Application of Computer Vision In Electronic Commerce

1. Introduction

Visual information is necessary for humans, and the same is true for computers. Without eyes, like a kite with a broken string or a train off the rails, one cannot find one's own direction, and the consequences are very serious. But the realization of the computer vision is not like human vision is born, it needs to go through rigorous complex logic operations in come out as a result, after the efforts of scientists for decades, computer vision has been in image recognition, classification, detection and segmentation, search, synthetic made great achievements. In daily life, people can see the convenience brought by computer vision everywhere, such as fingerprint recognition, face recognition, code scanning payment, vehicle recognition, beauty photography, medical CT and MRI, etc. At the same time, in the modern era of Renren.com, the contribution of computer vision in the field of e-commerce is also commendable. This paper discusses the related concepts and applications of computer vision and hopes to be helpful to readers [1].

2. Computer vision

2.1. Computer vision concept

Computer vision is a simulation of biological vision. It is a subject that studies how machines can "see". It uses cameras and computers to track, recognize, analyze and process objects instead of human

eyes. However, it should be noted that the computer vision system does not necessarily process information as the human vision system does. It will process information according to the characteristics of the computer itself, such as image perception, image preprocessing, image feature extraction, detection and segmentation, etc.

2.2. Development of visual theory methods

Helping a computer to have "vision" so that it can understand pictures and make sense of them is a difficult and challenging task [2]. Computer vision has been continuously updated for 50 to 60 years, and the development of phasic theory is also bumpy and good. The emergence of computer vision with the birth of artificial intelligence dates back to the 1860s, when Larry Roberts, an American scientist, proposed that the pattern of computer vision recognition was similar to that of biological recognition, believing that edges were the most critical information used to describe the shape of objects. In the 1970s, David Marr, a representative of computer vision from the UK, proposed that computer vision consists of three levels: computing theory, expression and algorithm, and hardware implementation. Er believed that the computing theory should fully excavate the intrinsic properties of the corresponding physical space contained in the image and use these properties to realize the three-dimensional representation of the object [3]. In the 1980s, active vision theory and qualitative vision theory emerged, which believed that computer vision should be active and purposeful. Meanwhile, in this period, computer vision methods that lay particular stress on calculation and mathematics began to develop, such as image pyramid, Canny edge detection, discrete Markov random model, 3d distance data processing, etc. In the 1990s, computer vision recognition, detection, segmentation, classification, tracking and other technologies developed rapidly. By the beginning of the 21st century, computer vision had become a major discipline, with computational photography and feature-based recognition methods developing actively.

Figure 1. Computer vision concept map.

2.3. Computer vision mission critical and technology

Computer vision research is divided into three levels: low-level feature research, which aims at identifying and extracting performance features from simple images; The middle-level semantic feature expression, in addition to recognizing the objects in the image, also needs to analyze and distinguish the semantic information of different areas in the image. High-level semantic understanding, able to analyze and understand the semantics of complex images. At present, the key tasks of computer vision are image classification, target detection, image segmentation, target tracking, image search, image beautification, three-dimensional reconstruction and so on [4].

2.3.1. Image classification
Image classification is one of the most basic tasks in computer vision, which is to extract the features of the input images through algorithms, then judge and classify them into a known category. A picture of a husky dog, for example, is algorithmally grouped into a "husky category, not some other dog, like a Tibetan mastiff, nor any other object category. At present, most Image classification techniques are trained on the ImagNET data set. The ImageNet data set contains more than 14 million images and contains more than 20,000 categories [5]. The Image classification techniques of computers have far surpassed those of humans.

2.3.2. Target detection
Target detection - similar to image classification but different, with different emphasis. Image classification focuses on what is the content of the image, while target detection focuses on the specific target in the image. It not only recognizes what is and marks the location of the target, which includes two subtasks: classification and positioning. For example, a picture of a cat and a dog can be identified by the target detection algorithm where the cat and dog are. The convolutional neural network firm-R-CNN model based on deep learning is a classic model of computer target detection.

2.3.3. Image segmentation
Image segmentation is a traditional field of computer vision, which is based on the unit of pixel. Each pixel is classified and divided according to the characteristics such as color and texture, and the image is divided into different sub-regions. Similarly, the image segmentation method has also been transferred from the threshold method, the level set method, Graph Cu method and other traditional methods to the deep learning method. The popular methods include full convolutional neural network (FCN), deep convolutional neural network (DCNN) and so on.

2.3.4. Target tracking
Target tracking is the detection and tracking of objects in video or real scenes, which is often used in video surveillance and unmanned driving. The traditional target tracking algorithm is divided into generating algorithm and discriminant algorithm. The generating algorithm tracks the specified target, while the discriminant algorithm tracks the target and the background, the latter is more robust. At present, the commonly used deep learning target tracking algorithms include stack self-encoder based algorithm (SAE) and convolutional neural network (CNN) algorithm.

2.3.5. Image search
Image search is a complicated process. Common application platforms include search platforms such as Google and Baidu, as well as online shopping platforms such as Taobao and JINGdong. The traditional image search method is hash coding, but combining it with deep learning method can make image search more efficient [6].

2.3.6. Image beautification
In daily life, all kinds of beauty, filter and other functions are computer image beautification technology. Through computer vision algorithm, not only can the image noise reduction, contrast enhancement, super resolution processing, repair defects, etc., but also can quickly produce a variety of stylization effects. In recent years, face algorithms based on deep learning can quickly and stably recognize face attributes, and can be flexibly edited and converted. Beauty apps like this are booming.

2.3.7. Three-dimensional reconstruction
Three-dimensional reconstruction is the reconstruction of three-dimensional model by using one or more scene pictures or videos. This technology is widely used in maps, movies, games and other fields.

Table 1. Comparison of data processing speed between computer vision and traditional technology.

Sample data	Traditional technology	Computer vision
1000	20s	0.01 s
10000	100s	0.05 s
100000	1500s	0.2 s
1000000	5000s	0.5 s
10000000	10000s	1s

3. Application of computer vision in electronic commerce

3.1 Commodity identification and search

Commodity identification and search, that is, "drawing for drawing", is an important application of computer vision in the field of e-commerce. Especially in the era of mobile e-commerce, "search for pictures" has greatly improved people's shopping efficiency and also increased the added value of goods. Traditional product text search can only lead people to find products related to the input text description. If the text description is inaccurate or does not match the keywords set by the product, it will be difficult to find the desired product. Even if the text description is accurate and matches the product keywords, it will take some time to find. And the use of pictures to search for goods, it is much more convenient and faster, consumers through mobile devices, will want the picture of goods or similar style pictures. Upload to online shopping platform. The visual computing function of the platform can quickly find the same or similar goods for users by extracting the color, style, shape and other features of pictures. In addition, "drawing for drawing" also strengthens the connection between online and offline sales, provides consumers with independent shopping experience, and promotes the integration of online and offline marketing modes of merchants.

3.2 Content Supervision

Content supervision in the field of e-commerce is necessary, which is not only conducive to maintaining the legitimate interests of merchants and consumers, but also conducive to protecting the ecological health of e-commerce platforms. The traditional manual supervision workload is too large, especially for the current large quantity of goods and information, manual supervision is time-consuming, laborious and costly. Here, the computer vision recognition, classification, detection technology appears very important, effective. For example, in the supervision of illegal goods, visual algorithms are used to identify and detect inflammable and explosive products, pornographic and vulgar products, some drugs and other e-commerce products that are forbidden to be sold. Just like the market supervision administrator, strict and efficient sorting of online goods can be conducted. Once the illegal goods are found, they can be directly removed from the shelves, deducted points and closed stores, etc. For example, the supervision of prohibited words and sensitive words, some merchants will be unable to add the prohibited words and sensitive words in the title of the product into the picture or video, computer vision of the text recognition technology can be very good to eliminate the merchants fluke psychology. Repeat, tort pictures regulation, such as computer vision technology to electric business platform in the same repetitive pictures to regulate, can effectively supervise the businessman's stolen figure, the other face recognition technology is commonly used in computer vision can be found that the illegal use of stars do advertising images, in order to effectively protect the rights of the famous star.

3.3 Intelligent Express

Although express delivery and e-commerce do not belong to the same industry, they are closely linked. Since the birth of e-commerce, it needs the support of express logistics, and the express delivery industry also has new opportunities with the rise and development of e-commerce. However,

with the increasing amount of online shopping consumed by e-commerce, people have increasingly higher requirements for online shopping experience, which requires more efficient and intelligent express services to support. By using computer vision technology, sender information and express waybill number can be quickly identified. Compared with the traditional handwritten waybill, the current electronic waybill is faster and more accurate. In addition, the express sorting robot based on computer vision can automatically identify, classify and carry the express parcels, which greatly reduces the labor cost and capital cost.

Figure 2. Intelligent express cabinets are gradually gaining popularity.

4. Conclusion

The 21st century is an era of science and technology. With the development of science and technology, various intelligent products come into people's life. Among them, computer vision technology is highly appreciated, especially the reference of deep learning and neural network, which makes it advance by leaps and bounds. This paper introduces the basic knowledge of computer vision and its application in the field of e-commerce, hoping to help readers understand the relevant knowledge and get involved in relevant research.

References

[1] Dong. Research on key technology of computer vision based on convolutional neural network [D]. University of Electronic Science and technology, 2017.
[2] Ye Yun. Deep learning and computer vision: algorithm principle, framework application and code implementation [M]. China Machine Press, 2017.
[3] Simon J.D. prince. Computer vision modeling, learning and reasoning [M]. China Machine Press, 2019.
[4] Richard Szeliski. Computer vision algorithm and application [M]. Tsinghua University Press, 2012
[5] Ni Chenxu. Review of computer vision research [J]. Electronic world, 2018 (01): 91, 93.
[6] Liu Zhe. On computer vision technology [J]. Digital users, 2019 (08): 159.