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A Study on Consumer Strategy of Artificial Intelligence Service Using Importance-Satisfaction Analysis

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ABSTRACT

Purpose: The purpose of this paper is to investigate satisfaction and importance in order to appropriately evaluate AI-based service quality evaluation. It is to conduct an importance and satisfaction analysis for users of artificial intelligence speakers and derive a service strategy.

Design/methodology/approach: This study conducted a survey of consumers using artificial intelligence speakers in Republic of Korea. The survey was conducted online and the total number of samples was 200.

Findings: In this study, meaningful results were derived by conducting an overall importance-satisfaction analysis targeting artificial intelligence speaker users. Based on this, a maintenance strategy, improvement strategy, and reinforcement strategy were established for each quality item of artificial intelligence service. By analyzing gender characteristics, service strategies suitable for men and women were derived.

Research limitations/implications: It is necessary to derive a broad service strategy by conducting additional analysis based on different criteria such as by brand. In the future, research is needed to expand to various services based on artificial intelligence in addition to artificial intelligence speakers.

Originality/value: These research results will help to establish appropriate strategies for various services based on artificial intelligence.

Keywords: Artificial Intelligence, Importance-Satisfaction Analysis, Artificial Intelligence Speaker, Service strategy, AI-based service

I. Introduction

New knowledge and various information are rapidly changing, and this is leading innovation in the industry through the creation of new contents and the formation of multi-platforms. The era of convergence has arrived due to changes in technology and industry that were previously unthinkable. This

removes the boundaries of existing social, cultural, and industrial groups and provides innovative value to people. In particular, based on new technologies such as big data and artificial intelligence, there is a big change in the services that people use. This is because the needs of consumers are very different from the existing ones and new values are created for people. The convergence of products and services is providing a new type of service, and it is causing a big change in society as a whole.

As mentioned in the study of Yoo (2017), the concept of artificial intelligence was first proposed by Professor John McCarthy and others at the Dartmouth

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Conference in 1956. In addition, several studies related to artificial intelligence have been conducted. Rich & Knight (1991) defined a computer as a system that works more efficiently than a human in a specific situation and moment. The Small and Medium Business Technology Information Promotion Agency (2017) expressed artificial intelligence as a technology realized as a program based on human cognition, learning, and reasoning ability.

Although the age of artificial intelligence has arrived, service quality evaluation still relies on existing service evaluation methods. As for the existing service quality evaluation method, the SERVQUAL (Service + Quality) model suggested by Parasuraman et al. (1985) has been generally used. Voss (2000) defined e-service in the Internet era, and Zeithaml et al. (2005) proposed E-S-QUAL through a new study. However, due to the recent quality evaluation of artificial intelligence services, the existing methods are no longer valid.

Looking at recent changes, new and innovative services are being provided based on artificial intelligence. Based on real-time two-way communication, customized services that reflect the needs of consumers are emerging. Accurate demand forecasting has become possible based on the diverse needs of these consumers. And by reflecting the latest trends that are rapidly changing, it provides greater Satisfaction to consumers. The existing quality of service was mainly performed based on behavior or environment provided by people. With the birth of the Internet, it has changed to establishing online-based service quality. With the rapid change of the times, it is now rapidly changing to an artificial intelligence-based service. Therefore, the measurement of the quality of service provided in the existing human or Internet environment has become unsuitable.

Among AI-based services, the AI speaker market is growing the fastest. According to the Korea Statistical Office (2020), more than 50% of Korean households in 2020 have an artificial intelligence speaker, and further explosive growth is predicted. It is necessary to check and verify that the quality evaluation of AI services can be used appropriately

through user satisfaction with AI speakers. Baek (2020) analyzed the concept and characteristics of AI services and studied the main characteristics and cases. And 7 main characteristics and 24 quality evaluation items for AI-based services were presented. In this study on the satisfaction and importance of AI speakers, 24 AI-based quality evaluation items were applied.

Among the services based on artificial intelligence, this was verified through a user survey of artificial intelligence speakers. Using this, consumers can make appropriate evaluations and selections for artificial intelligence-based services. When developing artificial intelligence-based services, companies can provide them appropriately by reflecting the new needs of consumers. Therefore, it is necessary to investigate the importance and satisfaction of consumers for artificial intelligence-based services. And it is important to analyze this and establish a service strategy suitable for this.

The purpose of this study is to investigate user satisfaction and importance by performing a new AI-based service quality evaluation targeting users of Korean artificial intelligence speakers. Second, based on the surveyed data, the importance and satisfaction of users of artificial intelligence speakers are analyzed and results are derived. Third, based on the analysis results, it is to derive and suggest an appropriate service strategy for AI speaker users.

II . Literature Review

Various studies have been conducted to evaluate service quality. First of all, Parasuraman et al. (1985) researched the quality of service and argued that the purchase behavior and consumption behavior of the service occur at the same time. In addition, SERVQUAL was proposed to evaluate the service with the characteristics of inseparability, extinction, intangibility, and heterogeneity. Parasuraman et al. (1988) summarized the service quality into five

dimensions by supplementing the existing SERVQUAL model. Meanwhile, Gronroos & Christian (1988) argued that the purpose of using service quality is more important than the basic characteristics. It divided into functional quality and technical quality, and studied in the two-dimensional aspect of expectation and satisfaction. Cronin & Taylor (1992) proposed a SERVPERF that evaluates only the satisfaction of the customer, not the expected service of the service in the existing SERVQUAL.

With the advent of the Internet, research on the quality of e-services has been conducted. Huang et al. (1999) classified four aspects of internal quality, representative quality, context quality, and access quality to measure the quality of e-services, and named this as IQ (Information Quality). Zeithaml, et al. (2000) argued that it was different from the existing service quality measurement method and suggested 11 evaluation items suitable for e-service quality. Loiacono et al. (2002) selected major items such as web site reaction time, visual appeal, screen design, and intuitiveness, and proposed the WEBQUAL model.

Dabholkar et al. (1996) studied retail store SERVQUAL by studying service quality suitable for retail store sector. Hennon and Calvert (2005) studied the service quality in the library field and proposed ten major items such as flexibility, ease of use, and accessibility. Sam & Taihr (2010) suggested that airline service quality was classified into five major categories (ease of use, reliability, information quality, perceived risk, and website design). Lee et al. (2015) proposed a model by linking airport service quality with the Public Customer Satisfaction Index.

Customer satisfaction is mainly used to identify consumers through surveys on service quality. Oliver (1980) defined satisfaction as an individual's cognitive response expressed through consumer experiences after purchasing a product. Park & Cho (2000) classified customer satisfaction into cognitive and emotional aspects, and studied them as a combined concept.

Importance Performance Analysis (IPA) is used as a technique to analyze the priorities of measured performance factors by comparing their relative importance and performance. Martila & James (1977)

argued that performance and importance should be measured at the same time when grasping product quality or customer requirements. It was introduced for the first time in the business field. IPA has also been used as an ISA in terms of customer satisfaction. Importance-Satisfaction Analysis (ISA) is used to establish a systematic service strategy through service quality surveys. And it was used in various fields such as marketing, education, banking, and sports psychology. Yang (2003) studied the difference between the importance and satisfaction of internal employees and external customers by quality attribute using the importance-satisfaction model.

Hammit et al. (1996) regarded customers as the same in terms of importance and satisfaction, and used them in various fields. It was used to derive improvement items for the needs of customer needs by linking the relationship between important factors and satisfaction factors. Kim (2010) studied the effect of service value and service quality on customer satisfaction and importance. Kim & Mauborgne (2005) used Strategy Canvas and ERRC Framework as a method of linking blue ocean creation and service strategy. The ERRC framework utilizes four major execution frameworks: Eliminate, Reduce, Raise and Create.

Kano et al. (1984) proposed the Kano model as a methodology for service quality evaluation and strategy. This model was also used to analyze the quality attributes of artificial intelligence assistants. Pit et al. (1995) studied the importance of objectively measuring service quality. He mentioned that it can be used to improve service quality and design products. Anderson & Sullivan (1993) also noted that systematic measurement and improvement of service quality were important. And they argued that this had a very positive effect on customer loyalty and use.

As a study on artificial intelligence-based services, Park (2017) studied artificial intelligence-based public administration chatbot services. Oh & Jo (2019) proposed a plan to develop an integrated control service model based on artificial intelligence. However, an analysis study on the quality of service based on artificial intelligence has not yet been presented.

Therefore, based on the artificial intelligence service quality evaluation model proposed by Baek(2020), the satisfaction and importance cases of artificial intelligence speakers were analyzed. And I would like to suggest a service strategy suitable for this.

In addition, research applying artificial intelligence services to various fields is spreading. Kim (2020) suggested a direction for design development by studying the characteristics of UX design for AI assistant service. Kim & Kim (2020) studied the content characteristics of artificial intelligence fashion styling, organized them into five categories, and presented them as informatization, personalization, playfulness, convenience, professionalism, and interactivity.

III. Research method

The artificial intelligence speaker showed the highest utilization among artificial intelligence services. Therefore, a survey was conducted targeting users of artificial intelligence speakers. The total number of samples in the survey was 200 people, and online survey was conducted. It was conducted for users using artificial intelligence speakers in Republic of Korea. Considering gender, age, and brand for artificial intelligence speaker users in Korea, an online survey was conducted randomly. The larger the number of samples, the better, but they were selected in consideration of representativeness and homogeneity, and then verified through reliability. Through this,

200 people who can be surveyed among users of artificial intelligence speakers in Korea were randomly selected.

Importance and satisfaction of each investigator were surveyed for 24 items suggested as quality evaluation items of artificial intelligence service. A 7point scale was used to select one of the appropriate numbers between 1 (very low) and 7 (very high). In addition, the respondents were asked to write their gender, age, occupation, and AI speaker brand. Related information is summarized in Table 1.

The brands of artificial intelligence speakers were classified into SKT Nougat, KT Gi Genie, and other brands, which are mainly used in Korea. Cronbach Alpha was used to confirm the reliability of the survey. Statistical analysis was performed using SPSS. The 24 quality evaluation items proposed by Baek(2020) in the AIservice quality evaluation model were used in this survey. satisfaction and importance were investigated for users of artificial intelligence speakers. The 24 items used in the survey are summarized in Table 2.

IV. Results

A. General Characterization

This survey was conducted online for users who actually use artificial intelligence speakers in Republic of Korea. The analyzed general characteristics are summarized in Table 3. Gender was surveyed at a

Table 1. Key points of the survey

	Contents
No. of samples	200
Survey method	Online Survey
Survey target	Consumers using artificial intelligence speakers in Korea
Measure	7 point scale
Gender	Male, Female
Age	20s, 30s, 40s or older
Brand	SKT's NUGU, KT's GiGA Genie, and other brands

Table 2. Quality evaluation items and main characteristics of artificial intelligence service

Quality evaluation items		Main characteristics
Item1	AI speaker continuously monitors individual customers	Personalization
Item2	AI speaker accurately grasps the customer's characteristics	
Item3	AI speaker provides optimized services to individual customers	
Item4	AI speaker responds accurately to customer requests	Professionalism
Item5	AI speaker reflects the most up-to-date information	
Item6	AI speaker provides a higher level of quality than humans	
Item7	AI speaker clearly recognizes the diverse needs of customers	Diversity
Item8	AI speaker connects various services required by customers	
Item9	AI speaker handles complex services	
Item10	AI speaker recognizes the environment and performs autonomously	Convenience
Item11	AI speaker is convenient to use service	
Item12	AI speaker provides comfortable service to customers	
Item13	AI speaker provides emotional satisfaction to customers	
Item14	AI speaker cuts costs and increases efficiency	
Item15	AI speaker can be serviced at any time	Spatio temporality
Item16	AI speaker can be serviced anywhere	
Item17	AI speaker responds quickly to customer requests	Real-time
Item18	AI speaker interacts seamlessly with customers	
Item19	AI speaker provides a service in real time	
Item20	AI speaker safely manages personal information about customers	Responsibility
Item21	AI speaker performs perfectly without mistakes	
Item22	AI speaker provides stable service to customers	
Item23	AI speaker respects customer privacy	
Item24	AI speaker responds appropriately to the problem	

Table 3. Analysis result of general characteristics

	frequency	%	division
Gender	1	100	50 Male
	2	100	50 Female
	Total	200	100
Age	1	80	40 20s
	2	80	40 30s
	3	40	20 40s or older
	Total	200	100
Brand	1	80	40 SKT's NUGU
	2	80	40 KT's GiGA Genie
	3	40	20 Other brands
	Total	200	100

ratio of 50%:50% for males and females, respectively. Ages were 40% in 20s, 40% in 30s, and 20% in

40s and older. As for the brands, SKT's Nugu 40%, KT's GiGA Genie 40%, and other brands 20% were surveyed.

B. Reliability Analysis

Reliability analysis was conducted based on the results of general characteristic analysis of the survey. Reliability refers to the consistency of the various variables measured. That is, it means the variance of values calculated when repeatedly measuring the same concept. Parasuraman et al. (1988) said that reliability refers to the variance of values that can be obtained when the same concept is repeatedly investigated several times. And he mentioned that it is the possibility of obtaining the same value. It

is noted that these concepts include concepts such as measurement accuracy, predictability, consistency, and stability.

Campbel and Fiske (1959) presented Cronbach's alpha to check reliability. Cronbach's alpha is a commonly used concept to check reliability. Cronbach's alpha coefficient is a method of removing items that lower the overall reliability and selecting higher items among several items. Cronbach's alpha value is

usually expressed as a value between 0 and 1. If Cronbach's alpha value is 0.6 or higher, it is evaluated that the reliability is relatively high.

Cronbach's alpha coefficient was calculated to measure the reliability of the importance and satisfaction of the AISpeaker's quality evaluation items. As shown in Table 4, the satisfaction level of the entire Cronbach's alpha coefficient was calculated as 0.976 and the importance level was 0.972, and the overall reliability

Table 4. Results of reliability analysis

Confidence statistic				
Number of items	Cronbach's Alpha on Satisfaction		Cronbach's Alpha on Importance	
24	.976		.972	
Total statistics by item				
	Satisfaction		Importance	
	Correlation	Cronbach Alpha on item deletion	Correlation	Cronbach Alpha on item deletion
Item1	.723	.975	.649	.971
Item2	.731	.975	.632	.972
Item3	.704	.975	.712	.971
Item4	.790	.975	.744	.971
Item5	.685	.975	.624	.972
Item6	.783	.975	.736	.971
Item7	.809	.974	.810	.970
Item8	.824	.974	.792	.970
Item9	.800	.974	.781	.970
Item10	.815	.974	.746	.971
Item11	.745	.975	.788	.970
Item12	.799	.974	.809	.970
Item13	.749	.975	.693	.971
Item14	.841	.974	.802	.970
Item15	.809	.974	.725	.971
Item16	.765	.975	.765	.971
Item17	.774	.975	.777	.970
Item18	.809	.974	.831	.970
Item19	.773	.975	.755	.971
Item20	.801	.974	.740	.971
Item21	.756	.975	.811	.970
Item22	.837	.974	.845	.970
Item23	.814	.974	.792	.970
Item24	.811	.974	.793	.970

was high. For both satisfaction and importance, there was no particular item that lowered the reliability in the quality evaluation items.

C. Importance-Satisfaction Analysis

The importance-satisfaction analysis was conducted for 24 quality evaluation items of artificial intelligence service targeting users of artificial intelligence speakers. Importance satisfaction analysis of 24 quality evaluation items of artificial intelligence service was conducted for users of artificial intelligence speakers. Real time(Item 17~Item 19) showed high satisfaction and high importance, and reliability (Item 20~Item 24) showed low satisfaction and low importance. Items for real-time satisfaction need to be upgraded or maintained high importance and satisfaction through continuous management. Reliability-related Items need to be improved to increase satisfaction and importance. As shown in Figure 1, real-time service provision (Item 19) resulted in very high satisfaction and very high importance, Item 2 and Item 10 showed low satisfaction and low importance. In addition,

Item 1 shows relatively high importance and low satisfaction, and needs to be improved.

The importance-satisfaction was analyzed by classifying the users of artificial intelligence speakers into males and females. This is expressed in Figure 2. As for the importance-satisfaction of men, the diversity (Item 7 to Item 9) showed relatively low satisfaction and low importance. Real-time (Item 17 to Item 19) showed high satisfaction and high importance. Reliability (Item 20~Item 24) showed low satisfaction and low importance. The average of male satisfaction was 4.51 and the average of male importance was 4.65. Men's importance score was relatively high.

Item 1 showed very high satisfaction and very high importance as in the overall satisfaction-importance. Item 24 and Item 10 showed low satisfaction and low importance. Item 8 showed relatively high importance and low satisfaction. Therefore, in order to improve Item 24 and Item 10, there is a need for a plan to increase satisfaction and importance. Item 8 needs a plan to improve satisfaction.

Female showed different characteristics compared to men's importance-satisfaction. As shown in Figure

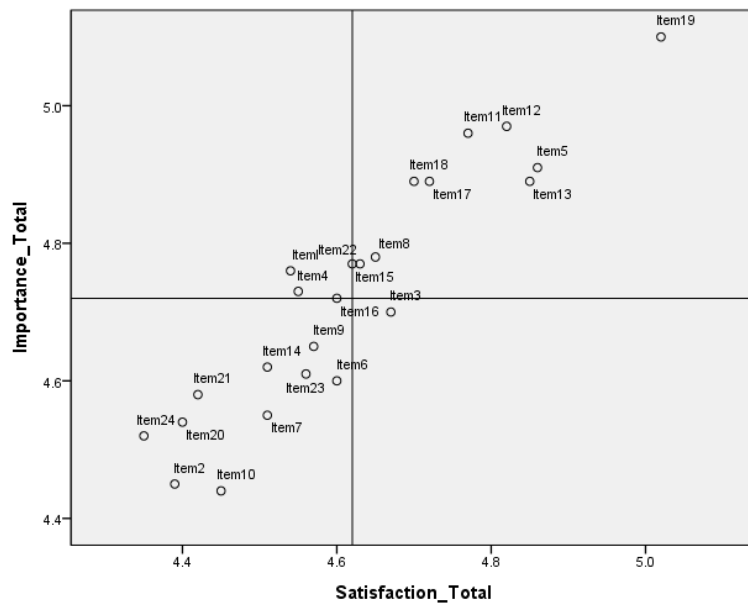


Figure 1. Total importance-satisfaction analysis

3, female's importance-satisfaction was shown to be low satisfaction and low importance in personalization (Items 1 to 3). The spatio-temporality (Item 15, Item 16) was found to have relatively high satisfaction

and high importance. The average of women's satisfaction was analyzed as 4.72 and the average of women's importance was 4.80. In other words, the satisfaction and importance of women were higher

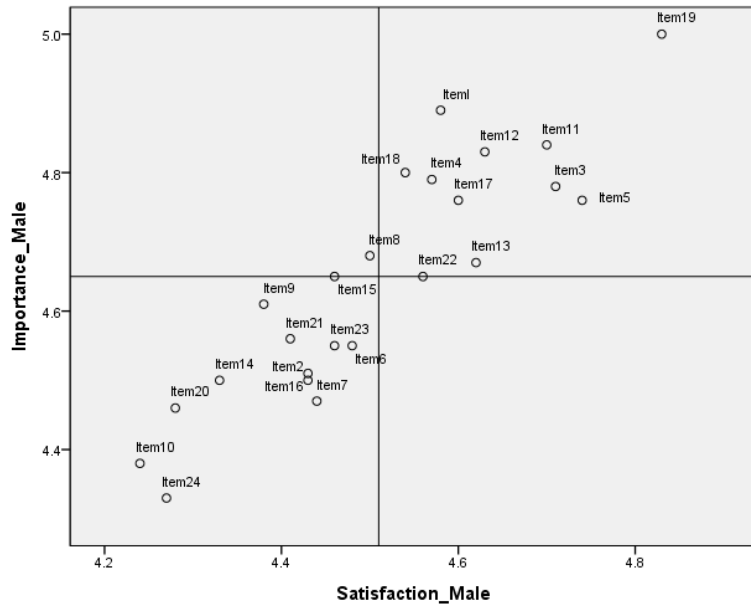


Figure 2. Results of male importance-satisfaction analysis

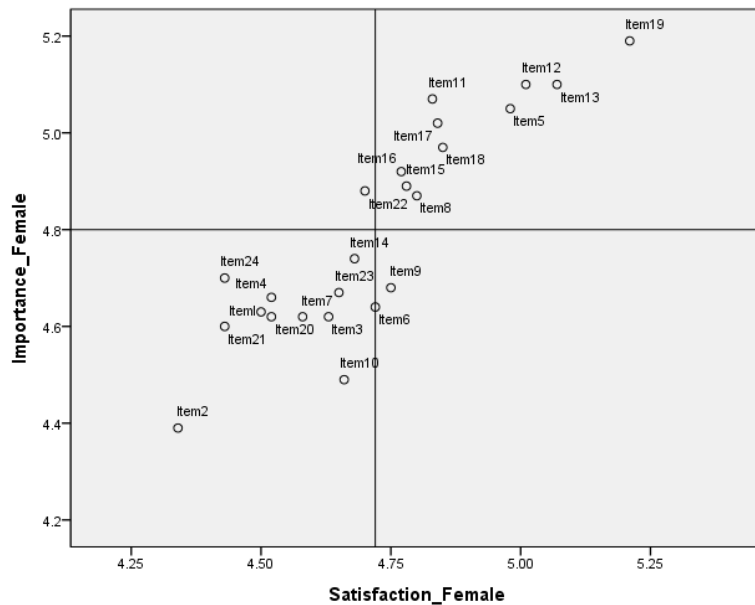


Figure 3. Results of female importance-satisfaction analysis

than that of men.

There were also major characteristics or items in which the results of the importance-satisfaction of men and the importance-satisfaction of women were the same. However, there are items showing different characteristics according to gender, so it can be seen that different strategies are needed according to the characteristics of men and women.

V. Conclusion

In the past, service quality evaluation was mainly based on actions performed by employees or the Internet. However, the AI service is no longer suitable for the existing quality evaluation method. Therefore, this study conducted a user satisfaction and importance survey targeting artificial intelligence speakers, and the results are highly accurate and useful.

The importance-satisfaction survey using the quality evaluation items of the artificial intelligence service was measured for users using artificial intelligence speakers. Data analysis was conducted and several meaningful results were drawn. By analyzing the results of measurement of importance-satisfaction, the following service strategy can be derived.

First, as a result of analyzing the results of overall importance-satisfaction, the following strategies are needed. For the real-time items and Item 19 of high satisfaction and importance, a strategy to maintain the current state is effective. Item 2 and Item 10 need to be improved gradually. In addition, a strategy is needed to improve related items according to the speed of development of artificial intelligence technology and the interests of users.

Second, when analyzing the results of the importance-satisfaction of men, the following strategies are needed. Diversity in areas of low satisfaction and importance, and Items 24 and 10 require a strategy to gradually improve. In addition, for Item 8, a strategy for improving the service is needed to increase the satisfaction of male users.

Third, by analyzing the results of the importance-satisfaction of female users, the following strategies can be derived. The space-time and real-time items and Item 19 require an upgrade strategy. Item 22 is an area of relatively high importance and low satisfaction. Therefore, an improvement strategy is needed to increase the importance of female users.

It is important to establish overall importance-satisfaction results and appropriate service strategies for each area. Depending on the main characteristics and items, the importance and satisfaction of male and female users appear differently. Therefore, it is necessary to derive and implement a service strategy suitable for gender by reflecting each characteristic.

Based on the results of this study, the implications for companies and consumers in the age of artificial intelligence are summarized as follows. Based on these results, companies can use it as a useful tool when planning new AI speakers in the future or improving satisfaction with existing products or services. If a company develops a new product or service by analyzing the core characteristics that affect customer satisfaction, it can achieve results by increasing customer satisfaction and corporate sales. Consumers are very useful when purchasing a new AI speaker or using related services. Consumers can be recommended artificial intelligence services such as customized artificial intelligence speakers that fit their individuality. By applying the results of this study to various AI service quality evaluations, it is possible to build various platforms that realize the virtuous cycle structure of the smart era.

In this study, the importance-satisfaction survey was conducted for users of artificial intelligence speakers, and a service strategy was derived based on the analysis results. These research results will help to establish appropriate strategies for various services based on artificial intelligence. As a limitation of this study, it is necessary to expand research to target various AI-based services other than AI speakers. In addition, it is necessary to perform additional analysis based on other criteria such as users' age and brand.

In the future, its use is also expanding in smart

home appliances equipped with artificial intelligence, chatbot using artificial intelligence, fintech centered on artificial intelligence, and smart shopping. It is also expected to be used in smart buildings and smart cities. In the future, it is necessary to apply and study various AI service-related cases and fields. In addition, it is necessary to conduct research to verify and supplement the quality metrics of AI services in various fields.

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