Hindawi
Mobile Information Systems
Volume 2022, Article ID 3773469, 10 pages
https://doi.org/10.1155/2022/3773469

Research Article

IOT-Oriented Visual Target Tracking and Supply Chain Art Product Design

Hua Song

Wuhan Polytechnic University, School of Art and Design, Wuhan 430048, Hubei, China

Correspondence should be addressed to Hua Song; huasong@whpu.edu.cn

Received 20 May 2022; Revised 19 June 2022; Accepted 29 June 2022; Published 15 July 2022

Academic Editor: Shadi Aljawarneh

Visual target tracking technology has always been one of the hotspots in the field of computer vision. After analyzing the above two problems and introducing real-time tracking, this article makes corresponding improvements to the visual target tracking structure of the Internet of Things. Based on this point, this article finally brings together related theories such as the Internet of Things and supply chain, starting from practical problems, inspecting the current situation of the supply chain of Chinese art product design companies, and proposing the necessity of establishing a systemic risk indicator system to use in the product supply chain; this article uses the HHM method to identify the risk factors of the artwork in the Internet of Things environment and promotes a multiangle risk analysis tailored to its own characteristics in the product supply chain. According to controllable risks and uncontrollable risks, combined with the structural level of the Internet of Things system, risks are divided into detection risk layer, network layer (information layer), application layer risk, and other risks. This article combines the above-mentioned visual target tracking technology with the relationship between the Internet of Things supply chains, uses the G1 method and the entropy weight method to determine the risk indicators for the subject and purpose of the risk weight, and classifies the risk indicators to propose risk control measures.

1. Introduction

Traditional visual target tracking algorithms cannot track part of the scene well due to insufficient functions, such as light changes and target deformations. In response to the above problems, this paper, based on the visual target tracking algorithm, conducts an in-depth analysis and improvement on image acquisition methods, target size estimation, occlusion, and missing target analysis and proposes a stable real-time visual target tracking algorithm [1]. It solves the problem of insufficient formal capture and description capabilities of the visual target tracking algorithm. The target tracking strategy is based on the weight fusion of multiple components in the response layer and introduces a method of estimating multiple dimensions [2]. Given the real performance of the algorithm, focus on the scale change of the target during the tracking process. According to the target position determined in this framework, the target set samples of different scales are constructed, and this set of sample input is used to drive the variable scale filter. The best real-time target proportion should be determined, so as to improve the tracking accuracy of the algorithm when the target proportion changes [3]. Next, based on the literature review, this research integrates and summarizes the Internet of Things, the supply chain of artworks, and other related content. In view of the current investigation situation, a company has relatively mature technology in the supply chain of art products, but on the surface, the company's early warning methods and early warning strategies are not ideal for new problems caused by the use of the Internet of Things technology. Based on the technical characteristics of the Internet of Things, this research combines the design characteristics of art products with the supply chain itself according to the hierarchical structure of the Internet of Things (psychological layer risk, network layer (information layer) risk, and application layer risk) and analyzes the product supply chain IoT applications at all levels of the chain. Finally, this article introduces the concept of artistic product design around the supply chain through product experience and proposes specific methods of organization and management and its implementation measures. First of all, we should pay attention to the needs of consumer experience (from supply chain to product experience), the overall structure of the designated catalyst unit, and the large number of experiences generated by the overall structure of the catalyst when the product contacts customers. Second, use the most advanced technology to expand the scope of product expertise, create a value matrix in empathy design, and create a fusion mechanism for organizational management to provide more diversity and sustainability.

2. Related Work

The literature introduces related issues such as the Internet, the art supply chain, and the product supply chain. Through the system dynamics model, the risk perception layer, risk layer (information layer), and system risk application layer of the product supply chain under the Internet of Things environment are established [4]. This dynamic model is based on a system dynamic model that visualizes the risk layer, information layer risk (information layer), and application layer risk and builds a risk model for the entire art product supply chain. The object's network environment and model dynamic system are used to supplement the supply chain risk model for the product [5]. It can simulate a real and dynamic operating system and test the extremeness and sensitivity of the model through scientific means. The literature introduces the technology of the RFID anti-counterfeiting system [6]. The system focuses on label operations and can be divided into four subsystems, namely label storage system, label issuance system, label and seal system, and authentication system. The business logic of the four subsystems is designed in detail, the AES encryption algorithm and the MD5 algorithm are used to design the RFID data encryption method, and the AES encryption algorithm and the RSA encryption algorithm are used to design the data communication encryption algorithm [7]. The literature introduces manufacturing maturity evaluation indicators and prioritizes the algorithmic analysis of manufacturing factors based on the analytic hierarchy process, the representation method of manufacturing maturity based on fuzzy sets, and the content of the manufacturing maturity analysis method based on the estimated ideal value arrangement to obtain maturity [8]. A comprehensive analysis model is created for the product design solution. Taking an electronic pump produced by an automobile energy company as an example, the product design scheme was verified according to the maturity of the production, and the feasibility of the inspection method was proved [9]. The literature introduces a trend binding filter, which targets a tracking algorithm based on spatio-temporal regularization [10]. The target tracking algorithm based on correlation filtering uses cyclic shift operation for dense sampling, which indirectly improves the discriminative ability of the tracking model but also introduces the problem of boundary effects. In addition, this method is used to update the model, which is updated every frame to quickly cause model degradation. The literature describes the linear correlation of target tracking algorithms, which combines the statistical characteristics of colors [11]. Related filtering barriers can prevent forms used to identify target information from becoming template features, including manual template forms (HOG, CN) and CNN forms.

3. Visual Target Tracking Method Design

3.1. Learning Correlation Filters. Consistent with MOSSE, when multiple shape paths are found, we will independently learn a specific correlation filter for each shape segment. Assuming that the sample used to start the correlation filter x and the shape extraction operation is labeled f, then $f(x)$ represents the shape obtained from the sample x. L is the label part of the channel, $l \in \{l|l = 1, \ldots, \mathrm{d}\}$, any form of discharge flow in channel l is marked as fl. The correlation filter is marked as h, so the correlation filter of any channel in this format is marked as h^l. The relevant response of each channel is marked as $S_h(x, l)$, which is defined as follows:

$$S_h(x, l) = h^{l*} f^l(x), l = 1, \ldots, \mathrm{d}. \quad (1)$$

In order to solve the above-mentioned insufficient learning problem, we independently create a knowledge-specific filter to consider each function of the model and optimize learning to minimize the difference in response between each channel and label, without slowing down. In this case, all occurrence paths will be processed individually, and the associated filters can also be fully identified. Therefore, the shape channel is called a separate independent channel. In order to obtain the filter hl in each independent part of the component, the following target expression must be defined:

$$E(h, l) = \left\|S_h(x, l) - y\right\|^2 + \lambda\left\|h'\right\|^2, l = 1, \ldots, \mathrm{d}. \quad (2)$$

After solving the equation using the strategy provided by the reference, we obtained the correlation filter of the independent channel based on the shape of the Fourier domain.

$$H^l = \frac{\overline{Y} F^l(x)}{\overline{F^l(x)} F^l(x) + \lambda}, l = 1, \ldots, \mathrm{d}. \quad (3)$$

After obtaining the correlation filter, we use the correlation filter to estimate the new target state. Assuming that the current frame is t, we can obtain the response spectrum used by R_t^l to estimate the state of the natural channel l:

$$R_t^l = \mathfrak{g}^{-1}\left(\overline{H_{t-1}^l} F^l(z_t)\right), l = 1, \ldots, \mathrm{d}. \quad (4)$$

If it is the t-th frame, we denote the response spectrum in the current frame as R^l, then the final response spectrum can be obtained.

$$R = \sum_{l=1}^{\mathrm{d}} w^l R^l. \quad (5)$$

3.2. Confidence Combination Based on the Optimal Distribution of Time and Space. We introduce a synthesis operator to describe the spatial dependence of the response spectrum. Since some of the following indicators cannot fully measure the spatial distribution of the response spectrum, this operator uses multiplication to combine them. For any response spectrum R, we define the reliability of its spatial distribution as

$$J(R) = \prod_k J_k(R). \tag{6}$$

FMAX is the maximum value of the color response, which can be obtained in the following ways:

$$J^{\text{FMAX}}(R) = \max(R). \tag{7}$$

PSOC is a measure between the highest peak and the second highest peak of the color response. We use PSOC to measure the significance of the most common peaks in the color response, which is defined as

$$\begin{aligned} J^{\text{PSOC}}(R) &= \frac{\text{peak1}(R) - \text{peak2}(R)}{\text{peak}(R)}, \\ &= 1 - \frac{\text{peak2}(R)}{\text{peak}(R)}. \end{aligned} \tag{8}$$

The definitions of peak 1 (R) and peak 2 (R) are as follows:

$$\text{peak1}(R) = J^{\text{FMAX}}(R). \tag{9}$$

Here, for the calculation of peak 2 (R), all peaks must be in the response spectrum R. The meaning is as follows:

$$\text{peaks} = \{R(i,j)\, I\, R(i,j) > R(m,n),\ (m,n) \in U(i,j,q)\}. \tag{10}$$

Obtain peak 2 (R):

$$\text{peak2}(R) = \left\{v \mid v = max\left(\left\{u | u \in \text{peaks}, u \neq S^{\text{FMAX}}(R)\right\}\right)\right\}. \tag{11}$$

PSR reflects the credibility of the estimated value of the target state. We use PSR to enhance the credibility of the spatial distribution of the response spectrum. The meaning of PSR is as follows:

$$J^{\text{PSR}}(R) = \frac{J^{\text{FMAX}}(R) - \mu(R)}{\sigma(R)}. \tag{12}$$

APCE measures the level of color response changes and then displays the confidence level by detecting shape-independent channels. The meaning of APCE is as follows:

$$J^{\text{APCE}}(R) = \frac{|\max(R) - \min(R)|^2}{\mu\left(\sum_{i,j}(R(i,j) - \min(R))^2\right)}. \tag{13}$$

The optimal spatial distribution of the response spectrum is defined as follows:

$$\begin{aligned} &\underset{w\prime}{\text{argmax}}\, J(R), \\ &\text{where } J(R) = J\left(\sum_{l=1}^{\text{d}} w^l R^l\right), \\ &\qquad = \prod_k J_k\left(\sum_{l=1}^{\text{d}} w^l R^l\right), \\ &s.t. \sum_{l=1}^{\text{d}} w^l = 1, \\ &w\prime > 0, l = 1, \ldots, \text{d}. \end{aligned} \tag{14}$$

In order to obtain the weight w^l that satisfies the best time distribution, the goal is described as follows:

$$\begin{aligned} &\underset{w'}{\text{argmax}} \sum_{i=2}^{t} J(R_i), \\ &\text{where} \sum_{i=2}^{t} J(R_i) = \sum_{i=2}^{t} J\left(\sum_{l=1}^{\text{d}} w^l R_i^l\right), \\ &\qquad = \sum_{i=2}^{t} \prod_{i=2} J_k\left(\sum_{l=1}^{\text{d}} w^l R_i^l\right), \\ &s.t. \sum_{l=1}^{\text{d}} w^l = 1, \\ &w' > 0, l = 1, \ldots, \text{d}. \end{aligned} \tag{15}$$

$$w\prime > 0, l = 1, \ldots, \text{d}. \tag{16}$$

In order to easily adapt to changes in the target shape, we have updated the weights obtained online. In this case, the optimization problem (15) can be simplified to

$$\begin{aligned} w_{t+1}{}' &= (1 - \varphi) w_t^l + \varphi w_{t+1}{}', l = 1, \ldots, \text{d}, \\ w_{t+1}{}' &= \frac{w_{t+1}{}'}{\sum_{k=1}^{\text{d}} w_{t+1}^k}, l = 1, \ldots, \text{d}. \end{aligned} \tag{17}$$

After obtaining the corresponding natural channel weights according to the best spatial distribution and the best time distribution of the response spectrum, the final response spectrum of formula (5) can be effectively generated, and a new target state can be found.

3.3. Online Update of Relevant Filters in Independent Feature Channels. We provide VAF, which is the change rate of appearance characteristics. It can measure the degree of change in visual appearance patterns in different visual paths to track visual targets. Assuming that the current frame is t, the sample used for online update is tx. For each environmental channel, VAF is defined as follows:

$$r_t^l = \frac{N_t^l}{\text{D}_t^l}, l = 1, \ldots, \text{d}. \tag{18}$$

Table 1: Experimental performance comparison results of IFCT and fD SST on OTB-2015.

	AUC	DPt	OP	FPS f
IFCT	59.9	77.7	73.3	69.8
fDSST	55.4	72.5	67.2	100.9

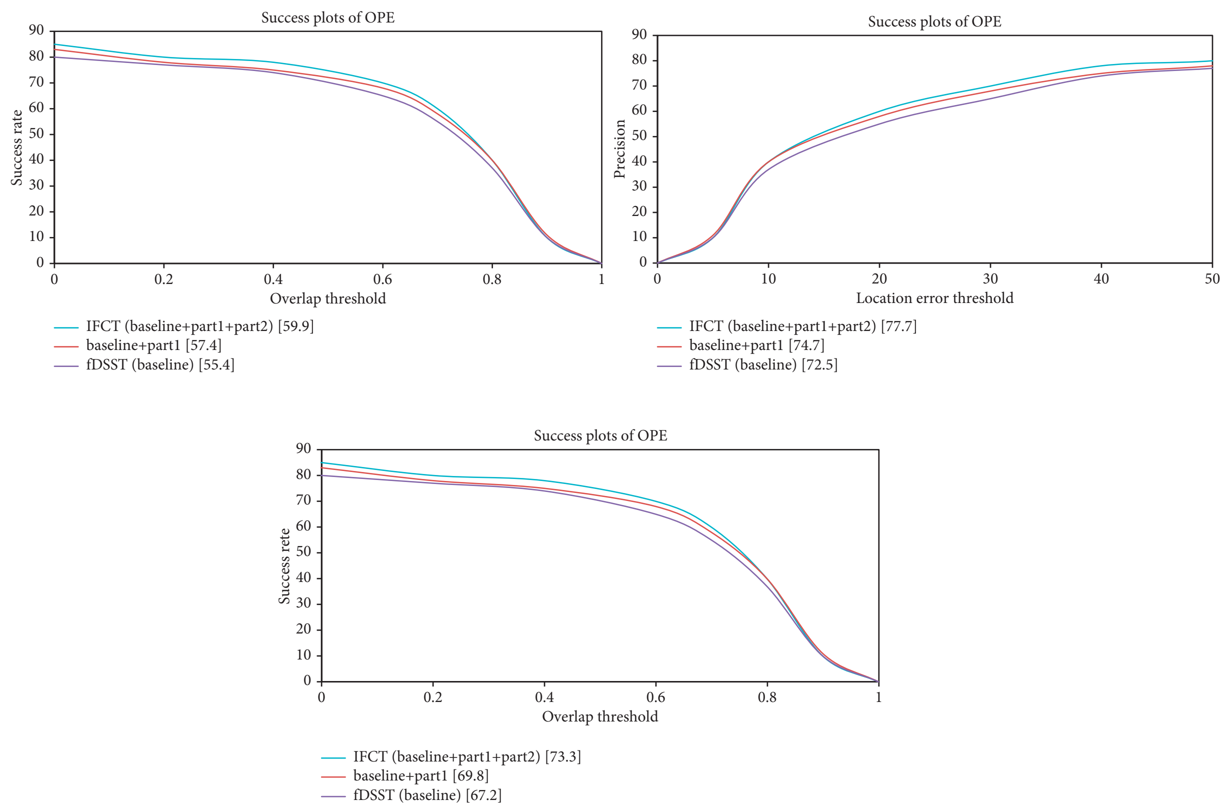

Figure 1: Showcase of experimental results for the validation of key parts on OTB-2015.

N_t^l is

$$N_t^l = \sqrt{\left| f^l(x_t) - f^l(x_{t-1}) \right|^2}, l = 1, \ldots, \text{d}. \quad (19)$$

D_t^l ensures that $r_t^l \in (0, 1)$ is

$$D_t' = \max\left(\left\{N_k^l | k = 2, \ldots, t\right\}\right), l = 1, \ldots, \text{d}. \quad (20)$$

After obtaining the r_t^l feature change feature, you can independently update the relevant filters online in the feature channel. Unlike the improved and similar learning rate between channels, the learning rate we provide can reflect the feature changes between independent feature path frameworks, shown as follows:

$$a_t^l = r_t^l a_{\text{thres}}, l = 1, \ldots, \text{d}. \quad (21)$$

For frame $t+1$, we obtain H_{t+1}^l by updating the A_t^l numerator and denominator B_t^l of H_t^l with the sample x_{t+1}.

$$\begin{aligned} H_t^l &= \frac{A_t^l}{B_t^l + \lambda}, \\ A_{t+1}^l &= \left(1 - \text{d}_{t+1}{}'\right) A_t^l + \text{d}_{t+1}{}' \overline{Y} F^l(x_{t+1}), l = 1, \ldots, \text{d}., \\ B_{t+1}^l &= \left(1 - a_{t+1}{}'\right) B_t^l + a_{t+1}^l \overline{F^l(x_{t+1})} F^l(x_{t+1}), l = 1, \ldots, \text{d}. \end{aligned} \quad (22)$$

3.4. Experimental Results. To estimate the position, we use a two-dimensional correlation filter. We use the shape with gray part and HOG-PCA. For the integrated part of the channel grayscale, we use the 4×4 size to combine the distribution of the grayscale image. For the HOG-PCA part of the channel, we reduced the size of the obtained part by 4 times. In order to measure the scale, we use a one-dimensional correlation filter, use HOG-PCA to obtain the shape, and finally set the λ parameter in regularization to 0.01.

It is known from the experimental results that our method has a significant improvement in tracking accuracy

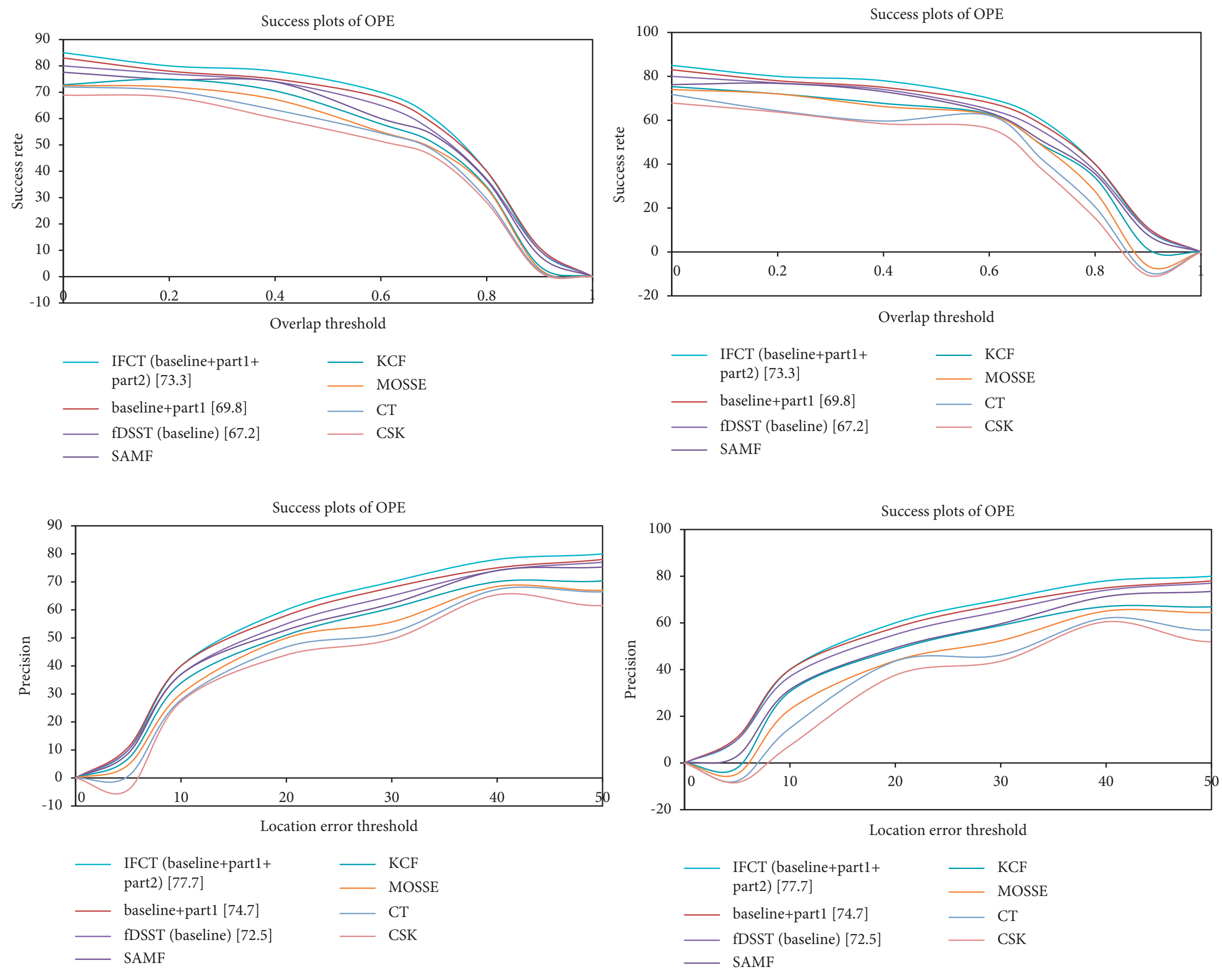

Figure 2: Comparison results of IFCT and many advanced algorithms on OTB-2013 and OTB-2015.

Table 2: Further comparison between many advanced visual target tracking algorithms and IFCT on OTB-2013 and OTB-2015.

	OTB-2013				OTB-2015			
	AUC	DP	OP	FPS	AUC	DP	OP	FPS
IFCT (ours)	63.7	83.5	79.9	72.0	59.9	77.7	73.3	69.8
SRDCF (ICCV2015)	62.6	83.8	78.1	4.9	59.7	78.8	72.6	4.7
CSR-DCF (CVPR2017)	59.3	80.3	73.8	8.6	58.6	80.2	69.8	8.4
LMCF (CVPR2017)	62.8	84.2	80.0	77.6	58.0	78.9	71.9	65.6
Staple (CVPR2016)	59.3	78.2	73.8	59.3	57.8	78.4	69.9	57.6
fDSST (TPAM2017)	60.0	80.3	74.7	107.6	55.4	72.5	67.2	100.9

compared with the initial value. For real-time execution, even if our method reduces the calculation speed to some extent due to many aspects of the tracking process, it can still guarantee the real-time execution of the process and keep the calculation speed tracking 70 FPS. The comparison results are listed in Table 1.

We independently verified the effectiveness of the main components of the OTB-2015 algorithm, and the experimental results are shown in Figure 1.

It can be seen that, according to the experimental method, fDSST control has been added to the first part of IFCT (i.e., including filters about independent form paths and subsequent color generation based on the contribution of the shape channel). In comparison, DP and OP increased by 2.0%, 2.2%, and 2.6%, respectively. After adding the second part of IFCT (the filter related to the online understanding of independent table channels), our method increases AUC, DP, and OP by 4.5%, 5.2%, and 6.1%, respectively, compared with fDSST. Therefore, compared with the experimental fDSST control method, each component of IFCT has a significant effect on its improvement, and the efficacy of the main component of IFCT is also confirmed.

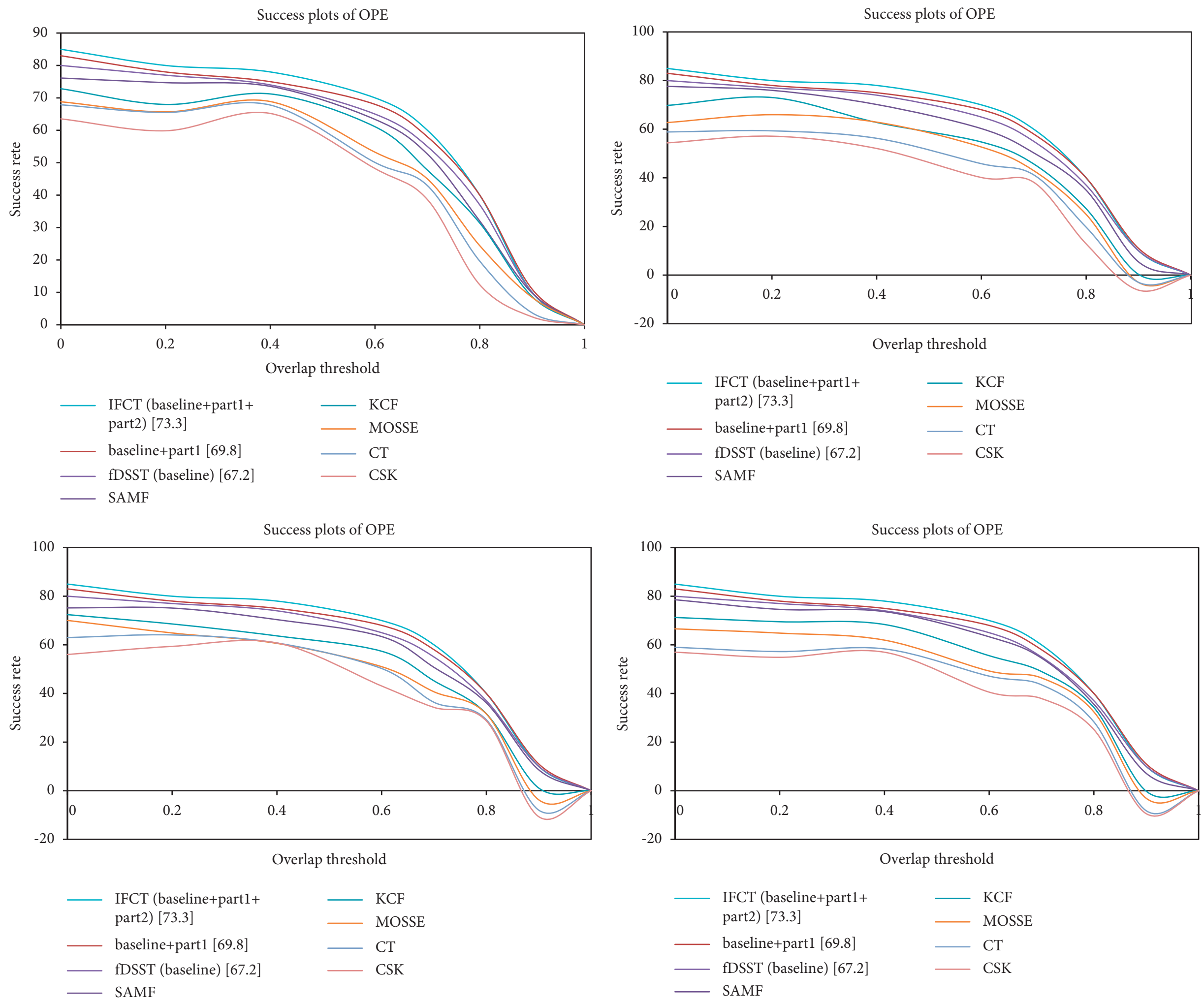

Figure 3: IFCT and many advanced methods compare results based on attributes of OTB-2013.

After starting the IFCT experiment and the fDSST control method, we compare the performance of other advanced algorithms in this chapter to track the visual targets of OTB-2013 and OTB-2015.

As shown in Figure 2, in OTB-2013, our IFCT method ranked first with an AUC score of 63.7%, which was 0.9% higher than LMCF, which ranked second with a score of 62.8%.

In order to better compare performance, we chose a typical comparison method to better compare and analyze our IFCT. The detailed information of the experimental results is shown in Table 2.

It is worth mentioning that between the two databases, IFCT not only has a good competitive advantage in tracking accuracy but also has some real-time performance advantages. Especially compared with SRDCF and CSR-DCF, our method is 15 times faster than SRDCF in calculation speed and 9 times faster than CSR-DCF. Figure 3 shows the results of the IFCT comparison and several advanced methods based on OTB-2013 features.

4. Supply Chain Art Product Design in the Context of the Internet of Things

4.1. IoT Architecture Design. With the support of Internet technology, the Internet of Things has become more intelligent and has become a mediator and link that connects everything. When studying the architecture of the Internet of Things, researchers further constructed their system structure in a layered manner, and many architectures rely on ISO/OSI as a reference model. Consistent with the nature of the Internet of Things, scientists divide it into three levels. These three levels correspond to the three components of the Internet of Things. These three layers not only overlap each other but are also connected to each other. Each level is supported by related technologies.

The perception layer is the key to identifying appropriate objects and collecting relevant information; the network layer processes relevant information and transmits the information from the perception layer to the application layer, as shown in Figure 4.

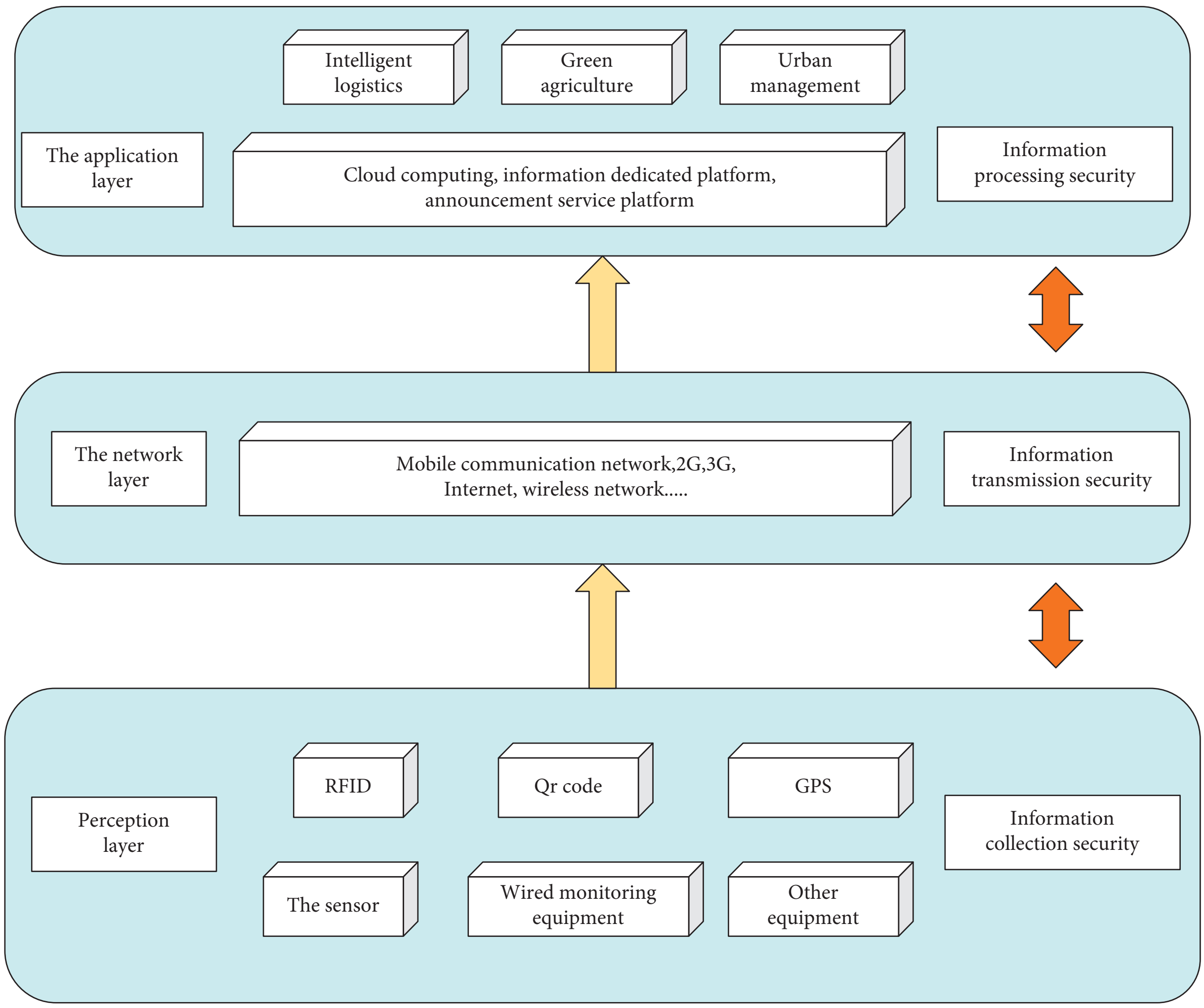

Figure 4: Three-tier architecture system of the Internet of Things.

It can be seen from Figure 4 that the functions of its three levels are different, and different levels are supported by different technologies.

4.2. The Basic Aspects of Artistic Design Based on the Product Experience Supply Chain. Design is undergoing a transition from "innovative style" to rapid "innovation." The plan has expanded from the link between the industrial chain and the innovation chain in the past to contribute to the system and the entire process. In the manufacturing process itself, traditional design is usually only seen as a specific and well-defined link in the production chain, which is connected to the "pipe" of the production chain in the form of "screws" and is located at the end of the chain. The supply chain with a product experience is based on sustainability thinking, and the nodes of product experience are connected to each other to form a general delivery chain of experience. From the perspective of consumer use, the artistic design of the supply chain around the product experience is generally defined as the "catalyst" and internal "catalyst" in contact with the customer's products.

According to traditional economic logic, people always weigh the value of products in terms of technology cost and

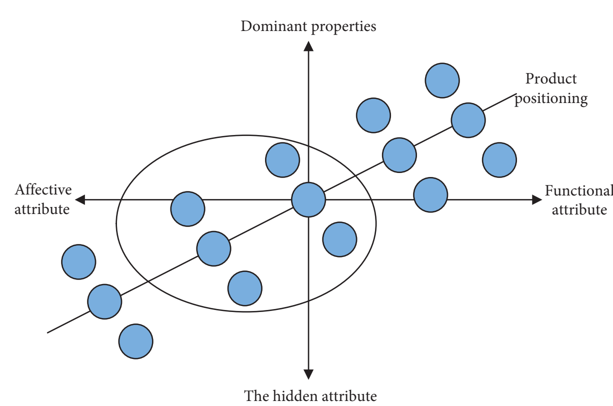

Figure 5: Extended design of product attribute dimension.

cost value, in order to increase the technical value of the product and increase the additional technical value of the product, or to improve the product by improving the manufacturing technology and reducing the cost of production. Nowadays, the aesthetic quality of products is no longer like decorative samples, but an organism that has been integrated into the product manufacturing process,

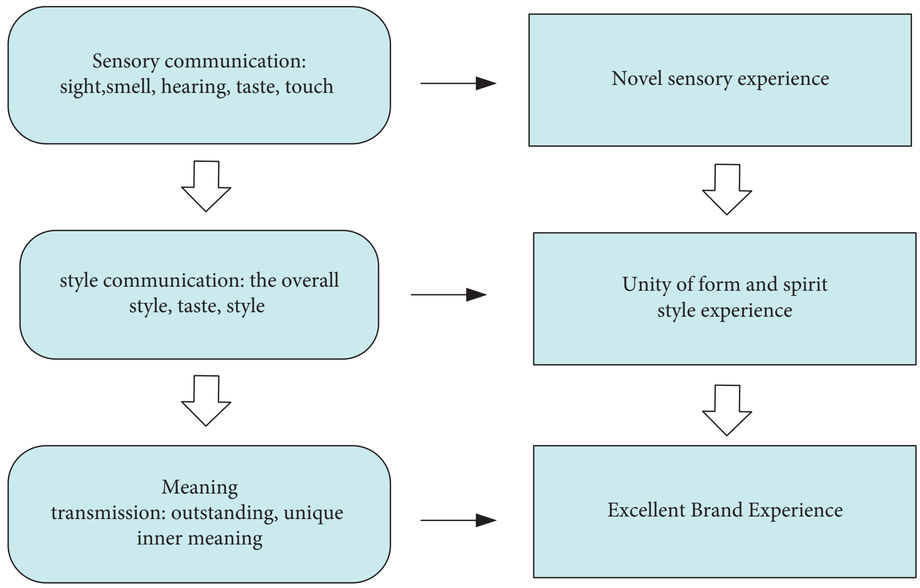

Figure 6: The value matrix of art design of product experience supply chain.

which is very important for consumption. In the continuous use of products by consumers, the manufacturer creates an aesthetic taste and brings an extraordinary experience to the product.

Consistent with this, the design concept of product experience supply chain art brings experience links, which can be included in products as chain units to maintain separate components and experience design [12]. The experienced supply chain art design not only expands the value channels of products but also makes the value chain of products become "organic expansion," that is, mutual connection and common value orientation. In this way, the geometric value of the product experience can be expanded, that is, the "$1 + 1 > 2$" effect. Different from traditional products with short added value, the quantity created by artistic design based on product experience in the supply chain is high-end cost and high-end capital, which is difficult to imitate and copy by competitors.

The production method available in art design is the latest supply chain, or it can be said to be a production system based on an intelligent network [13]. The experience of the product value chain covers the entire process of product development, manufacturing, marketing, and service and has a radiant impact on the entire product production chain and life cycle [14]. Nowadays, the testing and manufacturing of raw materials at the end of the industrial chain have begun to pay more and more attention to the transfer of aesthetic quality and aesthetic experience. At the same time, with the advancement of microcomputer technology, many aesthetic considerations can gradually be fully reflected in computer simulation and realized in the production process [15].

In addition, unlike the "pipeline" production chain where traditional design exists, the art design is no longer just a link in the industrial chain but becomes an "energy harvesting ring" in the industrial chain [16, 17]. These companies are mainly committed to combining the four basic resources of technology, production, brand, and market through art design. From exploring the concept connotation to ergonomic design, and then to manufacturers and users (setting production plans according to users' real-time response), creating brand image and management experience, the artistic design of users and services has gradually become the center of the whole product production value chain. The artistic design of users and services has gradually become the center of the entire product production value chain [18].

In the process of creating products, art design can be regarded as a method of creating beauty, emphasizing the paradigm method of observing specific aesthetic laws and specific product design techniques. The successful use of technology to create aesthetics is inseparable from the designer's abstract thinking and rational reasoning, as well as design thinking and intelligence. The designer must also have the ability to open up the product space and see it from the consumer's point of view. In addition, the emergence of new environments and new technologies has led to the continuous emergence of advanced methods of aesthetic creation. For example, an application program can automatically beautify photos or the shooting process according to the goal of the beautification law in product development and practice.

According to different dimensions, product experience attributes can be divided into four quadrants. From the perspective of explicit and implicit proof of product experience quality, detailed quality is made by consumers themselves and can be clearly expressed. There is a specific need to acquire or satisfy the inherent needs of an object. The requirements provided by hidden attributes have not yet been understood by people, and there is no explicit abstraction to meet them. Because these requirements are unconscious, consumers do not express them clearly. From the perspective of function and the sense of the quality of product experience, functional characteristics mainly refer to the usable value of the product, while emotion mainly refers to the intrinsic emotional value of the given

Table 3: Server side file description.

File name	Description
GetWorksId	Worksld generation and related processing modules
PerpaymentAction	Label authentication, settlement, and payment module
TagCommandAction	Label command control module
TaglnfoAction	Label information processing module
TagVisitRecordAction	Label operation record module
UploadTaglnfoAction	Tag data upload processing module
WorksInfoQueryAction	Work information acquisition module
WrtSendBlogAction	Social sharing module for signed works information
WrtUserlnfoAction	User information acquisition module

Table 4: Cloud platform continuous certification time-consuming test data.

Anticounterfeiting authentication times	Total time (ms)
10	353
20	1082
30	1208

characteristics of the product. Using aesthetic manufacturing technology to expand the scope of high-quality product experience is mainly to meet the basic needs of consumers, better meet the emotional needs, and pay attention to detect the invisible quality of the product itself in the unique position (process) in the market (see the oval in Figure 5), which is more attractive to consumers.

The core and key of the art design of product experience in the supply chain are to create aesthetic value systematically. The aesthetic value retention system mainly includes three value matrixes: sense transfer, style transfer, and definition transfer. The essence of experience is to explain the value matrix, and the effect of experience is the necessary purpose to reveal the basic aesthetic value of different matrices.

Product sensory communication is based on the visual image of the product itself, which usually brings people intuitive aesthetic feeling. Art design around product appearance is a kind of image design, which is based on appearance elements (such as product shape, pattern, color, and their combination), aesthetically beautiful and suitable for industrial application. The visual image of the product itself is no longer limited to the sensory characteristics of the product logo but extends to the multidimensional sensory experience and the taper aesthetic feeling of the image, such as emotional response and internal interaction. Under the joint action of multidimensional sensing, the product image brings people a comprehensive aesthetic experience. The value matrix of art design of product experience supply chain is shown in Figure 6.

Changing the inner meaning of products not only leads to new life concepts but also actively expands the significance of human existence. Therefore, the subversive change of the internal meaning of products is the mixture of art and design: art and design is the constant change of stereotypes and common "features" of products, as well as the continuous expansion of the existing lifestyle. By subversively aligning aesthetics and design with the concept, cost, shape, function, and service of the product, it provides an excellent brand experience. Classic art design conveys the inherent meaning of the product and provides consumers with a new way of life and the meaning of life experience.

4.3. Design and Implementation of Anticounterfeiting of Art Products. The web server program is created using MyEclipse, hibernate, Struts2, and spring framework. The source package operation file in wrt package is particularly related to label operation. A description of each file is provided in Table 3.

The main module of the system is the brand anti-counterfeiting authentication algorithm running on the server. This module is mainly composed of a physical verification algorithm and a label data processing algorithm corresponding to the label signature system. The system tested the time from the authentication request sent to the completion of the ongoing cloud platform forged authentication tags. Among them, there are 150 verifiable database tag records. The test data are shown in Table 4.

5. Conclusion

In order to simultaneously solve the model drift caused by the algorithm during the tracking process and the model drift caused by the scene, this article provides detailed information about RCF (regression of channel-independent part). Based on fix filters, the transferable correlation filter is independent of the flow based on the shape. Specifically, for the drift factor algorithm model, we have improved the algorithm based on the IFCT model. At the same time, for the derived model caused by the scene, we have studied the transmission mechanism based on the IFCT model to find the relevant filters. In addition, we are updating the RCF, taking into account the confidence when detecting different channels and changing levels. Finally, by introducing digital media into product design, this article enhances the function of product information in a variety of ways at the beginning of the design. In the design process, multimedia technology is used to communicate with enterprises and consumers through a network that is not limited by time and space. In the design process, multimedia technology is used to communicate with enterprises and consumers through the network that is not limited by time and space, and to connect and exchange information with designers in real time. In the design stage, designers can use digital multimedia to directly publish information between professional design platforms or network platforms, so as to improve the design ability and speed up the design process.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

References

[1] C. Sun, D. Wang, C. L. Hu, and M. H. Yang, “Learning spatial aware regressions for visual tracking,” in *Proceedings of the IEEE Conference on Computer Vision and Pattern*, pp. 8962–8970, IEEE, Salt Lake City, UT, USA, June 2018.

[2] K. H. Galoogahi, A. Fagg, and S. Lucey, “Learning background-aware correlation filters for visual tracking,” in *Proceedings of the IEEE International Conference on Computer Vision*, pp. 1135–1143, IEEE, Venice, Italy, October 2017.

[3] L. Yong-Hwan, A. Hyochang, A. Hyo-Beom, and L. Sun-Yuong, “Visual object detection and tracking using analytical learning approach of validity level,” *Intelligent Automation and Soft Computing*, vol. 25, no. 1, pp. 205–215, 2019.

[4] J. T. Mentzer, W. DeWitt, J. S. Min et al., “Defining supply chain management,” *Journal of Business Logistics*, vol. 22, no. 2, pp. 1–25, 2001.

[5] Y. Xia, S. Qu, S. Goudos, Y. Bai, and S. Wan, “multi-object tracking by mutual supervision of CNN and particle filter,” *Personal and Ubiquitous Computing*, vol. 25, no. 6, pp. 979–988, 2021.

[6] B. Fahimnia, C. S. Tang, H. Davarzani, and J. Sarkis, “Quantitative models for managing supply chain risks: a review,” *European Journal of Operational Research*, vol. 247, no. 1, pp. 1–15, 2015.

[7] F. L. Chung, “Privacy protection and mutual authentication scheme for RFID systems,” *Journal of E-Business*, vol. 10, no. 3, pp. 715–726, 2008.

[8] N. Raza, V. Bradshaw, and M. Hague, “Applications of RFID technology,” in *Proceedings of the IEE Colloquium on RFID Technology*, pp. 1–1–1/5, IEEE, London, UK, October 1999.

[9] B. Zhao, N. Guo, and X. Yu, *White Paper on the Maturity Model of Intelligent Manufacturing Capability*, China Institute of Electronic Technology Standardization, vol. 11, no. 4, Beijing, China, 2016.

[10] J. Gao and S. Gao, “Research and application of capability maturity model for Chinese intelligent manufacturing,” *Procedia CIRP*, vol. 83, pp. 794–799, 2019.

[11] P. Radoglou-Grammatikis, K. Rompolos, P. Sarigiannidis et al., “Modeling, detecting, and Mitigating Threats against industrial Healthcare systems: a combined Software defined networking and Reinforcement learning approach,” *IEEE Transactions on Industrial Informatics*, vol. 18, no. 3, pp. 2041–2052, 2022.

[12] R. Khan, S. U. Khan, S. Khan, and M. U. A. Khan, “Localization performance evaluation of extended Kalman filter in wireless sensors network,” *Procedia Computer Science*, vol. 32, pp. 117–124, 2014.

[13] A. He, C. Luo, and X. Tian, “A twofold siamese network for real–time object tracking,” in *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, pp. 4834–4843, IEEE, Long Beach, CA, USA, June 2018.

[14] X. Zhou, “Influencing factors and optimization measures of supply chain overall performance,” *Journal of South-Central University for Nationalities (Humanities and Social Sciences)*, vol. S1, pp. 41-42, 2004.

[15] A. D. Papadopoulou, M. S. Gotsis, A. Wan et al., “Smart Irrigation system for Precision agriculture-the AREThOU5A IoT platform,” *IEEE Sensors Journal*, vol. 21, no. 16, pp. 17539–17547, 2021.

[16] N. Tynan and J. Tynan, “Fashioning contemporary art: a new interdisciplinary aesthetics in art-design collaborations,” *Journal of Visual Art Practice*, vol. 20, no. 1-2, pp. 143–162, 2021.

[17] S. Li, “The trend and characteristic of AI in art design,” *Journal of Physics: Conference Series*, vol. 1624, no. 5, Article ID 052028, 2020.

[18] H. Liu, X. T. Zhang, X. M. Fu, Z. C. Dong, and L. Liu, “Computational peeling art design,” *ACM Transactions on Graphics*, vol. 38, no. 4, pp. 1–12, 2019.