profit pattern of social network. It not only will change the customer's consumption style, but also expand the channels of the hotel's profitability.

(3) Differentiation sharing of the demand resources. The customer behavior of searching information is the demand resources generated process. The hotel information platform should differentially share the demand resources with intelligent hardware manufacturers and other supply enterprise to create the convenient communication and transaction channel between hotel and other tourism and leisure enterprises.

4.1.2. The Structure of Hotel Information Platform: The goal of hotel information platform is flexible and convenient provision of hotel customized products for customer by the way of gathering, scheduling, matching, combining and management the resources of supply and demand on the basis of the internet of things and cloud computing technology. The structure of hotel information platform contains business module, virtual community module, public information module, background management module and external links module, which is as shown in Figure 2.

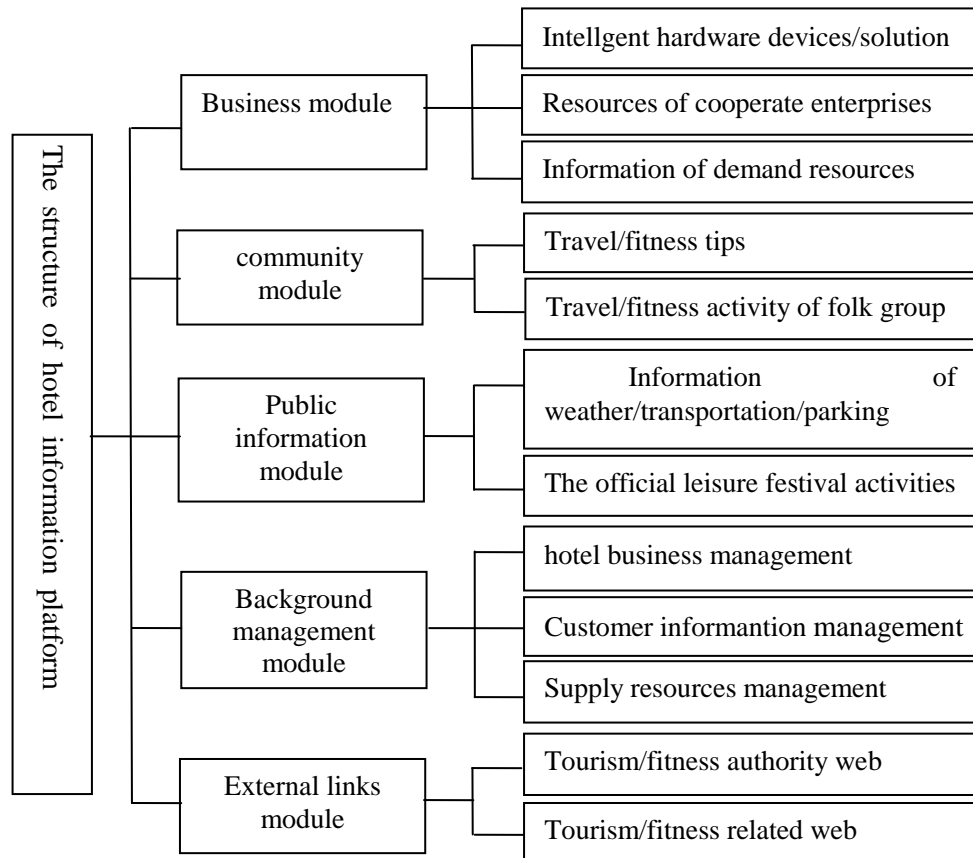


Figure 2. The Structure of Hotel Information Platform

The travel/fitness community module is the characteristic of the hotel information platform, its core point is users' interaction and interest sharing. The community module integrates travel/fitness diary, experience of intelligent hardware devices, share of tourism/fitness tips, review, goods in-trade and self-help groups. Additionally, it provide users with a harmonious atmosphere, rich information and equal communication environment to enhance customer's emotional attachment to the community, so the users will often access the platform and gradually form the new travel/fitness plan or experience intelligent hardwares in the community in order to indirectly improve's loyalty to the enterprise; On the other hand, the social network can form a strong alliance through gathering consumers to buy the products in the preferential price. The structure of tourism/fitness community, which is as shown in Figure 3.

Public information module provide updates information of weather, traffic, parking and official travel/fitness activity, which including the activity place, content, contact person, contact phone number. Background management module mainly contains the data maintenance which including travel/fitness activities, hotels, scenic spots, car rental and customer information, order processing and decision analysis. External links module includes the tourism/fitness industry authority and relevant web to expand the view of user.

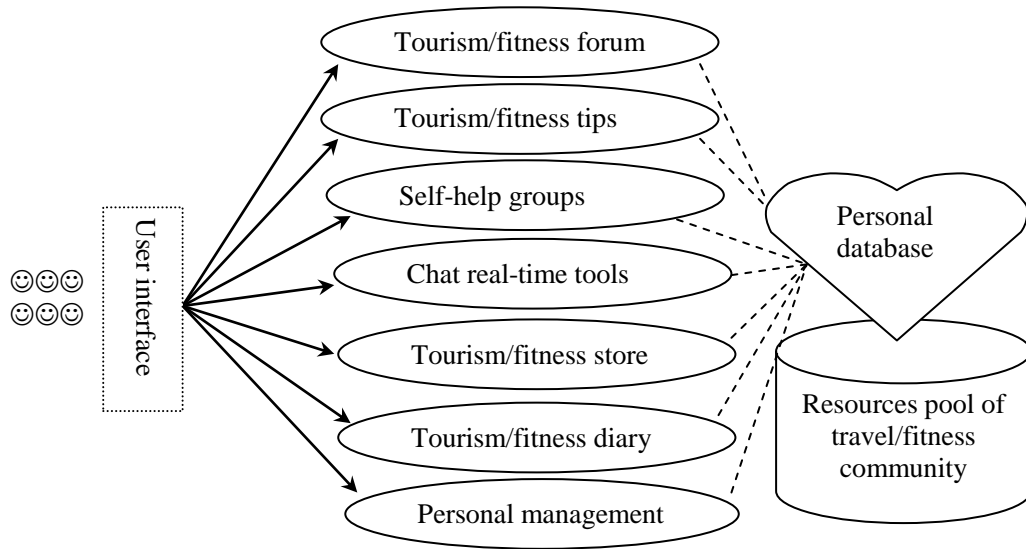


Figure 3. The Structure of Travel/Fitness Community

4.1.3. The Process fram of Hotel Information Platform: Implement of hotel customized products is based on the hotel information platform, according to the process of service retrieval, matching, integration, optimization, trading, experience and evaluation. The platform not only provides the information services for the customers and the manufacturers of intelligent hardware devices, but also establishes the management system of demand resource to make full use of the requirement information of customers, as shown in Figure 4. The requirement information of customers can provide the beneficial reference and suggestion for new product design and marketing innovation of hotel industry and intelligent hardware manufacturers.

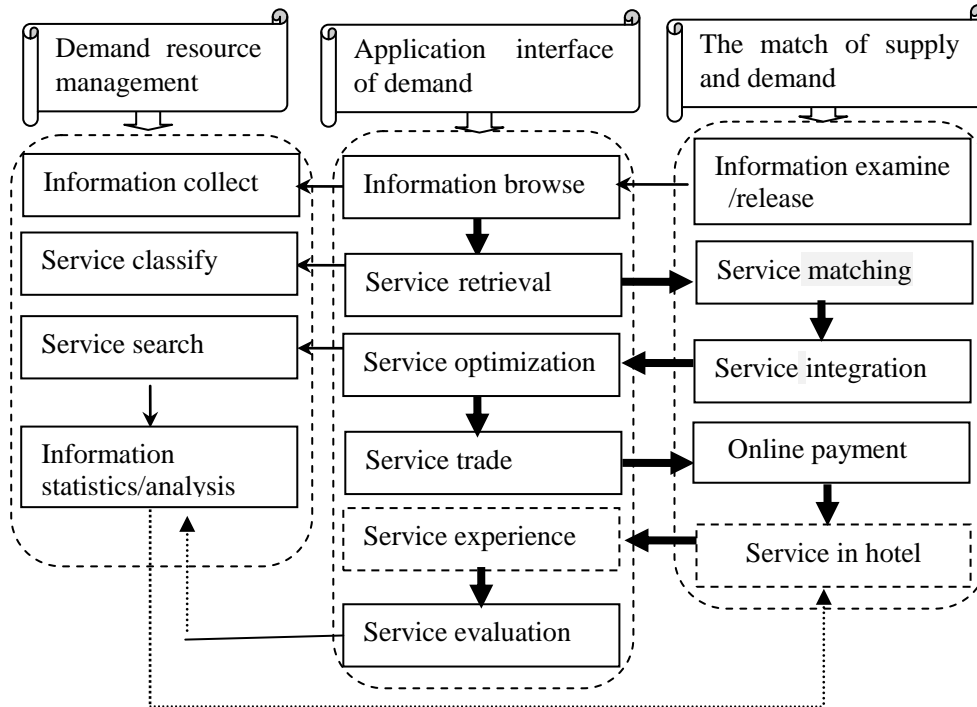


Figure 4. The Implement Process of Hotel Customized Product

The hotel information platform utilizes personalized vector retrieval algorithm^[20], specific steps are as follows:

(1) Service Vectorization

First, make assumption that the service of hotel information platform is a service set named WS, which contains N services.

Definition 1. Feature t: that is the basic language unit which can represent the service.

Definition 2. Feature weight: that can measure the service's ability of the feature t. The feature weight calculation utilizes feature frequency tf and the opposite feature frequency

$$idf: w_{ik} = tf_{ik} \times idf_k = tf_{ik} \times \log 2(N/n_k) + 1$$

w_{ik} ——the weight of feature t_k in the service of ws_i

tf_{ik} ——the frequency of feature t_k in the service of ws_i

N——The total number of N in the service set WS

n_k ——the service number of feature t_k in the service of WS

Definition3.the expression of service vectorization: make assumption about that some service has m different features: $t_1, t_2 \dots t_m$, and computing the feature weight of different features in the ws_i , which make up the ws_i vector space. The expression of service vectorization: $\vec{ws}_i = (w_{i1}, w_{i2}, \dots, w_{im})$

(2) Retrieval Keywords Vectorization

First, makes assumption that retrieval keywords request Q contains the service q_j , the

weight of keywords in the search request: $\alpha_{ij} = (0.5 + \frac{0.5 \times qf_{ji}}{\max_i qf_{ji}}) \times \log \frac{N}{n_j}$

qf_{ji} ——the frequency of the service q_j in the service of ws_i .

$\max_i qf_{ji}$ —the maximum number of the service q_j in all the service

N —The total number of service in the service set WS

n_j —The service number of keywords q_j in the service set WS , The expression of q_j vectorization: $\bar{Q}_i = (\alpha_{i1}, \dots, \alpha_{ij}, \alpha_{Mj})$

(3) The Specific Steps of the Vector Retrieval Algorithm

① Acquires the WSDL of each service within the range of service directory, and extracts the feature words: T_1 -input the message, T_2 -output the message, T_3 - functional description, T_4 -the name of opi, T_5 -the name of ws, T_6 -the service description. Puts all the feature words together to form the keywords space:

$$\begin{pmatrix} \{T_{i1}, T_{i2}, T_{i3}, T_{i4}, T_{i5}, T_{i6}\} \\ \dots \\ \{T_{n1}, T_{n2}, T_{n3}, T_{n4}, T_{n5}, T_{n6}\} \end{pmatrix}$$

① Decompose the service WSDL, and finds out the elements of opi , which is expressed as a combination of methods: $WS_i = \{op_1, op_2, \dots, op_n\}$

① Service vectorization. Using the formula $w_{ik} = tf_{ik} \times idf_k = tf_{ik} \times \log 2(N/n_k) + 1$, and computes the weight of each keyword to form quantitative service method, which composes service method vectorization space:

$$\begin{pmatrix} \{w_{i1}, w_{i2}, w_{i3}, w_{i4}, w_{i5}, w_{i6}\} \\ \dots \\ \{w_{n1}, w_{n2}, w_{n3}, w_{n4}, w_{n5}, w_{n6}\} \end{pmatrix}$$

④ Retrieval request vectorization

According to the formula $\alpha_{ij} = (0.5 + \frac{0.5 \times qf_{ji}}{\max_i qf_{ji}}) \times \log \frac{N}{n_j}$, compute the weight of the retrieval request keywords in the same space to form feature weigh space.

$$\begin{pmatrix} \{\alpha_{T_{i1}}, \alpha_{T_{i2}}, \alpha_{T_{i3}}, \alpha_{T_{i4}}, \alpha_{T_{i5}}, \alpha_{T_{i6}}\} \\ \dots \\ \{\alpha_{T_{n1}}, \alpha_{T_{n2}}, \alpha_{T_{n3}}, \alpha_{T_{n4}}, \alpha_{T_{n5}}, \alpha_{T_{n6}}\} \end{pmatrix}$$

In the feature weigh space, query retrieval request, if retrieval request contains some keyword, then the weight of the keyword is $\alpha_{T_{i3}}$ in the retrieval request vectorization; if retrieval request doesn't contain the keyword, then the weight of the keyword is 0.

⑤ Computes the similarity of two vector by the cosine. When the similarity value is 1, the matching coefficient is higher; when the similarity value is 0, the matching coefficient is lower, and forms service ordered list returned to the user according to the similarity calculation results from higher to lower.

$$sim(op_i, Q) = corel(op_i, Q) = \frac{\overline{op_i} \cdot \bar{Q}}{\|\overline{op_i}\| \cdot \|\bar{Q}\|} = \frac{\sum_{k=1}^m w_{ik} \cdot \alpha_k}{\sqrt{\sum_{k=1}^m w_{ik}^2 \sum_{k=1}^m \alpha_k^2}}$$

4.1.4. The Specific Process of Customized Service of Platform for Customer: The customized services of hotel information platform for customer contain customized information release in real-time, personalized information recommendation, real-time tracking schedule change information and making tourism/fitness plan.

(1) Customized information release. The platform should release information by the way of user's reservation in advance, which including the user's interface (such as the information numbers can be shown in a page, the color of the links, content arrangement), the delivery date and cycle, the delivery way , such as Email, short messages or WeChat.

(2) Individual information recommendation in real-time. The platform should recommend information which is needed for the users at any time and place based on the users' location, according to users' requirements and historical behavior information, in order to help users to make decision. The recommend information should refer the nearby restaurants, entertainment and leisure places, transportation and itinerary *etc.* The platform provides the personalized information service which is based on the common data analysis.

When users browse the website, the personalized information recommendation system of platform will not only record and analyse the user's information and behavior, but also similarity calculate compared with the stored data in the database and rank the supply information which is close to users' needs. Then the calculated result will delivery to the customer for choosing in real-time. After user selects the required service from the service list, the selected service is submitted to the server, the program will match and integrate the information to automatically display schedule and calculate the price. It also can record and store the user's interface, the service record and retrieve words in the database. It not only can help users to find the historical information, but also help platform recommend related information in time, the specific process of individual information recommendation is shown in Figure 5.

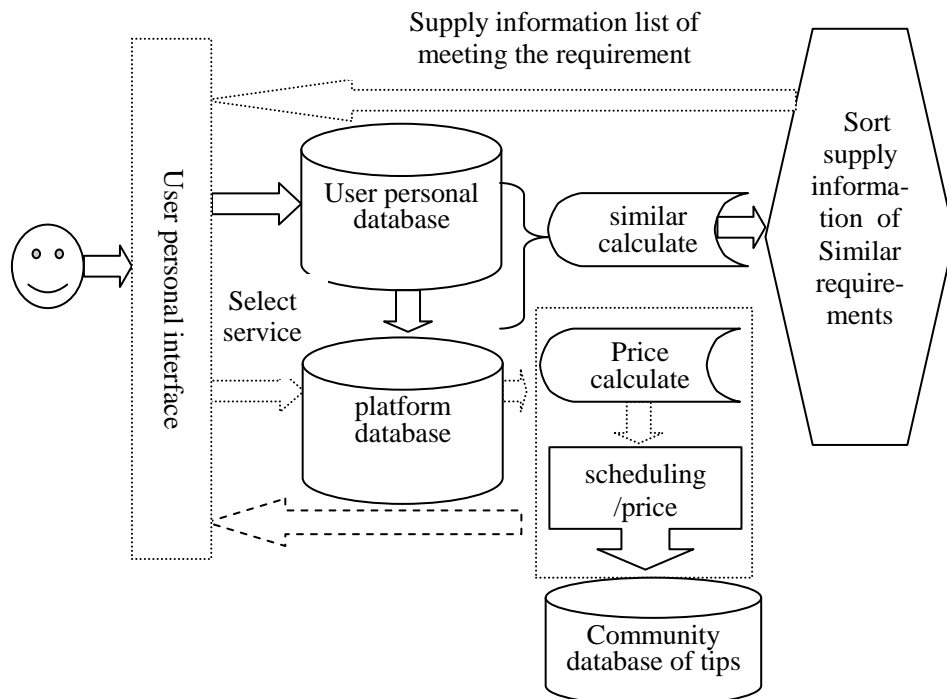


Figure 5. The Specific Process of Individual Information Recommendation

(3) Tracking schedule change information in real-time. During the journey, the schedule maybe change due to subjective or objective factors, so the platform will meet

the demand of customer in time. According to the user's schedule which is written on the web site, it can track customer's schedule information in real-time which including the change of scheduled flight departure time, business hours of scenic spots and tourism/fitness activity, and inform users timely to help them to adjust the travel arrangements. For example when the flight is late, platform will help user to contact the hotel to delay check-in time or increase the leisure activities and so on. The user can get and modify the schedule plan at any time and place through the mobile device during the journey.

(4) Making travel/fitness plan. The platform makes, organizes and completes activity items according to customer proposed purpose, scope and number of people. The platform sets up the consultant of tourism/fitness, after customer release travel/fitness plan and demand information, they can obtain customized plans in 24 hours. There are many travel/fitness plan from different consultants for free, before the deadline, the user can choose the most satisfactory solution, and communicate scheme details again with the consultant one-on-one to finally confirm the plan.

4.2. The Technical Support for Implementation of Hotel Customized Product

4.2.1. Intelligent Hardware Technology: Intelligent hardware technology is on basis of the advanced technology which includes modern sensor technology, network technology, automation technology, anthropomorphic intelligent technology, and make the traditional common instruments, daily household appliances and medical equipment to have the function of information collection, analysis and execution. The intelligent hardware device can realize intelligent perception and human-computer interaction. It has the powerful intelligent function through software support and data interaction. Intelligent hardware devices with the technology of network, mobile computing and cloud computing form a "cloud+end" typical structure from single intelligence to network intelligence with the additional value from the mass data.

4.2.2. Virtual Reality Technology: Virtual reality technology is found by Jaron Lanier in the early 80s, also known as artificial environment, which is characterized by 3D glasses and 3D Helmet-Mounted Displays. Virtual reality technology is a new technology which involves numerous subjects. It combines computer technology, simulation technology, three-dimensional design, computer graphics, image processing, pattern recognition, artificial intelligence, computer network, multimedia, sensor technology, microelectronics technology and parallel processing to a new technology. Virtual reality creates a realistically virtual environment by using virtual reality hardware devices and computer systems, the user experiences the sense of visual, hearing, touch, smell, moving and dynamic interaction in virtual space.

4.2.3. Multi-modal Human Robot Interaction Technology: Multi-modal human robot interaction should play a major role in the future development direction of human-computer interaction. The technology should be become the preferred way to the wearable devices. The technology can control the wearable devices by the way of identifying the body movement, language, expression, nerve and so on, and feedback to the users through visual and auditory.

4.2.4. Intelligent Voice Technology: Intelligent voice technology is the most natural and convenient way of interaction, input instructions by voice command, and improves the human-computer interaction to the high level of human-machine dialogue, in order to release the hands of user to focus on the tasks. Intelligent voice technology is made up of speech synthesis, speech recognition and semantic understanding, speech aroused and other technical support. Among them, speech aroused technology and the far field

identification technology play important role for the whole course of speech interaction. It has the advantages of low power consumption, high arousal rate, low false awake and customized aroused word.

4.2.5. Cloud Computing Technology: Cloud computing technology makes the waiting routine automatically split into many smaller subroutine through the large processing capacity of computer network, and then pass them to some huge system which is made up of many servers to search, calculate and analyse, finally put the results back to the user. All calculations will complete by large-scale "cloud" network to realize the resource sharing and cooperation. The core technology includes clustering technology, search engine technology, vector retrieval algorithm, personalized recommendation technology and massive storage technology.

5. Conclusion

With the rapid development of high and new technology, intelligent hardware devices inevitably become the new medium for hotel customized products, the hotel customized product based on intelligent hardware technology has a large optimized space of function and technology. For example hotel can develop auxiliary software and services on existing wearable equipment outside the hotel space, and the customer should pass monitoring health indicators and vegetables at home to hotel information platform, in order to get food collocation scheme and cooking process. They can watch, cook and chat each other at the same time, and get pleasant experience of mealtime. Intelligent hardware devices build seamless connection with human, environment and network. This article only describes the logical framework of hotel customized product design and implementation, lacks the relevant empirical research support. Therefore how to have a more in-depth combination with virtual reality technology, artificial intelligent technology, wearable technology and other emerging technologies will become one research direction in the future. At the same time, the theoretical discussion and empirical research of the hotel customized service mode will become the focus of the next step research.

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