

Research Article

Construction of a Digital Platform for Enterprise Financial Management Based on Visual Processing Technology

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Along with the continuous socioeconomic growth, more capital injection is needed to meet the daily operating cash flow demand compared to the traditional development model, so it is necessary to study the digital capability of enterprise financial management. Based on the evolutionary logic of financial risk identification, evaluation, and control, this paper summarizes the most suitable feature processing algorithm process for enterprise financial management systems by visual processing technology; for the visual guidance system, it needs to be able to identify artifacts quickly and accurately and compare different visual recognition algorithms experimentally. Considering the accuracy and real time of the visual guidance system, the efficiency of the algorithm is improved as much as possible under the condition of ensuring the accuracy, including the collection of work area features and the filtering preprocessing of data features, edge detection, and feature extraction, and, finally, the coordinate conversion can be carried out effectively to meet the requirements of the system for speed and accuracy. The digital platform for enterprise financial management built in this paper gives risk management strategies and implementation plans in six aspects, including improving the internal environment for risk management, setting control objectives in line with the development of the company, focusing on the response and control of major risks, ensuring efficient communication of information, and strengthening supervision. In terms of profitability risk, we propose to improve asset utilization, establish additional investment risk management departments, enhance capital utilization efficiency, and create core mobile products; in terms of asset operation, we propose to increase asset risk management, expand product sales scale, standardize cash flow system, and use centralized bank accounts.

1. Introduction

Financial risk management has become a necessary management skill for business executives. The focus of modern financial risk management is not only on external financing dispatch but also on the ratio of capital flow and working capital allocation in general. Many companies often have excellent business operations but have big financial problems. Financial risk management has become a necessary management skill for business executives. The focus of modern financial risk management is not only on external financing scheduling but also on the ratio of capital flow and working capital allocation in general. Many companies often have excellent business performance but have significant financial problems. This thesis will describe the various types of financial risks and how to develop a management plan to achieve the goal of corporate risk avoidance. Although

financial risk has increased dramatically in recent years, risk and risk management have existed for a long time [1]. To meet the needs of companies and investors in terms of diversification of financial risk management and instruments, financial markets must continue to innovate financially to manage market risk, but of course, if not done properly, it may bring new types of risk to occur.

In this paper, we start from computer vision processing technology, combined with the study of mapping visual images to natural language in the form of text with a rich evolutionary process, and build a digital platform for enterprise financial management through feature fusion algorithms combined with actual financial flow data of enterprises. Computer vision technology studies how to enable computers to obtain a semantic understanding of images, data, or videos, including data classification, scene classification, and data annotation. The first step is to extract

the visual information features of the data to achieve analysis and understanding of the data content. The extracted visual information features are then used to train a discriminative model corresponding to the visual task. The output of the discriminative model is a list of one or more labels. These labels are not sufficient to produce natural language for feature description. Feature description requires the use of natural language to express the data content [2]. The description statements need to be comprehensive and concise in expressing the data content, and the features need to be formally coherent and correctly expressed. Natural language processing techniques study the problem of how computers process natural language data, which includes the automatic generation of language models for natural language. Natural language generation is the conversion of the information input to the computer into natural language form. In the automatic feature description task, the information input to the computer is digital features. Once the feature description model fully understands the feature content, it uses the feature content as a guide to map the image visual features into ordered word sequences using a language model [3]. The word sequences are listed as human understandable and acceptable utterances for generating natural language.

Machine vision technology is divided into three stages according to the working process: image and video acquisition, image and video processing and analysis, and input and output control. The development of the core technologies of machine vision, “photoelectric image sensing” and “image and video processing,” has laid the foundation for the development of machine vision [4]. Using the technical elements of these three stages, academics have set their own research goals, and new research results are growing year by year but mainly focus on the image analysis stage. MeanXift is a kernel density gradient estimation algorithm with an offset mean vector, which is often used in image segmentation and object tracking direction. It completes the iterative search by quickly and sequentially calculating the current offset vectors of all pixels in the image, then rapidly moving to a new point according to the direction of the gradient of the offset vector, and repeating until the maximum density converges. Input and output control are industrial component control, although these aspects of knowledge are essential in machine vision systems, as they are mature supporting technologies that do not require redesign, and parts suppliers will provide some technical support. Therefore, this aspect generally takes the least amount of time and effort in the overall machine vision system development process.

Literature [5] proposed a real-time fusion semantic segmentation network RFNet, which can effectively utilize complementary cross-modal information for real-time RGB-D fusion semantic segmentation studies, enriched with unpredictable hazard recognition in real scenes. In [6], an image cascade network ICNet based on a pyramidal scene analysis network is proposed, which fuses medium- and high-resolution features while considering segmentation accuracy and uses a cascading strategy to accelerate real-time image semantic segmentation. By directly connecting the shallow feature maps in the coding module to the

corresponding sized decoding module, LinkNet not only uses the accurate location information of the shallow layers but also does not add redundant parameters and computation, thus increasing the computational speed. The net network is designed to have an asymmetric codec structure that decomposes the convolutional operations by low-rank approximation, which ensures the accuracy of segmentation while significantly reducing the computational effort. This real-time segmentation network can perform tasks such as pixel tagging and scene analysis. In addition, LEDNet, a lightweight network proposed in [7], develops a module based on a residual network encoder and introduces an attention mechanism in the decoder to predict the semantic label of each pixel. As a result, the network computation is reduced while enhancing the feature representation. Chung et al. [8] utilized a combination of robotics and vision technology and proposed a depth estimation method based on the distance between the feature point and the target, using a light sensor sensitive to the light source as a visual tool for the robot to calculate the depth of the optical stripes of the sense, thus completing the 3D spatial tracking and grasping action of the robot using vision to the target. Störmer et al. [9] proposed a template matching image recognition method based on a genetic algorithm, which greatly improves the time-consuming problem of the traditional template matching algorithm by using the best pathfinding function of the algorithm and achieves very good results in practical engineering applications. Regarding financial risk control, [10] proposed the capital asset pricing model (CAPM) to illustrate the relationship between risk and reward. Since high risk is accompanied by high income, the compensation received is compensation for risk. Risk can be subdivided into two types, including systematic risk as well as unsystematic risk. Unsystematic risk is mainly caused by the market and can be eliminated by diversification type of investment. Systematic risk, on the other hand, occurs due to the company itself and cannot be ruled out but can only be avoided if possible. Soltani et al. [11] emphasized the arbitrage pricing theory, which argues that the firm’s rate of return is not only related to a single factor but linearly related to multiple factors. This one is a further development of the capital price theory and provides a broader idea for corporate investors to understand the relationship between risk and risk. In [12], in the process of financial risk evaluation, the causes of 106 bankruptcy cases were analyzed by using the logistic regression method through a large number of cases and compared with 2058 nonbankruptcy cases, and the distribution of enterprise bankruptcy probability intervals, forms of enterprise bankruptcy, the magnitude of enterprise bankruptcy risk, the application and scope of venture capital, and the application of financial risk analysis were derived with an accuracy rate above 90%. Gupta et al. [13] partitioned the risk system as a whole into the Internet risk subnetwork, restricted subnetwork, and traditional risk subnetwork, explained the relationship between various risk factors, and communicated the risk through the internal circulation of the Internet to draw conclusions and identify potential problems of system risk. The results show that the nodes at

the center of the system as a whole are the main targets of Internet risk contagion. The summary outlines an initial research model that unfolds a new outlook and directionality for studying the chain reaction of Internet risks. Literature [14] proposes an image cascade network ICNet based on a pyramid scene analysis network that incorporates medium- and high-resolution features while considering segmentation accuracy and uses a cascading strategy to accelerate real-time semantic segmentation of images.

In general, it seems that the main content of the previous research is after the occurrence of financial risks, such as how to deal with and eliminate financial risks, and there are not enough reasonable analysis and empirical research about the causes of financial risks and the development process of the emergence of financial risks, and there is no relevant literature reference before the application of computer vision processing techniques to deal with financial.

2. The Digital Management Model of Enterprise Finance Based on Visual Processing Technology

2.1. Lightweight Visual Perception Methods. Image segmentation is one of the key research areas in machine vision, communication technology, image processing, video tracking, etc. It extracts the part of interest by dividing the image into several small regions based on certain specific similarity criteria. With the booming development of multimedia technologies mediated by images and videos, many parsing tasks use image segmentation methods. Before the widespread interest in deep learning, early image segmentation methods were limited by hardware computing power to obtain only shallow feature information such as color and texture and were mainly studied by topological principles and knowledge theories from the perspective of digital image processing, etc. [15]. Since multiple pixels are processed in parallel using one or several identical computing units, the processing results of each pixel can be obtained simultaneously without synchronization, saving synchronization logic and cache resources compared to multitask parallelism. With pixel-parallel acceleration, the clock frequency of the FPGA design can be reduced while achieving a set throughput rate target, thus making the timing easier to converge. With the popularization of machine learning and image processing applications and gradually powerful functions, the features and structural information that can be extracted from images have become increasingly rich after the twenty-first century. The learning methods are also changing.

MeanXift is a kernel density gradient estimation algorithm containing an offset mean vector, which is often applied to image segmentation and target tracking directions. It completes an iterative search by rapidly computing the respective current offset vectors of all pixel points in the image in order, then quickly moving to new points according to the direction of the rising offset vector gradient and repeating until convergence at the maximum density. This method is prone to oversegmentation as a superpixel

segmentation method, but its noise immunity and robustness are relatively stable and well adapted to the local feature structure of the image. At present, the use of different types of convolutional neural networks for the semantic segmentation of images is a popular topic of industrial and academic research. The core idea is to use a large number of training samples and labels from the dataset to perform training on the network, to obtain weight parameter updates according to the backpropagation algorithm and achieve the optimal solution for the specific problem, and finally to use test samples to perform testing on the trained and optimized network to obtain the final semantic segmentation results. The network structure of this method is shown in Figure 1.

The network is based on the VGG-16 architecture as the backbone network to extract features and proposes the first end-to-end learning approach that eliminates the pooling layer and the three fully connected layers in the final stage, refining to predict the classification of its semantic class for each pixel, and solving the problem of limiting the requirement of the input image resolution. Moreover, FCN also designs the Transposed Convolution module, which restores the convolution-generated feature map to the same size resolution as the original input image by upsampling the output.

The raw images captured by the camera are based on the RGB (Red, Green, Blue) color model, which is an inhomogeneous color space [16]. Changes in illumination have a large impact on RGB images. For the same color, RGB values change under different light intensities, and it is more difficult to measure a fixed RGB value, which can hurt subsequent image processing. HSV, on the other hand, is a color space created based on the intuitive characteristics of colors, which can express the hue, saturation, and lightness of colors very intuitively and can eliminate the influence of lighting changes, which is beneficial to the subsequent image target recognition.

$$\begin{aligned}
 H &= 60^\circ \times \frac{|G + B + R|}{\max - \min} + 240^\circ, \\
 S &= 1 - \frac{\min}{\max}, \\
 V &= 180^\circ \times \frac{|G - B|}{\max - \min},
 \end{aligned} \tag{1}$$

where H denotes hue, S denotes saturation, and V denotes color value. The acquired original image is processed by color space model conversion, and in the actual processing, it is found that blurred and distorted images occur when the valve pocket is located at the edge of the camera field of view. To improve the quality of image processing, the image field of view is segmented to determine the effective area of the camera field of view based on experimental measurements. At the same time, to enhance the contrast of image features and highlight color differences, the image channels are separated and equalized, and the image equalization process is represented by the cumulative distribution function shown in the following equation:

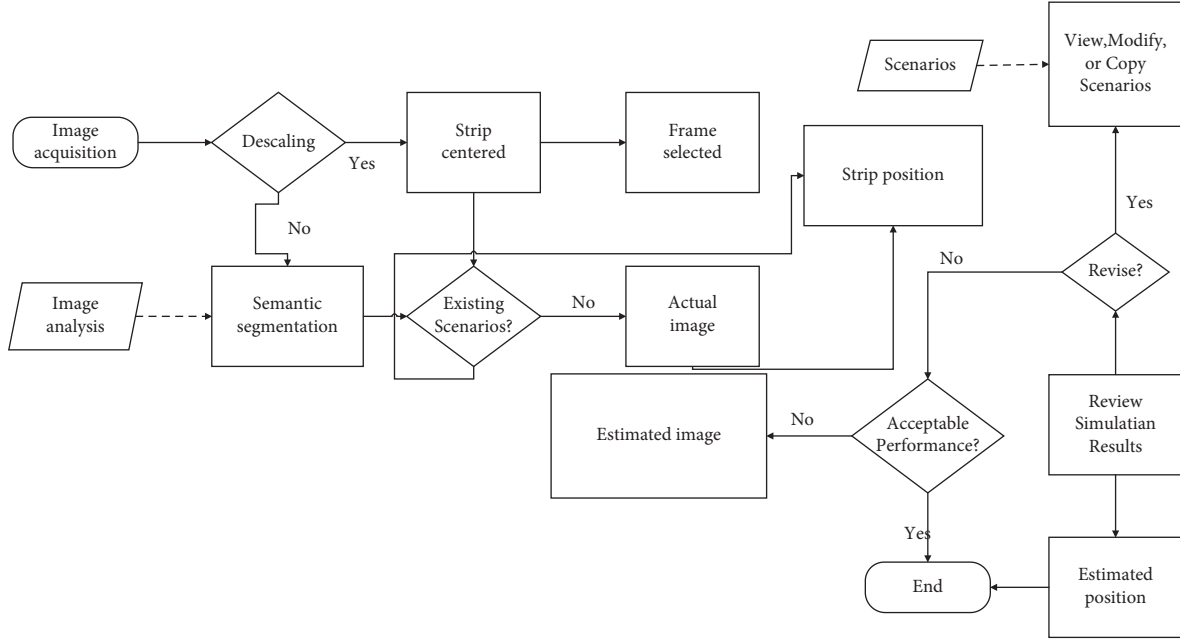


FIGURE 1: Semantic segmentation flowchart.

$$g_k = T[f] = \sum_{i=0}^n P \cdot f_i. \quad (2)$$

The image contains a large amount of information, most of which is invalid and affects the speed of visual processing. Determining the dynamic target in the image is necessary to determine the image features and reduce the amount of image processing calculations; usually, for dynamic target recognition, there are interframe difference methods, background difference methods, and color thresholding methods. After color thresholding, there will be voids in the image block, and image morphology optimization is usually used to eliminate the image voids. Image morphology optimization generally refers to the optimization of the shape features of the image, using convolution kernels to process the corresponding shapes and features in the image for further analysis and processing of the image. The open and closed operations are a combination of erosion and expansion [17]. The open operation erodes the image first and then expands the result of the erosion. The open operation can smooth the boundary without changing the size of the image area and eliminate the fine cavity areas with high brightness.

$$f \otimes s = (f * s) \oplus s, \quad (3)$$

where \otimes denotes the open-closed operation, $*$ denotes the erosion operation, and \oplus denotes the expansion operation. After actual processing, it is found that the open operation eliminates the fine burrs on the image edges and the edge contours are smoother, while the closed operation retains more edge contour information. Therefore, a combination of open and closed operations is used for morphological optimization. The network topology architecture of this paper is shown in Figure 2.

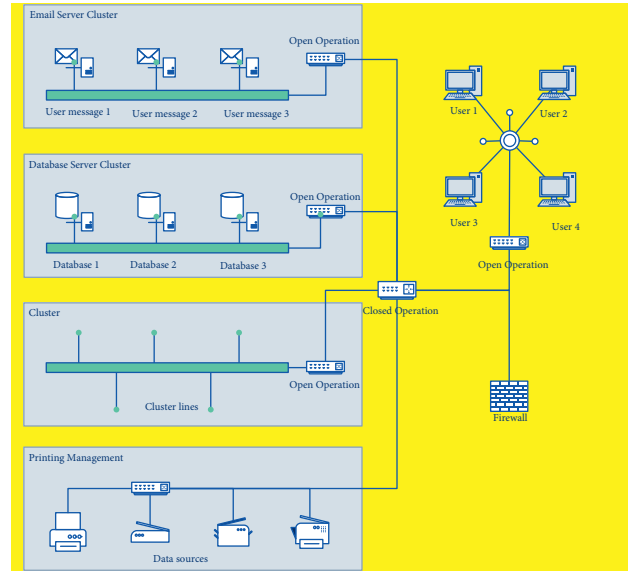


FIGURE 2: Network topology architecture.

In FPGA architecture design, task parallelism and data parallelism are the most commonly used parallel acceleration methods. The smallest granularity of data parallelism in image processing is pixel parallelism, and task parallelism and pixel parallelism correspond to hardware parallelization at the module level and computing unit level, respectively. Task parallelism is mostly used in scenarios with no data dependency or weak data dependency, and if there is some data dependency among tasks, multiple copies of data can be created for different tasks to use simultaneously. In FPGA, for different tasks processing the same data, the data can be distributed among different tasks using branching operations. For small amounts of data overlap between tasks, the

increased storage and computational cost of creating multiple copies of the data are also negligible. To perform parallel processing of simultaneously transmitted pixels, computing units equal to the number of pixels should be set up, or multiple pixel data should be stitched together and processed as a whole [18]. Since multiple pixels are processed in parallel using one or several identical computing units, the processing results of each pixel can be obtained simultaneously without synchronization, saving synchronization logic and cache resources compared to multitask parallelism. With pixel-parallel acceleration, the clock frequency of the FPGA design can be reduced while achieving a set throughput rate target, thus making the timing easier to converge.

2.2. Design of Digital Platform for Enterprise Financial Management with Visual Processing Technology. From the perspective of capital inflow, there are three main sources of capital to maintain the daily operation of an enterprise: first, the capital invested by investors, including the registered capital of shareholders before the listing, and the capital invested by minority shareholders from the stock market after the listing; second, debt financing, including direct borrowing from banks and loans from labor or material suppliers for procurement, as well as enterprises with the authority to issue bonds to raise funds by issuing bonds to the public, etc; third, the proceeds from business operations that are obtained and then realized and flow into the enterprise. To be able to solve the problem of cash flow, the common practice of many enterprises is to obtain a large number of funds through bank loans, but loans for the purchase of goods and services and direct borrowing are accompanied by higher costs for the use of funds, resulting in a heavier cash flow burden on the enterprise and causing greater potential problems when the enterprise has cash flow problems [19].

If we start the discussion on a conceptual level, as for the deviations between the actual business results and the expected results of the enterprise, such deviations are inferior and do not contribute to the achievement of the short- and long-term goals of the enterprise; it is the financial risks that lead to these deviations. The control of financial risk should be laid out in every node before, during, and after the event, and any node should be a key control point of financial risk. In the process of business development, often when based on the current production status, some development plans and specific goals are set, and the quantitative presentation of such goals is the financial data.

Financial risks have the following main characteristics.

2.2.1. Financial Risk Is Objective: Objective Existence. Financial risks cannot be eliminated as long as the company is in operation. It must be a special factor that exists objectively and has a huge impact on the company, which cannot be completely controlled by subjective awareness alone. At present, under the existing management situation and model, financial risks can significantly affect the future development of the company and in various types of

operating systems can only be controlled but not eliminated from the root. Therefore, a set of relatively efficient risk management measures can help reduce the specific chances of financial risks arising and further enable the effective and reliable control of losses.

2.2.2. Financial Risk Is Random: Uncertainty. Not all companies encounter the same or similar financial risks in the process of operation, and by the same token, the types and severity of financial risks faced by individual companies also differ greatly; perhaps a very small number of them have some regularity, but the majority of financial risks reflect the characteristics of randomness and basically cannot reflect the regularity, and it is impossible to judge whether the risk will occur or not; this is the financial risk of uncertainty.

2.2.3. Financial Risks Can Cause Losses to the Company: Loss. When an enterprise faces financial risks, it will inevitably suffer corresponding losses, which to a certain extent will increase the burden of the company's expenses. This risk will increase the operating costs of the enterprise; therefore, the enterprise should take into account all aspects of the decision, through a comprehensive and integrated exclusion and control of all influencing factors, to reduce the loss of financial risk and enhance the comprehensive competitive strength of the enterprise.

2.2.4. Financial Risk May Also Lead to High Returns: Rewardability. At some level, it is the link between risk and return that makes financial risk appear. The existence of risk does not necessarily mean the inevitability of loss, but rather the possibility of high returns and, to some extent, tax savings through borrowing, which can lead to higher returns than before, which means that the company is facing greater financial risk than before. Therefore, it is crucial that when a company establishes the right financial leverage, it can grow more easily in the future.

Considering the abovementioned factors, in the process of responding to enterprise financial management based on visual processing technology, the pixel points are clustered as data units based on the characteristic information of financial information combined with the clustering idea, which is the design feature of the region segmentation method based on clustering. MeanXift algorithm is an iterative algorithm based on nonparametric kernel density gradient estimation, and its core idea is to search the region of space based on the direction of the probability density rise to obtain the local optimum [20]. The mean drift in the MeanXift algorithm represents the mean vector of the bias, which is used as a measure of the probability density gradient function estimation. Usually, the MeanXift algorithm obtains the local density maximum of each pixel point based on the calculation in the sample data content and mines pixels with the same properties to form superpixel blocks after several iterations. Figure 3 shows the framework of a digital platform for enterprise financial management designed based on visual processing technology.

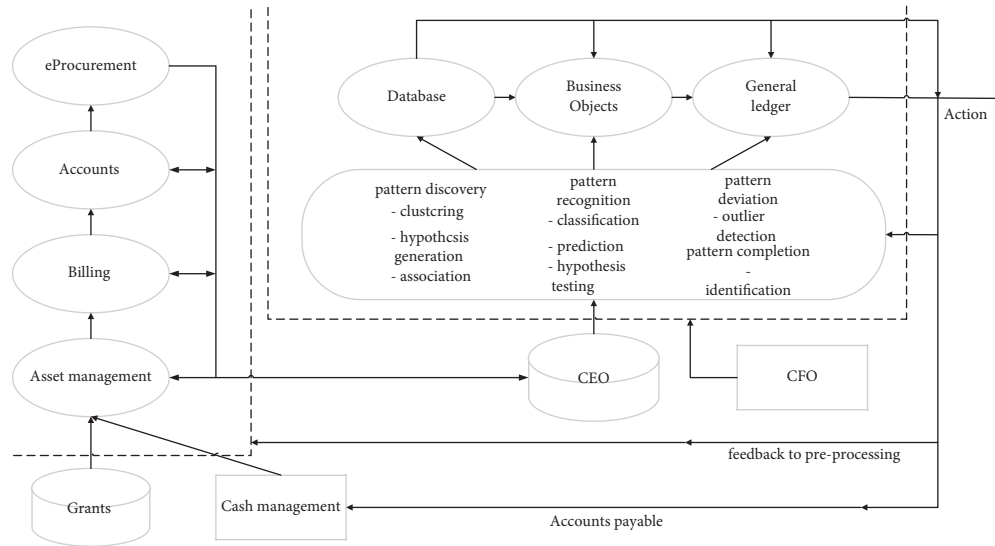


FIGURE 3: The research framework of the digital platform for enterprise financial management designed based on visual processing technology.

To assess the company's financial risk more accurately and objectively, both quantitative and qualitative methods should not remain at a single level but at least have alternative or complementary methods, so that when another method fails or is less reliable, we can control the financial risk based on or combined with the results of other methods. In particular, in the face of significant changes in the external economic environment, the calculation logic behind a single indicator is difficult to analyze and compare with the real situation to arrive at the assessment results, which need to be supplemented by other assessment systems that can cover the real background and represent the latest macro- and microenvironment to obtain more objective assessment results. For example, in the context of the new crown epidemic, if companies still assess financial risk based on the growth of indicators, it may deviate from the real situation; instead, it would be more reasonable to use the stability of financial indicators or financial liquidity as the core indicator.

In terms of business attributes and impact on the company's financial results, the Finance and Accounting Department is mainly responsible for the financial management of operating and investment activities, which affects the quality and efficiency of the company's operating business profitability, while the Capital Department is mainly responsible for the risk control of financing activities. The changes in the scale and cost of fundraising directly affect the scale of the company's business and its business choices, thus indirectly affecting the company's ultimate revenue. Therefore, if the risks of financing, operating, and investment activities are not controlled effectively and reasonably, they will threaten the safety of the company's operation. Only comprehensive control of financial risks in the whole business process of financing, investment, and operation will enable the company to better survive in an unfavorable environment and avoid bankruptcy crises. For a project in the current internal company environment,

including the financial environment and business management environment, if the company's project and the finance department's assessment showed that it is impossible to make a profit or the profit is low enough to cover the necessary costs or not as high as the return on investment of other projects, then even if the risk control after the investment is good, it is difficult to reduce the overall financial risk of the project. Therefore, the control of financial risk should be laid out in each node before, during, and after the event, and any node should be a key control point for financial risk.

2.3. Experimental Design. One of the most important purposes of building the model is to provide the prerequisites for the company to develop risk response measures, thus determining the key response targets and providing a reference for other companies with the same background in their development, so the indicators must be operational and have a clear meaning. In this paper, the system of financial risk indicators of the company is divided into two aspects: financial indicators and nonfinancial indicators, based on the principles of selecting financial risk evaluation indicators. With the current financial risk situation faced by the company, in the selection of financial indicators, from the four main aspects of solvency, profitability, asset operating capacity, and growth capacity. In selecting the nonfinancial indicators, the four aspects of market supply and demand, macro policy influence, the proportion of technical research and development personnel, and investment decision-making ability are taken as a starting point. Assuming that m indicators (variables) are involved in the study of a problem, their indicators are generated as m -dimensional random $X = (X_1, X_2, \dots, X_m)$ variables, and a linear transformation is applied to X to finally form a new composite variable (indicator), denoted by Y . The composite variable $Y = (Y_1, Y_2, \dots, Y_m)$ becomes the first, second, ... m th

principal component of the original variable (indicator), respectively. The actual research process of the factor analysis method is usually divided into the following steps with the help of several software programs such as Statistical Product and Service Processing (SPSS): (1) initial setting of the target sample and indicators; (2) initial processing of the indicators according to their information; (3) detailed study of the data information and clarification of the practical feasibility of the research analysis method; (4) use of analysis software such as SPSS 4 to accurately grasp the public factors and build a prognostic model of the financial risk level based on the relevant models provided, which can further facilitate the accurate grasp of the assessment results.

To verify the effectiveness of the improved 1D Fourier reconstruction algorithm for texture feature filtering, this paper performs statistical threshold segmentation of the reconstructed images to demonstrate the financial risk warning results and then quantitatively evaluates the defect detection metrics. To demonstrate the speed performance of the improved algorithm and design structure, the running time of the improved algorithm based on the integer-period truncation and resampling strategy on the CPU platform is first compared with that of the traditional extended-period 1D Fourier reconstruction algorithm, and then the speedup of the task-parallel and pixel-parallel FPGA acceleration schemes in this paper is given.

3. Results and Analysis

3.1. Algorithm Speed and Accuracy Evaluation. The conventional 1D Fourier reconstruction algorithm based on the extended period, whose transform length depends on the liquid crystal image null domain period, cannot be guaranteed to be an integer power of 2 and is not suitable for accelerating with FPGA. Therefore, in this paper, we first compare the improved algorithm based on the integer-period truncation and resampling strategy with the original algorithm on the CPU platform and implement a single-threaded and OpenMP-based 20-threaded (10-core) C++ programs. For the financial data with a height of 10000 eigenvalues, 100 repeatability experiments were conducted at transformation lengths of 1024, 2048, 4096, 8192, and 16384, respectively, and the final average running time of the program is shown in Figure 4.

Since the improved algorithm based on resampling resamples the truncation length to an integer power of 2 before performing the Fourier transform, its running time increases linearly with the increase of the transform length; while the original algorithm based on period expansion adds one period at each end of the image, its Fourier transform length is not guaranteed to be an integer power of 2, and the running time of the algorithm cannot be accurately predicted, but at least it is longer than that based on an integer power of 2. The algorithm running time cannot be predicted exactly, but it is at least longer than the algorithm based on integer powers of 2. As can be seen from Figure 4, the computational cost of the non-2-integer power transform length already exceeds the computational cost of resampling for the improved algorithm, and the conventional algorithm

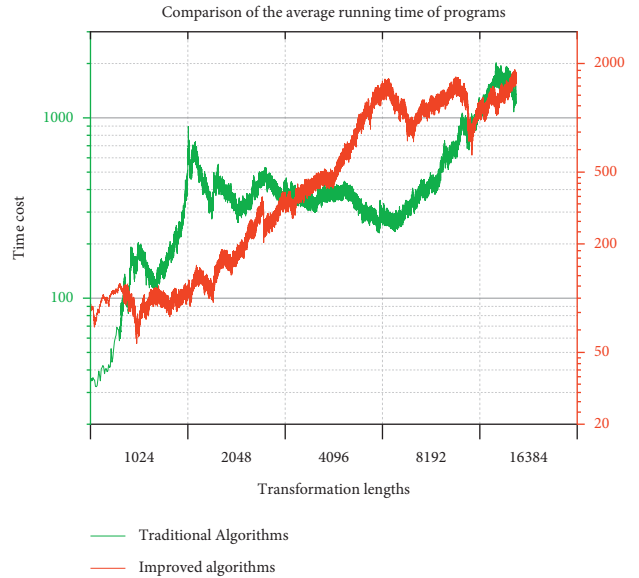


FIGURE 4: Comparison of the average running time of programs.

runs longer than the improved resampling-based algorithm at all transform lengths, in both the single-threaded and 20-threaded cases.

To fairly compare the speed performance of the FPGA and CPU running the algorithm, the CPU time to read data from the hard disk is excluded here, and the time for the FFTW library function to run several Fourier transforms in advance to determine the best calculation based on the Fourier transform length is also excluded, while only the time to run the 1D Fourier reconstruction and resampling algorithm is compared, in addition to the CPU using the single-precision floating-point version of the FFTW library to obtain the best performance. Figure 5 shows the CPU single-threaded, CPU 20-threaded (10 cores), and FPGA processing characteristics for 16384×10000 size financial data, respectively.

The FPGA fixed-point implementation, the CPU single-precision floating-point implementation, and the MATLAB double-precision floating-point implementation are compared to the FPGA fixed-point solution with a maximum of -3 gray value error caused by a 1-bit shift to the right of the Fourier positive transform and Fourier inverse transform input-output interface connections. Such an error applies the same and definite directional offset to all pixels and can be corrected by simply adding the mean value of the error; in addition, the average error of nearly half of the unequal pixels is less than half a gray level and has a negligible effect on the subsequent statistical threshold segmentation of the defect.

Figure 6 shows the number of FPGA resources occupied by each submodule of the financial feature defect detection algorithm including the 1D Fourier reconstruction algorithm and the percentage of each type of resource used by the whole algorithm to the total FPGA resources of the single board, and it can be inferred from the resource utilization results that BRAM is the maximum resource limit when increasing the task parallelism by simply copying the resampling module and the 1D Fourier reconstruction module. In the process of responding to corporate financial

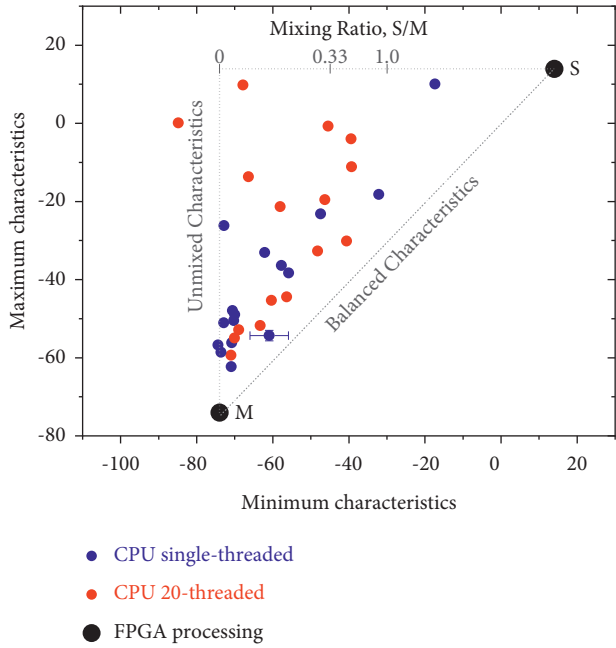


FIGURE 5: Single-precision financial data feature calculation for FFTW library.

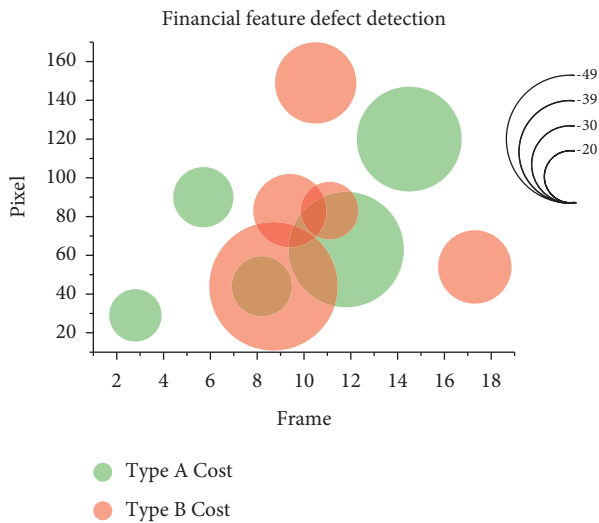


FIGURE 6: 1D Fourier reconstruction algorithm for financial feature defect detection.

management based on visual processing technology, pixel points are clustered as data units based on the characteristic information of financial information combined with the idea of clustering, which is the design feature of the region segmentation method based on clustering. The BRAM resource limit is reached by copying the resampling-based 1D Fourier reconstruction module 3 times on the Virtex6 FPGA. Based on the above results, it can be inferred that FPGAs with more BRAM resources will be more favorable for the parallelism scaling of the proposed architecture.

For the connection between Fourier positive transform and inverse transform, a bitwise conversion structure with

separate processing of high and low data bits and symbol bit expansion is designed; for the problems of complex storage mode and low computational efficiency of the general resampling structure, a pixel-parallel structure based on look-up tables is proposed. Finally, the effectiveness of the improved 1D Fourier reconstruction algorithm to deal with boundary effects is verified by visualization detection results and quantitative index evaluation, and the advantages of the two task-parallel and two pixel-parallel FPGA structures proposed in this paper in terms of speed are verified by speed comparison and online tests.

3.2. Validation of the Company’s Financial Capacity Analysis.

Combined with the actual operation data collected from Company X, a series of validations of the company’s financial capability analysis were obtained through the visual processing technology-based enterprise financial digitalization platform designed in this paper. Figure 7 shows the analysis of Company X’s solvency obtained through Company X’s operating conditions. From the solvency of Company X, it can be seen that 54.39% of the risks are of average level and 14.17% of the risks are of very high level, indicating that the financial risks of Company X in terms of solvency are mainly of average level. Furthermore, the financial risk of Company X’s solvency has a relatively low weighting in the overall evaluation. Therefore, Company X needs to maintain its current level of solvency so that Company X will not have serious financial risks. From the solvency of Company X, we can see that its solvency level is also higher than the average of the Internet industry, so we can see that Company X is more concerned about the financial risk of solvency. At present, the situation of X’s solvency index is relatively good, and the company has good solvency to ensure the normal operation of the company from financial difficulties, but the weight of X’s current ratio is high, and the excessive financial leverage of the Internet company will lead to its higher financing cost, and the management should pay some attention to this.

The profitability analysis of Company X is shown in Figure 8. From the profitability of Company X, it can be seen that 31.41% of the risk is high and 44.15% of the risk is average, which means that the financial risk of Company X in the aspect of profitability is average. In addition, profitability has the highest weighting in the overall financial risk evaluation of Company X. Although its return to shareholders is objective, the profitability of Company X’s main business is lower than the industry average, which is a measure of the operating efficiency of the Internet companies and reflects the ability of the company’s managers to obtain profits through operations. Especially in the face of significant changes in the external economic environment, the calculation logic behind a single indicator is difficult to analyze and compare with the real situation to arrive at assessment results and needs to be complemented by other assessment systems that can cover the real context and represent the latest macro- and microenvironment to obtain more objective assessment results. For example, in the context of the new crown epidemic, if companies still assess

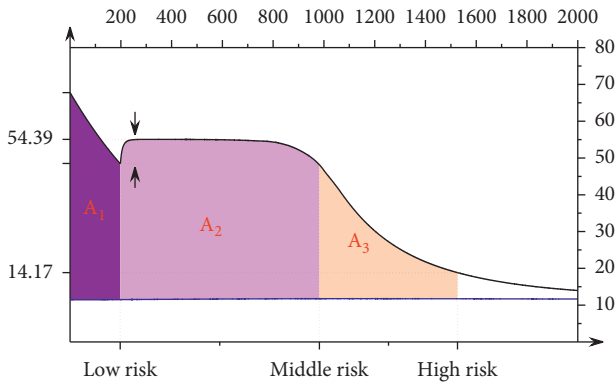


FIGURE 7: X company solvency analysis.

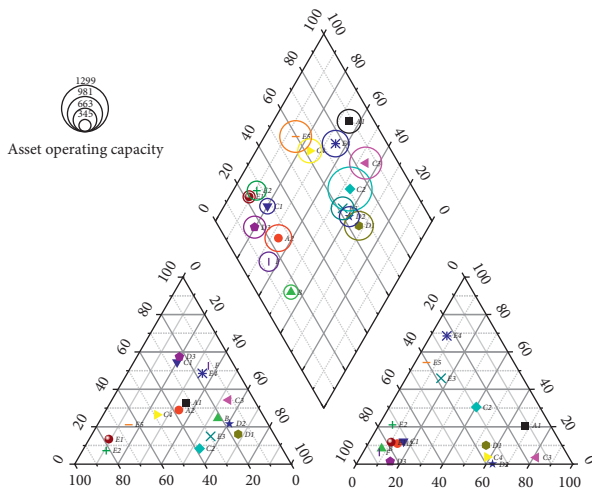


FIGURE 8: X Company's asset operating capacity analysis.

financial risks based on the growth of indicators, they may deviate from the real situation. The quality of the company's earnings is average, and this is what the company's managers should focus on.

From Company X's asset operating capacity, it can be seen that 15.71% is at a lower risk level and 40.85% is at a higher risk level, indicating that the trend of Company X's asset operating capacity is relatively small and the higher risk level is higher than the lower risk level in terms of asset operating capacity, which shows that Company X still has some hidden problems in terms of asset operating risk. In addition, the financial risk of Company X's asset operating capacity is the second highest in the overall risk weighting table, which requires Company X's continuous attention. The liquidity of capital and the characteristics of light assets of Internet companies indicate that the company's liquidity and asset flow are stagnant, the company does not make full use of its assets for operation, and its asset operation capacity needs to be improved, which is an area that company managers should focus on.

4. Conclusion

The efficiency of the visual inspection system is limited by the processing power of the key feature extraction algorithm.

Due to the flexible reconfigurable characteristics and performance power advantages of FPGA, this paper focuses on the FPGA-based acceleration scheme and applies it to the construction of a digital platform for enterprise financial management. To address the problems in the design of texture feature filtering, laser stripe center extraction, and phase point cloud computing FPGA acceleration structure, FPGA optimization techniques such as multilevel parallelism, full pipeline execution, heterogeneous processing, bit-width optimization, and high-precision lookup tables are studied, and the operation speed of the FPGA acceleration scheme in this paper is experimentally verified. Based on the research results of the existing enterprise financial risk evaluation index system, the financial risk evaluation index system of Company X is constructed by combining the industry characteristics of the enterprise and the financial management characteristics of the Internet enterprise. Then using the actual financial data of Company X as well as nonfinancial data, the financial risk evaluation index system of Company X is constructed based on the hierarchical analysis method, and the fuzzy comprehensive evaluation method is fully applied to make a comprehensive evaluation of the financial risk of Company X. Debt service risk, profitability risk, asset operation risk, growth risk, and other aspects correspond to the proposed financial risk control measures of Company X. In terms of debt servicing risk, we propose to determine the best capital structure, develop reasonable debt servicing plan, and optimize fund raising and financing channels; in terms of profitability risk, we propose to improve asset utilization rate, establish additional investment risk management department, enhance capital utilization efficiency, and create core mobile products; in terms of asset operation, we propose to increase asset risk management, expand product sales scale, standardize cash flow system, and use centralized bank accounts; in terms of growth risk, we propose developing reasonable product projects, optimizing main business operations, and formulating strategic development plans; in terms of other risks, we propose control measures such as improving the integration of risk management information, increasing R&D investment, and improving the level of innovation. It also serves as an inspiration to other similar enterprises.

In this paper, when constructing the judgment matrix, to judge the importance of two evaluation indexes, the expert survey method is used; even if the experts have rich experience and expertise, using the expert survey method is subjective to some extent. Therefore, it is necessary to learn and find a more scientific method of financial risk evaluation.

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 known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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