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Research Article

Innovation of Visual Communication Design of Interactive Packaging for Internet-Famous Food Based on Artificial Intelligence

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The combination of visual communication design of food packaging and digital media art is the new trend. In this study, the visual communication design of interactive packaging of Internet-famous food is analyzed, and an innovative identification method of the interactive packaging visual communication design based on artificial intelligence is put forward. The weighted fusion rule of conjunction disjunction double operators is used to fuse the innovative evaluation information of multiple expert groups on interactive packaging, and finally, the innovative multigroup discrimination results of interactive packaging are obtained. Considering both the consistency of evaluation information and the contradiction of evaluation information, the weight factor is introduced to achieve the balance between conjunction operator and disjunction operator. The designed conjunctive disjunctive double operator weighted fusion rule can support the contradiction handling in the innovative discrimination of interactive packaging and has the advantages of convenient application and easy programming.

1. Introduction

Internet-famous food is a novel, popular snack food with distinctive cultural transmission characteristics with the emergence of new trends such as multimedia technology and webcast. It has the properties of both food and network information carrier. But food attribute is its essential attribute. Therefore, when carrying out the innovation of its interactive packaging visual communication design [1–9], we must first consider its food attributes.

Under the severe situation of increasingly fierce market demand, the food industry should not only work hard at the level of market demand and strict control of food quality and safety but also should further grasp the aesthetic characteristics of the public, use artistic advertising creative design to attract customers' attention, expand publicity and planning, and establish brand awareness, so as to promote the overall growth of food sales [10, 11]. Digital media art [12–16] has the comprehensive characteristics of "sound, image, form, and sound", which has a key practical significance for accelerating the dissemination of information content in the food industry and getting rid of the restrictions of food advertising on time and indoor space. Customers can use diversified digital media technology and Internet platforms to independently search for advertisements related to food enterprises, strengthen the promotion scope and resource sharing level of food advertising, and indirectly expand the scope of food advertising.

With the strong support of a series of digital media technologies, packaging designers show diversified performance effects according to the reasonable arrangement of the visual effect elements such as color, graphics, and text, and it also improves the intimate interaction with the public, mobilize enthusiasm, and creative thinking and meets the artistic needs of these people, and it further promotes the development trend of creative design of food packaging in the period of digital media technology [16]. Digital media art combines electronic information technology with media art to become a scientific and reasonable art with strong expressiveness and high scientific and technological content.

Taking this as an opportunity, this paper carries out the research on the visual communication design innovation of Internet-famous food interactive packaging based on artificial intelligence. Firstly, the visual communication design of interactive packaging of Internet-famous food is analyzed. Then, taking the interactive packaging design of an Internet-famous food as the object, using artificial intelligence algorithm, an innovativeness identification method of interactive packaging visual communication design is proposed.

2. Analysis of the Visual Communication Design of Interactive Packaging of Internet-Famous Food

The application of new media technology in food packaging design can not only improve and update the visual elements of the plan of food packaging materials but also introduces more practical sensory stimuli, so as to improve the competitiveness of products.

2.1. Communicating More Product Information to Consumers. The more basic function of food packaging is not only to store food commodities but also to display the basic information of food, including the name, production date, shelf life, origin, specification, and other basic information of the food. The digital media art plays a key role here, and Figure 1 shows several examples of the Internet-famous food packaging design enabled by digital media technology [17–20]. Many contemporary food packages are printed with two-dimensional codes and the application of the two-dimensional code technology is to make full use of the information content storage and expansion functions of digital media art. By scanning the QR code, customers can obtain more and more product-related information, so as to have a deeper understanding of the food categories. In fact, for example, the two-dimensional code displayed on the package of a well-known brand of milk containing beverage, and after scanning, consumers can immediately log in to the manufacturer's official website. The website presents the product variety, the surrounding environment of the production site, the natural environment of the production line, the natural environment of milk raw materials, etc., so that customers can have a deeper understanding of the manufacturer of milk containing beverage and cannot help thinking that the product will appear in similar transactions in the future.

At the same time, the two-dimensional code on the food packaging generally has various decorations such as animation elements, so the visual impact is more prominent, completing the unity of artistic beauty and practicality.

2.2. Building an Interactive Bridge between Products and Consumers. AR technology is a digital media technology commonly used in food packaging, especially in dairy packaging. It plays a key role in combining food visual effect elements to enhance the charm of food packaging. By using AR technology, customers can use mobile phones and other devices to scan the AR identification control module on food packaging to obtain the content of interaction and

Figure 1: Food packaging design enabled by digital media technology.

communication with AR, such as 3D display of the food origin [18]. Customers can visit the origin of food in a 720° panoramic view to obtain different visual effects of tourism experience.

It is not difficult to see that AR technology has built a bridge for the interaction between customers and virtual scenes, thus improving the interest and interactivity of food packaging materials and bringing more in-depth shopping experience to customers.

2.3. Realizing the Publicity and Marketing of Internet-Famous Food Products. No matter what kind of digital media art it may be, its application in food packaging is not rigid but expressive and harmonious [19]. For example, the food industry uses digital media art to apply various artistic creative patterns, such as various animation element pattern design, data element pattern design, and digital media technology content, such as H5 web page, WeChat public platform, and Sina Weibo post.

On the one hand, it conforms to the visual effect art aesthetics of the product packaging design, increases the visual effect art aesthetics of the food packaging, and attracts more customers' visual actual effect. On the other hand, it also makes use of food packaging materials more extensive. When customers appreciate this artistic creative pattern, it is easier for them to take the initiative to master the technical content of digital media in the pattern design, so as to achieve the expected publicity planning and promotion effect. In this way, food packaging reasonably connects the gap between the data world and the physical world and completes data marketing. The application of digital media art in food packaging materials has a certain inevitable trend, which is also the main countermeasure to improve the competitiveness of the food industry.

3. Innovativeness Identification Method of Interactive Packaging Visual Communication Design Based on Artificial Intelligence

For the Internet-famous food product, there are many feasible packaging design schemes in the process of

interactive packaging design. With the deepening and popularization of the innovative design in the food packaging industry, the key technical problem to be solved is how to distinguish the innovation of interactive packaging design, so as to provide basis for subsequent product promotion and marketing.

3.1. Evidence Theory. It is a feasible way to identify the innovation of interactive packaging design that experts belonging to multiple groups evaluate the innovation of interactive packaging design according to their own experience and wisdom and then integrate the evaluation information of the multiple groups [21–25]. However, they are affected by many complex factors, such as experts' knowledge background, practical experience, and the group interest they represent, and the evaluation information given by the experts from the multiple groups in the innovative evaluation of the interactive packaging design is also highly uncertain. The fusion of multigroup evaluation information is essentially an uncertain reasoning and decision-making process.

As an uncertain reasoning method, evidence theory has unique advantages in information fusion and has been widely used [26–34]. When the evaluation information of the multiple groups supports the proposition that "the innovation of interactive packaging design is the best," when these evidences are fused together, the fusion results should support this proposition to a greater extent. In other words, the fusion rules should be able to achieve "downward focus," that is, the focus from a subset with a larger cardinality to a subset with a smaller cardinality, so as to facilitate the decision-making and judgment. Sometimes, the evaluation information of some groups may be contradictory. For example, for a certain two groups, one may think that "the innovation of interactive packaging design is excellent" and the other may think that "the innovation of interactive packaging design is poor." At this time, the two groups have contradictory evaluation information on the innovation of interactive packaging design.

In this case, the conclusion is that "the innovation of interactive packaging design is excellent (the second group is not trusted)" or "the innovation of interactive packaging design is inferior (the first group is not trusted)" or "the innovation of interactive packaging design is excellent or inferior (it is impossible to judge which group is not trusted)" will be drawn. Therefore, when there are contradictions in the evaluation information, the fusion rules should be able to achieve "upward" processing, so as to delay the decision-making and avoid unreasonable conclusions in case of evidence contradictions. It can be seen that when there are contradictions in the evaluation information of multiple groups, using the traditional evidence fusion rules will produce a conclusion contrary to common sense. Therefore, there is an urgent need for an innovative identification method of interactive packaging design that can deal with this contradiction.

3.2. Technology Roadmap. An innovative identification method of interactive packaging visual communication design is proposed as shown in Figure 2.

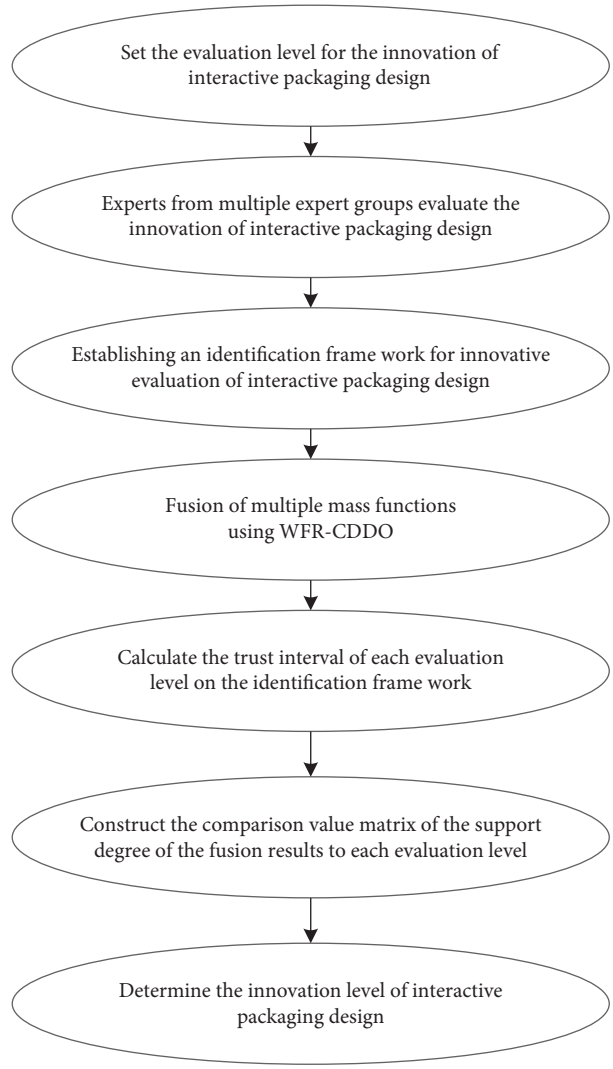

Figure 2: Innovativeness identification method of interactive packaging visual communication design.

Its steps are as follows.

Step 1. Set the innovativeness evaluation level of interactive packaging design as m levels : $S_1, S_2, ..., S_m$. From S_1 to S_m, the innovativenes decreases.

Step 2. Experts from n expert groups evaluate the innovativeness of interactive packaging design.

Here, there are ε_i experts in the i-th expert group, $i = 1, 2, ..., n$.

In the i-th expert group, the evaluation results of λ_i experts is that "the innovation of interactive packaging design definitely belongs to a certain level," where the number of experts who think the innovation of interactive packaging design belongs to $S_1, S_2, \ldots, S_m$" is $\varepsilon_{i1}, \varepsilon_{i2}, \ldots, \varepsilon_{im}$, where $\varepsilon_{i1} + \varepsilon_{i2} + \ldots + \varepsilon_{im} = \lambda_i$; the evaluation results of μ_i experts is "the innovation of interactive packaging design is vague and belongs to one of several levels," where the number of experts who think the innovation of interactive packaging design belongs to one level in $\{S_x, \ldots, S_y\}$ is

$\varepsilon_{i,(x,\ldots,y)}$, where $x = 1, 2, \ldots, m$, $y = 1, 2, \ldots, m$, $x \neq y$, and $\ldots + \varepsilon_{i,(x,\ldots,y)} + \ldots = \mu_i$, $\lambda_i + \mu_i = \varepsilon_i$.

Step 3. An identification framework for interactive packaging innovation evaluation is established as

$$\Theta = \{S_1, S_2, \ldots, S_m\}. \tag{1}$$

The evaluation information of n expert groups is regarded as evidence and further expressed as the basic probability assignment function under the identification framework $\Theta = \{S_1, S_2, \ldots, S_m\}$, which is expressed by mass. There are n mass functions $mass_1, mass_2, \ldots, mass_n$. For $mass_i$:

$$\begin{aligned} \mathrm{mass}_i(S_1) &= \frac{\varepsilon_{i1}}{\varepsilon_i}, \\ \mathrm{mass}_i(S_2) &= \frac{\varepsilon_{i2}}{\varepsilon_i}, \ldots, \\ \mathrm{mass}_i(S_m) &= \frac{\varepsilon_{im}}{\varepsilon_i}, \ldots, \\ \mathrm{mass}_i(\{S_x, \ldots, S_y\}) &= \frac{\varepsilon_{i,(x,\ldots,y)}}{\varepsilon_i}, \ldots. \end{aligned} \tag{2}$$

Step 4. Weighted fusion rules of conjunction disjunction double operators (WFR-CDDO) is adopted to realize the fusion of n mass functions $mass_1, mass_2, \ldots, mass_n$.

The expression of conjunction operator (CO) is

$$mass'(S) = \frac{1}{1-k} \sum_{S^p \cap S^q \cap \ldots \cap S^r = S} \mathrm{mass}_1(S^p)\mathrm{mass}_2(S^q)\ldots\mathrm{mass}_n(S^r), \tag{3}$$

where $mass'$ represents the mass function obtained by fusing n mass functions $\mathrm{mass}_1, \mathrm{mass}_2, \ldots, \mathrm{mass}_n$ with conjunction operator, $S^p, S^q, \ldots, S^r \subset \Theta$, $S = S_1, S_2, \ldots, S_m, \ldots, \{S_x, \ldots, S_y\}, \ldots$; $k = \sum_{S^p \cap S^q \cap \ldots \cap S^r = \varnothing} \mathrm{mass}_1(S^p)\mathrm{mass}_2(S^q)\ldots\mathrm{mass}_n(S^r)$ is a contradiction coefficient, reflecting the contradiction degree between N mass functions. If k is bigger, it means that the degree of contradiction among n mass functions $\mathrm{mass}_1, \mathrm{mass}_2, \ldots, \mathrm{mass}_n$ is higher.

The expression of the disjunction operator (DO) is

$$mass''(S) = \sum_{S^p \cup S^q \cup \ldots \cup S^r = S} \mathrm{mass}_1(S^p)\mathrm{mass}_2(S^q)\ldots\mathrm{mass}_n(S^r), \tag{4}$$

where $mass''$ represents the mass function obtained by fusing n mass functions $mass_1, mass_2, \ldots, mass_n$ with disjunction operator.

The expression of WFR-CDDO is

$$\begin{aligned} mass'''(S) &= \alpha \cdot mass'(S) + \beta \cdot mass''(S) \\ &= \alpha \frac{1}{1-k} \sum_{S^p \cap S^q \cap \ldots \cap S^r = S} mass_1(S^p)mass_2(S^q)\ldots mass_n(S^r) \\ &\quad + \beta \sum_{S^p \cup S^q \cup \ldots \cup S^r = S} mass_1(S^p)mass_2(S^q)\ldots mass_n(S^r), \end{aligned} \tag{5}$$

where α and β are the weighting factors of CO and DO, $\alpha \geq 0, \beta \geq 0$ and $\alpha + \beta = 1$. If we use k as the weighting factor of DO, that is, $\beta = k$, so $\alpha = 1 - k$.

WFR-CDDO is further expressed as

$$\begin{aligned} mass'''(S) &= \sum_{S^p \cap S^q \cap \ldots \cap S^r = S} mass_1(S^p)mass_2(S^q)\ldots mass_n(S^r) \\ &\quad + k \sum_{S^p \cup S^q \cup \ldots \cup S^r = S} mass_1(S^p)mass_2(S^q)\ldots mass_n(S^r). \end{aligned} \tag{6}$$

Then, n mass functions are fused through WFR-CDDO, and the fusion results are calculated in turn as $mass'''(S_1)$, $mass'''(S_2)$, ..., $mass'''(S_m)$, ..., $mass'''(\{S_x, \ldots, S_y\})$, ...

Step 5. Under the identification framework $\Theta = \{S_1, S_2, \ldots, S_m\}$, the belief function and plausibility function of level S_j are calculated as

$$Bel(S_j) = \sum_{S^p \subseteq S_j} mass'''(S^p), \tag{7}$$

$$Pl(S_j) = \sum_{S^p \cap S_j \neq \varnothing} mass'''(S^p). \tag{8}$$

They form the trust interval $[Bel(S_j), Pl(S_j)]$ of level S_j, where $j = 1, 2, \ldots, m$.

Step 6. Based on the trust intervals $[Bel(S_1), Pl(S_1)]$, $[Bel(S_2), Pl(S_2)]$, ..., $[Bel(S_m), Pl(S_m)]$ of $S_1, S_2, \ldots, S_m$, we calculate the matrix:

$$\Delta = (\Delta_{j,l})_{m \times m}, \tag{9}$$

where

$$\Delta_{j,l} = \frac{\max\{0, Pl(S_j) - Bel(S_l)\} - \max\{0, Bel(S_j) - Pl(S_l)\}}{Pl(S_j) - Bel(S_j) + Pl(S_l) - Bel(S_l)}. \tag{10}$$

It represents the comparison between the degree of support of the fusion result for "the innovation of interactive packaging belongs to S_j" and the degree of support of the fusion result for "the innovation of interactive packaging belongs to S_l," where $Bel(S_l)$ and $Pl(S_l)$ are the lower limit and upper limit of trust interval $[Bel(S_l), Pl(S_l)]$ of level S_l, respectively, and $l = 1, 2, \ldots, m$.

Step 7. According to $\Delta = (\Delta_{j,l})_{m \times m}$, if $\Delta_{j,l} > 0.5$, the degree of support of the fusion result for "the innovation of interactive packaging belongs to S_j" is higher than that of the fusion result for "the innovation of interactive packaging belongs to S_l," which is recorded as $S_j \succ S_l$. If $\Delta_{j,l} < 0.5$, the degree of support of the fusion result for "the innovation of interactive packaging belongs to S_j" is lower than that of the fusion result for "the innovation of interactive packaging belongs to S_l," which is recorded as $S_j \prec S_l$. If $\Delta_{j,l} = 0.5$, the degree of support of the fusion result for "the innovation of interactive packaging belongs to S_j" is equal to that of the fusion result

for "the innovation of interactive packaging belongs to S_l," which is recorded as $S_j \approx S_l$. After judgment in turn, the evaluation level with the highest degree of support is the innovation level of interactive packaging design.

4. Case Study

The shape, color, pattern, and material of packaging should be able to arouse people's favorite emotions because people's likes and dislikes play a very important role in buying impulse. Favors come from two aspects. The first is practical, that is, whether the packaging can meet the needs of consumers in all aspects and provide convenience, which involves the size, size, beauty, and other aspects of the packaging. The same skin care cream can be packaged in large bottles or small boxes. Consumers can choose it according to their habits; the same products with exquisite packaging are easy to be selected as gifts and those with poor packaging can only be used by themselves. When the packaging of the product provides convenience, it will naturally arouse consumers' favor. The interactive packaging design of a certain nut food is shown in Figure 3.

It is now necessary to identify the innovation of the interactive packaging visual Chuangda design. The implementation steps are as follows:

We set the innovative evaluation level of interactive packaging as level 3: S_1, S_2, S_3, which are superior, medium , and inferior in sequence. Experts from four expert groups evaluates the innovation of interactive packaging visual communication design. Here, the number of experts included in the four expert groups are as follows: ε_1 =25, ε_2 = 28 , ε_3 = 30 , and ε_4 = 27. The evaluation results of the fourexpert groups on theinnovation of interactivepackaging visual creative design are shown in Table 1–4, respectively.

Then, we construct the identification framework for the innovative evaluation of the interactive packaging visual creative design $\Theta = \{S_1, S_2, S_3\}$.

The evaluation information of the four expert groups is regarded as evidence and further expressed as the basic probability assignment function under the identification framework, which is expressed by $mass_1, mass_2, \ldots, mass_4$.

For $mass_1$, $mass_1(S_1) = 0.8000$, $mass_1(S_2) = 0.0400$, $mass_1(S_3) = 0.0400$, $mass_1(S_1, S_2) = 0.0400$, $mass_1(S_2, S_3) = 0.0400$, and $mass_1(S_1, S_3) = 0.0400$.

For $mass_2$, $mass_2(S_1) = 0.0357$, $mass_2(S_2) = 0.0714$, $mass_2(S_3) = 0.7500$, $mass_2(S_1, S_2) = 0.0357$, $mass_2(S_2, S_3) = 0.0357$, and $mass_2(S_1, S_3) = 0.0714$.

For $mass_3$, $mass_3(S_1) = 0.8333$, $mass_3(S_2) = 0.0333$, $mass_3(S_3) = 0.0333$, $mass_3(S_1, S_2) = 0.0333$, $mass_3(S_2, S_3) = 0.0333$, and $mass_3(S_1, S_3) = 0.0333$.

For $mass_4$, $mass_4(S_1) = 0.7778$, $mass_4(S_2) = 0.0370$, $mass_4(S_3) = 0.0370$, $mass_1(S_1, S_2) = 0.0741$, $mass_1(S_2, S_3) = 0.0370$, and $mass_1(S_1, S_3) = 0.0370$.

Based on WFR-CDDO, $mass_1, mass_2, \ldots, mass_4$ are fused.

CO is $\text{mass}'(S) = 1/1 - k\sum_{S^p \cap S^q \cap \ldots \cap S^r = S} \text{mass}_1(S^p)\ \text{mass}_2(S^q) \ldots \text{mass}_4(S^r)$, where $mass'$ represents the mass function obtained by fusing four mass functions with CO,

Figure 3: The interactive packaging design of a certain nut food.

Table 1: Evaluation results of the first expert group on the innovation of interactive packaging visual creative design.

	S_1	S_2	S_3	S_1, S_2	S_2, S_3	S_1, S_3
Number of experts	20	1	1	1	1	1

Table 2: Evaluation results of the second expert group on the innovation of interactive packaging visual creative design.

	S_1	S_2	S_3	S_1, S_2	S_2, S_3	S_1, S_3
Number of experts	1	2	21	1	1	2

Table 3: Evaluation results of the third expert group on the innovation of interactive packaging visual creative design.

	S_1	S_2	S_3	S_1, S_2	S_2, S_3	S_1, S_3
Number of experts	25	1	1	1	1	1

Table 4: Evaluation results of the fourth expert group on the innovation of interactive packaging visual creative design.

	S_1	S_2	S_3	S_1, S_2	S_2, S_3	S_1, S_3
Number of experts	21	1	1	2	1	1

$S^p, S^q, \ldots, S^r \subset \Theta$, $S = S_1, S_2, S_3, \ldots, \{S_x, \ldots, S_y\}, \ldots$; $k = \sum_{S^p \cap S^q \cap \ldots \cap S^r = \varnothing} \text{mass}_1(S^p)\text{mass}_2(S^q) \ldots \text{mass}_4(S^r)$.

DO is $\text{mass}''(S) = \sum_{S^p \cup S^q \cup \ldots \cup S^r = S} \text{mass}_1(S^p)\ \text{mass}_2(S^q) \ldots \text{mass}_4(S^r)$, where $mass''$ represents the mass function obtained by fusing four mass functions with DO.

The expression of WFR-CDDO is

$$\begin{aligned} mass'''(S) &= \alpha \cdot mass'(S) + \beta \cdot mass''(S) \\ &= \alpha \frac{1}{1-k} \sum_{S^p \cap S^q \cap \ldots \cap S^r = S} mass_1(S^p) mass_2(S^q) \ldots mass_4(S^r) \\ &\quad + \beta \sum_{S^p \cup S^q \cup \ldots \cup S^r = S} mass_1(S^p) mass_2(S^q) \ldots mass_4(S^r). \end{aligned} \tag{11}$$

It is further expressed as

$$mass^{'''}(S) = \sum_{S^p \cap S^q \cap \ldots \cap S^r = S} mass_1(S^p) mass_2(S^q) \ldots mass_4(S^r) + k \sum_{S^p \cup S^q \cup \ldots \cup S^r = S} mass_1(S^p) mass_2(S^q) \ldots mass_4(S^r). \quad (12)$$

According to WFR-CDDO, four *mass* functions $mass_1, mass_2, \ldots, mass_4$ are fused. We calculate the fusion results in turn: $mass^{'''}(S_1)$, $mass^{'''}(S_2)$, $mass^{'''}(S_3)$, $\ldots$, $mass^{'''}(\{S_x, \ldots, S_y\})$, $\ldots$:

(i) $mass^{'''}(S_1) = 0.7638$

(ii) $mass^{'''}(S_2) = 0.0141$

(iii) $mass^{'''}(S_3) = 0.1011$

(iv) $mass^{'''}(S_1, S_2) = 0.0422$

(v) $mass^{'''}(S_2, S_3) = 0.0309$

(vi) $mass^{'''}(S_1, S_3) = 0.0479$

Then, we calculate on identification framework $\Theta = \{S_1, S_2, S_3\}$.

The reliability function and plausibility function of S_1 are $Bel(S_1) = 0.7638$ and $Pl(S_1) = 0.8539$, which constitute the trust interval of S_1: $[Bel(S_1), Pl(S_1)] = [0.7638, 0.8539]$.

The reliability function and plausibility function of S_2 are $Bel(S_2) = 0.0141$ and $Pl(S_2) = 0.0872$, which constitute the trust interval of S_2: $[Bel(S_2), Pl(S_2)] = [0.0141, 0.0872]$.

The reliability function and plausibility function of S_3 are: $Bel(S_3) = 0.1011$ and $Pl(S_3) = 0.1799$, which constitute the trust interval of S_3: $[Bel(S_3), Pl(S_3)] = [0.1011, 0.1799]$.

Based on the trust intervals of S_1, S_2, S_3, we calculate

$$\Delta = \left(\Delta_{j,l}\right)_{3\times 3} = \begin{bmatrix} 0.5 & 1 & 1 \\ 0 & 0.5 & 0 \\ 0 & 1 & 0.5 \end{bmatrix}. \quad (13)$$

According to $\Delta = (\Delta_{j,l})_{3\times 3}$, $\Delta_{1,2} = 1 > 0.5$, so the degree of support of fusion results for "the innovation of interactive packaging visual communication design belongs to S_1" is higher than that of fusion results for "the innovation of interactive packaging visual communication design belongs to S_2," that is, $S_1 \succ S_2$.

$\Delta_{1,3} = 1 > 0.5$, so the degree of support of fusion results for "the innovation of interactive packaging visual communication design belongs to S_1" is higher than that of fusion results for "the innovation of interactive packaging visual communication design belongs to S_3," that is, $S_1 \succ S_3$.

$\Delta_{2,3} = 0 < 0.5$, so the degree of support of fusion results for "the innovation of interactive packaging visual communication design belongs to S_2" is lower than that of fusion results for "the innovation of interactive packaging visual communication design belongs to S_3," that is, $S_2 \prec S_3$.

Therefore, the evaluation grade with the highest degree of support for fusion results is S_1, and the innovation of interactive packaging visual communication design belongs to S_1.

5. Conclusions

As a comprehensive course across social sciences and humanities and social sciences, digital media art can be applied to the Internet-famous food packaging design, promote the reform and improvement of visual communication design of Internet-famous food packaging, make electronic information technology and news media technology organically combine with Internet-famous food packaging technology, and give new meaning to Internet-famous food packaging. When the evidence fusion rules in the classical evidence theory deal with the evidence contradiction in the innovative identification of interactive packaging visual communication design, they will get wrong results that are contrary to the common sense. Compared with the evidence fusion rules in the classical evidence theory, the conjunction disjunction double arithmetic weighted fusion rules provided in this study can support the contradiction processing in the innovative identification of interactive packaging visual communication design.

Data Availability

The dataset can be accessed upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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References

[1] Yu. Chen, "Visual communication design based on 5G technology," *Wireless Communications and Mobile Computing*, vol. 2022, Article ID 1699213, 12 pages, 2022.

[2] J. Yang, X. LiLi, and X. Li, "Data-driven dynamic neural programming for network media nonlinear visual communication design," *Mathematical Problems in Engineering*, vol. 2022, p. 10, 2022.

[3] X. Liu, "Animation Special Effects Production Method and Art Color Research Based on Visual Communication Design," *Scientific Programming*, vol. 2022, Article ID 7835917, 13 pages, 2022.

[4] X. Guan and K. Wang, "Visual Communication Design Using Machine Vision and Digital Media Communication Technology," *Wireless Communications and Mobile Computing*, vol. 2022, Article ID 6235913, 11 pages, 2022.

[5] Y. Zhang, R. YuYu, X. ShiShi, K. HongHong, and K. Hong, "Visual communication design in print advertising under new media environment," *Wireless Communications and Mobile Computing*, vol. 2022, Article ID 7664127, 10 pages, 2022.

[6] Y. Gao, "Feature Extraction Technology-Guided Visual Communication Design for Folk Paper-Cutting," *Scientific Programming*, vol. 2022, Article ID 3210054, 9 pages, 2022.

[7] C. Ma and W. Chung, "Visual communication design based on collaborative wireless communication video transmission," *Journal of Sensors*, vol. 2022, Article ID 5348222, 11 pages, 2022.

[8] H. Zhang and C. Wu, "An analysis of computer-aided design software course teaching in visual communication design

major by integrating grey variable weight clustering evaluation model," *Advances in Multimedia*, vol. 2021, Article ID 6588734, 7 pages, 2021.

[9] W. Zhu, "A Study of Big-Data-Driven Data Visualization and Visual Communication Design Patterns," *Scientific Programming*, vol. 2021, Article ID 6704937, 11 pages, 2021.

[10] Z. Dong, L. Lu, Z. Liu, Y. Tang, and J. Wang, "Migration of toxic metals from ceramic food packaging materials into acid food Simulants," *Mathematical Problems in Engineering*, vol. 2014, Article ID 759018, 11 pages, 2014.

[11] E. Ghorbani, D. Moghaddam, A. Sharifan, and H. Kiani, "Emergency food product packaging by pectin-based antimicrobial coatings functionalized by pomegranate peel extracts," *Journal of Food Quality*, vol. 2021, Article ID 6631021, 10 pages, 2021.

[12] W. Ye and Y. Li, "Design and Research of Digital Media Art Display Based on Virtual Reality and Augmented Reality," *Mobile Information Systems*, vol. 2022, Article ID 6606885, 12 pages, 2022.

[13] Y. Li and W. Zhuge, "Application of Animation Control Technology Based on Internet Technology in Digital Media Art," *Mobile Information Systems*, vol. 2022, Article ID 4009053, 11 pages, 2022.

[14] M. Wang, J. Wang, and C. Zhang, "Visual Space System Design in Digital Media Art Design," *Scientific Programming*, vol. 2022, Article ID 3678090, 13 pages, 2022.

[15] P. Liu, C. Song, X. Ma, and T. Xuchao, "Visual Space Design of Digital Media Art Using Virtual Reality and Multidimensional Space," *Mobile Information Systems*, vol. 2022, Article ID 822057, 11 pages, 2022.

[16] H. Tian, "Application and Analysis of Artificial Intelligence Graphic Element Algorithm in Digital Media Art Design," *Mobile Information Systems*, vol. 2022, Article ID 6946616, 11 pages, 2022.

[17] Y. Liu, S. Wu, Qi Xu, and H. Liu, "Holographic Projection Technology in the Field of Digital Media Art," *Wireless Communications and Mobile Computing*, vol. 2021, Article ID 9997037, 12 pages, 2021.

[18] W. Ye and Y. Li, "Digital Media Art Display Design and Research under the Research of 3D Point Cloud Data Acquisition Technology Based on Sequence Images," *Mobile Information Systems*, vol. 2022, Article ID 7106900, 12 pages, 2022.

[19] X. Wu and Y. Li, "Experience Mode of Digital Media Art under Virtual Reality Technology," *Applied Bionics and Biomechanics*, vol. 2022, Article ID 5117150, 6 pages, 2022.

[20] T. Mao and X. Jiang, "The use of digital media art using UI and visual sensing image technology," *Journal of Sensors*, vol. 2021, Article ID 9280945, 11 pages, 2021.

[21] M. Liu, Y. Wang, J. Chen, and Y. Zhang, "Link Prediction Model for Weighted Networks Based on Evidence Theory and the Influence of Common Neighbours," *Complexity*, vol. 2022, Article ID 9151340, 16 pages, 2022.

[22] L. Li, B. Lei, and C. Mao, "Digital twin in smart manufacturing," *Journal of Industrial Information Integration*, vol. 26, no. 9, Article ID 100289, 2022.

[23] Y. Liu, T. Bao, H. Sang, and Z. Wei, "A novel method for conflict data fusion using an improved belief divergence measure in dempster-shafer evidence theory," *Mathematical Problems in Engineering*, vol. 2021, Article ID 6558843, 15 pages, 2021.

[24] L. Li, T. Qu, and Y. Liu, "Sustainability assessment of intelligent manufacturing supported by digital twin," *IEEE Access*, vol. 8, pp. 174988–175008, 2020.

[25] L. Li and C. Mao, "Big data supported PSS evaluation decision in service-oriented manufacturing," *IEEE Access*, vol. 8, no. 99, p. 1, 2020.

[26] J. Zhang, C. Wu, C. Ruan, R. Zhang, Z. Zhao, and X. Cheng, "ECG signal classification based on fusion of hybrid CNN and wavelet features by D-S evidence theory," *Journal of Healthcare Engineering*, vol. 2021, Article ID 4222881, 13 pages, 2021.

[27] L. Li, C. Mao, H. Sun, Y. Yuan, and L. Bingbing, "Digital twin driven green performance evaluation methodology of intelligent manufacturing: hybrid model based on fuzzy rough-sets AHP, multistage weight synthesis, and PROMETHEE II," *Complexity*, vol. 2020, no. 6, p. 24, 2020.

[28] Z.-Q. Liu, M.-C. Peng, and Y.-C. Sun, "Estimation of driver lane change intention based on the LSTM and dempster-shafer evidence theory," *Journal of Advanced Transportation*, vol. 2021, Article ID 8858902, 11 pages, 2021.

[29] Y.-L. Zhang and C.-Qv. Li, "Numerical characterizations of topological reductions of covering information systems in evidence theory," *Mathematical Problems in Engineering*, vol. 2021, Article ID 6648108, 9 pages, 2021.

[30] Z. Wan, M. Shi, F. Yang, and G. Zhu, "A novel pythagorean group decision-making method based on evidence theory and interactive power averaging operator," *Complexity*, vol. 2021, Article ID 9964422, 11 pages, 2021.

[31] C. Wang and H. G. Matthies, "Epistemic uncertainty-based reliability analysis for engineering system with hybrid evidence and fuzzy variables," *Computer Methods in Applied Mechanics and Engineering*, vol. 355, pp. 438–455, 2019.

[32] C. Wang and H. G. Matthies, "Evidence theory-based reliability optimization design using polynomial chaos expansion," *Computer Methods in Applied Mechanics and Engineering*, vol. 341, pp. 640–657, 2018.

[33] L. Sun, M. K. Siddique, L. Wang, and S. J. Li, "Mixing characteristics of a bubble mixing microfluidic chip for genomic DNA extraction based on magnetophoresis: CFD simulation and experiment," *Electrophoresis*, vol. 42, no. 21-22, pp. 2365–2374, 2021.

[34] Z. Wang, J. Jiang, and T. Wang, "Failure probability analysis and critical node determination for approximate circuits," *Integration*, vol. 68, pp. 122–128, 2019.