

**Analysis Of Target Detection
Based On
Machine Learning and Distributed
Computing**

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1 Project Introduction

1.1 Project background

Computer vision analysis of target movement can be roughly divided into three levels: motion segmentation, target detection; target tracking; motion recognition, behavior description. Among them, target detection is not only one of the basic tasks to be solved in the field of computer vision, but also the basic task of video surveillance technology. Because the targets in the video have different poses, often appear occluded, and their motion is irregular, taking into account the depth of field, resolution, weather, lighting and other conditions of the monitored video and the diversity of the scene, and the results of the target detection algorithm will directly Affects subsequent tracking, motion recognition, and behavior description effects. Therefore, even with the development of technology today, the basic task of target detection is still a very challenging subject, and there is great potential and space for improvement.

The analysis of target movement by computer vision is a popular direction of image processing. It is widely used in many fields such as intelligent video surveillance, industrial inspection, aerospace, etc. It is of great practical significance to reduce the consumption of human capital through computer vision. Therefore, this direction has become a research hot spot in theory and application in recent years. It is the core part of intelligent monitoring systems. At the same time, the analysis of motion is also a basic algorithm in the field of universal identity recognition. Recognition, crowd counting, instance segmentation and other tasks play a vital role.

For example, about 5 hours of data content will be uploaded to YouTube every second, so it is very difficult or impossible to manually annotate and classify each video. Computer vision is an important solution to this problem. Technology that tags, classifies, and processes every frame of a video.

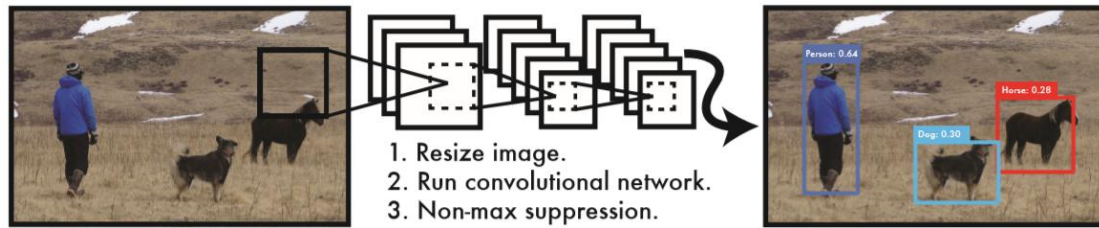


Figure 1: The YOLO Detection System.

In addition, the analysis of target motion by computer vision also involves many different fields such as engineering, physics, and biology, such as drones, unmanned driving, and visual navigation of handling robots.

1.2 Project Overview

This section explains the framework of a distributed system. In our distributed image recognition project, we use both Alibaba Cloud and Huawei Cloud.

We implemented deep learning image recognition based on distributed system architecture. By training twenty kinds of images of person, car, bus, truck, motorbike and traffic light and so on, and processing service requests through multiple servers, we obtained approximate ideal image recognition.

Figure 5 shows our distributed system architecture.

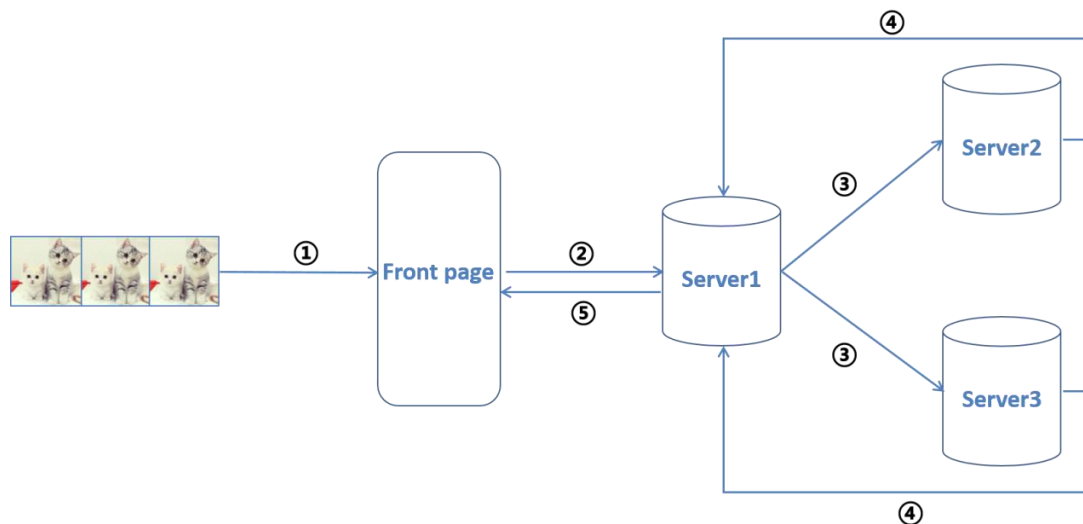


Figure 2: The Distributed System.

The intermediate server is used to process the front-end user request, and the server 2 and the server 3 are respectively the Alibaba Cloud server and the Huawei cloud server, and participate in the image recognition work.

Regarding the flow of data information in a distributed system, we will explain it through Figure 6.

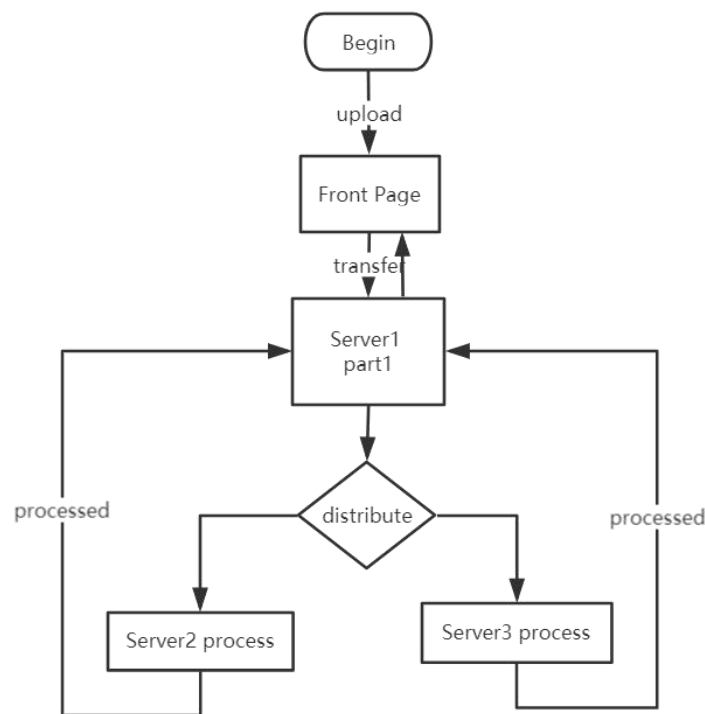


Figure 3: Data Flow Diagram.

The front end transmits the image to be identified to the intermediate server, and the intermediate server determines which server the video or video should be forwarded through a load balancing policy.

2 The Problem Of the Project

2.1 Project Reality

In the whole project, your company's project has already met some CMMI standards in some standards. This manifests in:

1. "Measurement and Analysis":

For the accuracy of the model, we have a quantitative requirement, and your company already has the relevant requirements for the accuracy of the model. On the

other hand, there is also a norm for data management and analysis.

2. 2. " Technical Solution"

In terms of Technical Solution, your company has developed a design for the product and product components. In addition, your company has prepared some alternatives, which is also a good aspect.

3. "Configuration Management"

Your company has a clear division of decisions and each member has their own clear responsibilities. This project has clear development milestones. At key points of the project, inspections will be arranged for discussions. When the project configuration changes, your company conducted The change reflects your company's strong ability to respond and manage.

Because your company's above-mentioned processes and specifications have been nearly perfected, we will not explain the above in detail in this solution. For other aspects of your company's imperfections, we will detail your company's problems in the following sections. At the same time, we propose corresponding solutions and predict the benefits that your company can obtain after adopting the corresponding solutions. Finally, we summarized the problems in your company's project development, and summarized our solutions, and the improvements that your company can achieve in the project development process after adopting the corresponding solutions, which is reflected in shortening time and reducing costs aspect.

2.2 Demand Management

Mistake 1: in the demand analysis stage of the project, the developer and the client can reach an agreement on the basic outline of various problems, and the specific details can be filled in later. Because no matter how meticulous it is at the beginning, it is almost inevitable to modify the requirements later. Analysis: This is a very dangerous thought.

In fact, the main reason for the failure of many software projects is that the description of the problems in the requirements stage is not detailed enough, which

leads to the budget exceeding or the time schedule not meeting the requirements later.

Mistake 2: the requirements of software projects can change continuously, and these changes can be easily implemented. Analysis: it is true that for various reasons, it is difficult for the client to describe all problems comprehensively and accurately in the demand analysis stage. With the development progress, there are often some changes in requirements. Modern software engineering theory also uses the flexibility of software to adapt to this situation in various ways. However, this does not mean that "the requirements of a software project can change continuously, and these changes can be easily implemented".

Mistake 3: the software program is mainly composed of code, so the coding stage is the most important stage of the whole software project, which should give a lot of time and concentrate the main resources. Analysis: compared with the past, due to the increase of software scale and complexity, as well as the emergence of semi-automatic software code development platform, the center of modern software project management has shifted - not focusing on the coding stage, but on the overall / detailed design stage of the system. Generally speaking, the reasonable allocation proportion of various resources in modern software project management is: project demonstration, risk assessment stage 3%, project demand analysis stage 8%, system overall / detailed design stage 45%, coding stage 10%, system testing stage 34%

Mistake 4: in order to facilitate the maintenance and modification of the code, the document work in the detailed design stage of the system should be able to write the pseudocode of all programs.

Mistake 5: since a special tester is set up in the project personnel configuration, all internal testing of the software should be completed by the tester. Analysis: software program testing can be divided into "white box method" and "black box method". Due to the various requirements of using "white box method" for the quality of testers, the testers always give priority to "black box method" in program testing. Their way of work is often to test the program with "black box method"; if the test fails, they have to consider the "white box method" test of the program code. Obviously, this kind of "escape" to "white box method" intentionally or

unintentionally poses a threat to the reliability and stability of software.

Mistake 6: software project management is only the business of relevant technical departments, and has nothing to do with other departments of the company.

Mistake 7: when the development progress lags behind, more programmers can be hired to join the development team to catch up with the progress by increasing human resources.

Mistake 8: the technical backbone should be the project manager of the project, and the project manager must be the highest salary of all project members.

Mistake 9: only project managers and department heads care about the overall progress of the project, and programmers only care about their own development progress.

Mistake 10: in order to keep the project going and keep the core programmers, get a raise.

II. Supplier Agreement Management

Do software development, it is inevitable to buy some hardware and software. Software may be middleware, controls, plug-ins, components, etc., hardware may be some servers, PDAs, microcontrollers, etc.

2.3 Project Plan

In your company's software development process, there is no standard project planning arrangement. There have been many delays in the completion of the project, and the personnel work arrangements have overlapped. There is a phenomenon of staff overload in which the work pressure of some personnel exceeds the work efficiency of the personnel. Reasonably leads to the fastest delivery of projects and systems. The related issues will be described in detail here for your company's reference.

2.3.1 Project scope

There is a problem in the scope of the project, which refers to the fact that your company does not effectively limit the work to be done and some performance in the

work process in the process of project management and development, which leads to the mid-term project or the project delivery process. Some questions.

(1)Incomplete function implementation details

Your company's project realizes the main functional requirements of users, that is, distributed image recognition and application. Your company has completed the main functional requirements of users, but when the users are displayed, the identified objects will be identified by the same graphics. Labeling, did not mark the objects that the user is very concerned about. Your company has not effectively mined and realized the user needs that may be hidden.

To this end, the team gave constructive suggestions on how to avoid these problems. We will provide detailed explanations and provide specific solutions in the next "Project Plan" and "Requirement Management" modules.

(2)Limited performance

Your company has not explained the performance of the developed system and the requirements of software and hardware. At the same time, due to poor scalability, there are certain problems with system performance. How to improve system performance, specific solutions, we will be in the "project The "Plans" and "Technical Solutions" modules are given.

(3)Poor system interface flexibility

Because your company does not have a unified plan and arrangement during the system development and design phase, the design interface of the team members is not implemented in accordance with the standards, resulting in poor system interface limitations and poor flexibility, and there will be great hidden problems. Specific solutions, We will give it in "Project Plan" and "Technical Solution".

(4)Poor system scalability

The system is developed on different platforms, the interface used is poor in flexibility, the system is poorly adaptable to software and hardware platforms, it cannot be run on multiple platforms at the same time, and the system is poorly scalable. For specific solutions, we will use the "Project Plan" and Given in "Technical Solutions".

2.3.2 Company Resources

Your company's corporate resources refer to the company's software and hardware resources, as well as human resources, etc. The following problems exist in its arrangement and allocation.

(1)Unreasonable staffing

The staffing of your company is unreasonable, manifested in the overload of some staff workloads, and the arranged work far exceeds the staff's work efficiency. Meanwhile, most staff have gaps at some time, and at the same time, some staff are still in Overload period. Specific solutions will be given during the "project planning" phase.

(2)Unreasonable software and hardware resources

The company's software and hardware resources are unreasonable, which means that during the development process, the company's development equipment cycle is normal due to unavailable hardware facilities. The use of software is unreasonable, which causes repeated problems during project development. Specific solutions The plan will be given in the "Project Plan" and "Project Management" stages.

2.3.3 Schedule

Arrangement refers to the software progress made to ensure the project is completed on time.

(1)System progress architecture is missing

During the software development process, your company did not carry out the construction of the system schedule structure, which led to the lack of the system schedule structure. At each stage and at each stage of completion, each member of the team did not know where they went. Indirectly, it led to the entire work of the team. Poor integrity. Specific solutions will be given in "Project Planning", "Project Monitoring and Control" and "Integrated Project Management".

(2)Cost exceeded

Due to the reasonable arrangement of personnel and unreasonable software and hardware resources, the company has spent a lot of labor costs, prolonged the

construction period, and caused costs to exceed standards. Specific solutions are discussed in "Project Planning" and "Integrated Project Management".

2.4 Project monitoring & control

Project monitoring means working around the project, tracking progress, grasping the current status of various work, in order to carry out appropriate resource allocation and progress adjustment, determine the start and end time of the activity, and record the actual progress, and in some cases, for example, path and risk analysis. During the implementation of the project, the project must be tracked and monitored at any time, so that the project is completed according to the planned schedule, technical indicators, and feedback of the current stage of work is provided to facilitate the smooth development of the subsequent stage and the completion of the entire project.

2.4.1 Actual performance and progress of the project are monitored against the project plan.

In the previous article, we have advised your company to make a detailed plan. The plan needs to be supervised to execute smoothly, and your company should track the content in the plan

(1) Monitor the actual values of the project planning parameters against the project plan.

In this project, the actual values are uncertain. For example, after training, how many types of things do your company aim to recognize? Of course, Your company need to identify everyone on the road, but do you need to spend the cost to train so that the final machine can recognize the traffic lights on the road? Your company must make an accurate estimate of the scope and cost of the project. And, during the project, your company must pay close attention to whether the actual situation of these parameters is consistent with the estimated situation.

(2) Monitor risk against those identified in the project plan.

For the risks that have been identified in the project, for example, the wrong

results may be predicted in this project, and then the adversarial samples need to be used for correction. In image recognition, even small changes that are not visible to the our eyes will cause completely different results. The use of adversarial samples can greatly reduce the risk of image recognition errors, but the risks still exist. Your company must pay close attention to whether the risks have changed and consider whether new risks will occur.

(3) Monitor stakeholder involvement against the project plan.

Track the involvement of project stakeholders. The project plan clearly specifies when and what tasks to start, and when the customer starts to prepare the system environment, etc. Then your company needs to follow the plan. Your company does not assign specific people to oversee whether members complete tasks on time, which can lead to inefficiencies.

(4) Periodical review the project's progress, performance, and issues.

Your company need to plan our project's progress, performance, and problems. The actual ability of the project to execute according to plan, such as the ability of members to complete tasks, the quality of documents and the quality of code, should be carefully checked at certain determined times. Different training steps of the neural network are interrelated. If there is an error in the parameters trained in the previous step, this error will continue to the subsequent training, and a wrong result will be obtained. Therefore, the members' tasks at each stage must be checked regularly.

(5) Review the accomplishments and results of the project at selected project milestones.

When the key nodes of the project, such as the requirements are determined, the architecture design is completed, and the software is released, your company need to check the project status again to ensure that there are no errors in these key nodes.

2.4.2 Corrective actions are managed to closure when the project 's performance or results deviate significantly from the plan.

(1)Collect and analyze the issues and determine the corrective actions necessary to address the issues.

(2)Take corrective action on identified issues.

(3)Manage corrective actions to closure.

These are the three steps to solving a problem in a project: collecting and analyzing the problem and then identifying corrective actions, implementing corrective actions, and managing corrective actions. It is not surprising that the actual situation deviates from the planned situation. The reason may be that the plan itself is not perfect, or the actual work has problem. SG2 emphasizes the need to analyze the cause, find out the source of the problem, take appropriate action to solve the problem, and make the project proceed as planned. Under normal circumstances, most of the deviations from the plan are delayed schedules, larger budgets, and other estimates beyond the plan. As a project manager, he should not easily change the plan and make the plan consistent with the actual situation. Instead, he should strive to improve the actual situation. The meaning of the plan is lost. However, there are exceptions to everything. It is indeed possible to make an "impossible" plan when making a plan. In this case, it is indeed a need to change the plan.

2.5 Risk Analysis

Risk analysis is very important for project management. At present, your company's project is underway without considering project risk.

(1)System risk not identified

In your company's system development process, the potential risks of the system are not considered, including the risk of staff turnover, the risk of system delay, etc. Detailed risk analysis and risk solutions will be given in the "Project Plan" and "Risk Management" modules .

(2)Software without standard quality assurance

Your company's software development process does not carry out software standardization quality assurance, and the company's software evaluation standards are missing. Specific solutions will be given in the "Project Plan" module.

2.6 Product Analysis

2.6.1 Product or product-component solutions are selected from alternative solutions

(1) Develop detailed alternative solutions and selection criteria.

Although the design plan for this project is clear, your company should still determine candidate plans and selection criteria rather than design directly. In addition to the large design scheme for the entire project, the design scheme also includes the design schemes of the various components that make up the product. In most cases, there are definitely some parts of a project where the technology is not clear and requires careful analysis. In addition, in any case, the design standard of the project should be determined according to the actual situation of the project. Even if there is only one plan, the design standard should be used to test the plan. In most cases, it is considered that there is no need to consider multiple design schemes and design standards, and it is "lazy" thinking to blame. Without such consideration, the risk of the project is relatively large. In short, your company should have a design document, and you must follow this design document during the project process.

(2) Evolve the operational concept, scenarios, and environments to describe the conditions, operating modes, and operating states specific to each product component.

In your previous design, your company did not consider that you can reuse the code or components of previous projects or third parties, nor did you use demand-driven design. Reusing existing components and code can greatly increase efficiency and reduce unnecessary time and labor costs. Considering the needs from the very beginning of the design, this will help your company make the final computer vision product more suitable for the needs of users.

(3) Select the product-component solutions that best satisfy the criteria established.

Select the best one in the solutions. Despite this, your company still needs to find candidate solutions and find the best solution based on selection criteria. In this project, a variety of neural networks can be used. When the neural network we choose

is not good enough, there should be alternatives. In addition, your company use python to encode, but your company can also use alternative matlab when python shows obvious disadvantages.

2.6.2 Product or product-components designs are developed.

- (1) Develop a design for the product or product components.
- (2) Establish and maintain a technical data package.
- (3) Design comprehensive product-component interfaces in terms of established and maintained criteria.
- (4) Evaluate whether the product components should be developed, purchased, or reused based on established criteria.

In fact, your company didn't realize the importance of design documents before, and therefore did not have the awareness to maintain design documents. Once the best candidate is determined, specific design work can begin. This part means to establish and maintain a set of standards for managing all design documents and data, and to effectively manage the data and documents in the design process. Then, based on this standard, design the appropriate product components and determine which components need to be changed.

2.6.3 Product components, and associated support documentation

- (1) Implement the designs of the product components.
- (2) Develop and maintain the end-use documentation.

After completing the above steps, your company will still face problems in actual coding. For example, the code is disconnected from the design, making it impossible to fit requirements correctly. Another example is that the project requires frequent changes, and your company write too many spaghetti codes, making the code difficult to maintain.

In this part, your company can perform coding activities according to the design, and develop and maintain user documentation. The effect of the design needs to be reflected in the specific coding. During the encoding process, your company can

judge whether the original scheme is good enough and decide whether to use alternatives, for example, to try another neural network. When coding, your company should also adjust the previous design, then the design will be more code-friendly.

2.7 Risk Management

Without effective risk management in your company's software development process, a range of potential risks and issues will arise. For all the following problems, we will give specific solutions in the "risk management" module.

2.7.1 Demand is at risk

Requirement has become the project benchmark, but the requirements continue to change; poor definition of requirements, and further definitions will expand the scope of the project; adding additional requirements; the obscure part of the product definition takes more time than expected; customers in the process of making requirements Insufficient participation; lack of effective demand change management processes.

2.7.2 Planning risks

Plans, resources, and product definitions are based on verbal instructions from customers or upper-level leaders, and are not completely consistent; plans are optimized and "best", but plans are unrealistic and can only be considered "expected states"; plans are based on the use of specific Team members, and that particular team member can't really count on; the product size (number of lines of code, function points, and percentage of the previous product size) is greater than estimated; the target date is completed ahead of time, but the product range is not adjusted accordingly Or available resources.

2.7.3 Organization and management risks

Only the management or market personnel make technical decisions, resulting in slow planning progress and prolonged planning time; inefficient project team structure reduces productivity; lack of necessary specifications, leading to work errors and repeated work.

2.7.4 People at risk

Prerequisite tasks (such as training and other projects) cannot be completed on time; conflicts between project team members result in poor communication, poor design, interface errors, and additional duplication of work; some people need more Time to adapt software tools and environments that are not yet familiar.

2.7.5 Development environment risks

Facilities were not available in time; development tools were not available in time; development tools were not as effective as expected, and developers needed time to create work environments or switch to new tools.

The risks that your company has during the software development process include, but are not limited to, the above risks. Therefore, effective risk management is required. Specific risk management will be given in the "Risk Management" module.

3 SOLUTIONS

3.1 Requirements management

Problem 1:

In the demand analysis stage of the project, the developer and the client can reach an agreement on the basic outline of various problems, and the specific details can be filled in later. Because no matter how meticulous it is at the beginning, it is almost inevitable to modify the requirements later. Analysis: This is a very dangerous thought.

In fact, the main reason for the failure of many software projects is that the description of the problems in the requirements stage is not detailed enough, which leads to the budget exceeding or the time schedule not meeting the requirements later.

Solution1:

In the project requirements analysis stage, both parties must comprehensively and carefully discuss the application background, functional requirements, performance requirements, operation interface requirements, interface requirements with other software, and various evaluation standards for project evaluation. Moreover, after the end of demand analysis, the two sides should also establish channels that can be directly contacted to communicate the change of demand as early as possible.

Problem 2:

The requirements of software projects can change continuously, and these changes can be easily implemented. Analysis: it is true that for various reasons, it is difficult for the client to describe all problems comprehensively and accurately in the demand analysis stage. With the development progress, there are often some changes in requirements. Modern software engineering theory also uses the flexibility of software to adapt to this situation in various ways. However, this does not mean that "the requirements of a software project can change continuously, and these changes can be easily implemented".

Solution 2:

The practice shows that the cost of implementing software requirement change increases exponentially with the development progress. It is assumed that it costs twice as much to implement requirement change in requirement analysis phase, 1.5-6 times as much in system design and coding phase, 10-20 times as much in system test phase, and even 60-100 times as much after software release. Thus, in the process of project development, the change of software requirements should be put forward as early as possible. Only in this way can it cost less and be easily realized.

Problem 3:

The software program is mainly composed of code, so the coding stage is the most important stage of the whole software project, which should give a lot of time and concentrate the main resources. Analysis: compared with the past, due to the increase of software scale and complexity, as well as the emergence of semi-automatic software code development platform, the center of modern software project management has shifted - not focusing on the coding stage, but on the overall / detailed design stage of the system. Generally speaking, the reasonable allocation proportion of various resources in modern software project management is: project demonstration, risk assessment stage 3%, project demand analysis stage 8%, system overall / detailed design stage 45%, coding stage 10%, system testing stage 34%.

Solution 3:

In order to facilitate the maintenance and modification of the code, in the detailed design stage of the system, the document work should be able to write out the pseudo code of all programs. Analysis: the most important function of pseudo code is to describe the algorithm flow of the program, so that people can understand the function and implementation process of the program. It can be seen that, to some extent, pseudo code is indeed conducive to the maintenance and modification of program code. However, we know that in order to ensure the one-to-one correspondence between project documents and program codes, project documents need to be maintained when maintaining program codes. Pseudo code and program code are very close. If we maintain pseudo code, it is equivalent to twice of the program code maintenance. It's a lot of work. Therefore, the practical way is to make

the program flow chart for the general program documents, and the pseudo code is needed for the complicated algorithm.

Problem 4:

In order to facilitate the maintenance and modification of the code, the document work in the detailed design stage of the system should be able to write the pseudocode of all programs.

Solution 4:

Analysis: Usually the biggest function of pseudo code is to describe the algorithm flow of the program, so that people can deeply understand the function and implementation process of the program. It can be seen that, to some extent, pseudo code is indeed conducive to the maintenance and modification of program code. However, we know that in order to ensure the one-to-one correspondence between project documents and program codes, project documents need to be maintained when maintaining program codes. Pseudo code and program code are very close. If we maintain pseudo code, it is equivalent to twice of the program code maintenance. It's a lot of work. Therefore, the practical way is to make the program flow chart for the general program documents, and the pseudo code is needed for the complicated algorithm.

Problem 5:

Since a special tester is set up in the project personnel configuration, all internal testing of the software should be completed by the tester. Analysis: software program testing can be divided into "white box method" and "black box method". Due to the various requirements of using "white box method" for the quality of testers, the testers always give priority to "black box method" in program testing. Their way of work is often to test the program with "black box method"; if the test fails, they have to consider the "white box method" test of the program code. Obviously, this kind of "escape" to "white box method" intentionally or unintentionally poses a threat to the reliability and stability of software.

Solution 5:

How to solve this problem? On the one hand, we need to improve the

requirements for testers, on the other hand, we need programmers to complete some "white box" tests (in fact, programmers are often the best candidates for "white box" tests).

Problem 6:

Software project management is only the business of relevant technical departments, and has nothing to do with other departments of the company.

Solution 6:

Analysis: in the increasingly fierce competition today, software projects are large-scale, high complexity and urgent time requirements. In order to improve the software project management level of the company, it is necessary to improve the overall participation awareness of the company, and all departments of the company need to work together. For example, the accounting department is required to assist in project budget, financial management and cost control; the research department (Technical Committee) is required to assign experts to assist in various risk assessments and provide technical guidance; the logistics department is required to provide various support.

Problem 7:

When the development progress lags behind, more programmers can be hired to join the development team to catch up with the progress by increasing human resources.

Solution 7:

Analysis: in the era of team development, developers should carefully consider this approach according to the current level of software project management. If the new programmers have a certain understanding of the application industry of the current software project, and can quickly adapt to the project management mode, software development style and team cooperation atmosphere of the developer, then the "new" is beneficial. Otherwise, it may "do bad things with good intentions". Because in spite of its high personal ability, in order to make it work together with everyone, the development team has to allocate personnel to carry out technical / business training related to the project, and more importantly (and most difficult) to

guide it into the team. This can take a lot of time and effort on the part of the development team and is likely to slow down the project.

Problem 8: The technical backbone should be the project manager of the project, and the project manager must be the highest salary of all project members.

Solution 8:

Analysis: in the era of "software workshop", this is a commonly used and effective method; in the era of "software factory", this method brings various problems, sometimes even directly leads to project failure. The main reason is that with the refinement of modern software development division of labor, the requirements for project managers have also changed fundamentally - the most important thing is not their mastery of a certain professional technology, but their ability to organize, lead and coordinate the development team (of course, both of them can highlight the best). As for the salary of the project manager, it has a lot to do with the salary system. Usually, the project manager implements the salary system of the management personnel, while the other personnel implements the salary system of the technical personnel. The salary of the project manager is relatively high among the project members, but not necessarily the highest. Sometimes, in order to motivate technicians, the technical backbone of a project is paid more than the project manager.

Problem 9:

Only project managers and department heads care about the overall progress of the project, and programmers only care about their own development progress.

Solution 9:

Analysis: it's a bureaucratic idea. In fact, as a member of the team, the programmer is not only doing a job, but also participating in the creation of a "work". While appreciating the hard work, it is more important for programmers to enjoy the pleasure of creation. The project manager should not ignore the programmer's pursuit of "sense of achievement". He should describe to everyone how wonderful and exciting the final "work" will be, and set up a series of milestones on the way to the final goal. Whenever the whole project advances to a milestone, the project manager should inform each project member of this message. In fact, this can not only make all

project members enjoy the joy of stage victory, but also stimulate everyone's greater work enthusiasm and improve work efficiency.

Problem 10:

In order to keep the project going and keep the core programmers, get a raise.

Solution 10:

Analysis: salary increase can be said to be a common method used by many enterprises to retain programmers. This may work for a while, but it's often people who stay, but the side effect is also coming - people who get a raise don't necessarily have to work much, but people who don't get a raise start to slack off. In fact, it is a "bad habit" inherited in the "workshop" era that the project is carried out too much depending on the personal technology of programmers. Since the flow of personnel in the IT industry is uncontrollable, the implementation of the project should pay more attention to the power of the group, and more consideration should be given to the overall technical level and core technical capabilities of the company. For example, form the company's own expert knowledge base, class / function library, third-party control library, development platform with independent copyright, etc. In addition, in fact, the reason why programmers get frustrated is not salary, but lack of motivation and respect. This requires the project manager to use the "old-fashioned" method to find the right time to do ideological work for the programmers, describe the bright future of the project to them, and make them feel concerned and respected. In a word, we should start from many aspects to ensure the smooth development of the project, rather than simply increasing the salary.

Excepted result:

Developers should understand the needs of customers. If this can not be done, the following work is meaningless. Therefore, it is not appropriate to rush to develop without understanding the requirements. Of course, if you want to get requirements through prototyping, it is not listed here. In addition, you should not misunderstand. You must not carry out development work before you fully understand the requirements. If some requirements have been mastered and some requirements have

not been mastered, it is also possible to carry out the design and coding work of some requirements that have been mastered. At this time, you need to consider the needs that have not been determined. Ask for possible impact on these jobs.

3.2 project planning

The project plan is to establish and maintain a plan that defines project activities. Compared with the previous project development process, it can better control the project execution progress. According to the time node, accurately grasp the project development progress and development time, and can achieve project development responsibility to people.

The following sections plan and arrange the project by establishing estimates, specifying project plans, and planning commitments.

SG 1 Establish estimates

Software project estimation is based on accurate survey data and project available resource information. It predicts the size, workload, progress, and cost of the estimated object and defects. It is the basis for project planning.

SG 1.1 Estimated project scope

The scope of project estimates includes software scale, workload, and work progress.

(1) Estimate product size

The estimated product size includes the number of code lines and function points. In the image recognition system of a distributed system, it represents the number of code lines estimated during the system implementation process and the expected function points of the product.

(2) Estimated workload

Estimate how long it will take to complete the project based on the number of people working in the group and the efficiency of each person's daily work.

(3) Estimate progress

Estimate the work progress of the entire project according to the workload and number of workers.

(4) Cost Estimate

The cost estimates here include human and software and hardware costs, learning, training, risk, and maintenance costs. Here, in particular, the hardware costs of leasing multiple servers, as well as labor costs, because this accounts for the vast majority.

(5) Defect number estimation

Estimation of the number of defects, an estimate of the workload and schedule affected by the number of defects. This refers to the potential defect risk within the project.

(6) Estimate improvement

Estimates are provided within a certain range, and the range is regularly improved as the project progresses to provide greater accuracy.

Here you can determine the project scope and boundaries according to user needs, form WEBs based on lifecycle products, analyze reusable, purchased, outsourced components, analyze various support activities, such as qa, cm, etc., project goals smart (clear, measurable, (Acceptable, achievable, time-bound). Visualization can be performed by technology WEBs (product breakdown structure), sow, and project WEBs (project work breakdown structure).

SG 1.2 Establish estimates of work product and task attributes

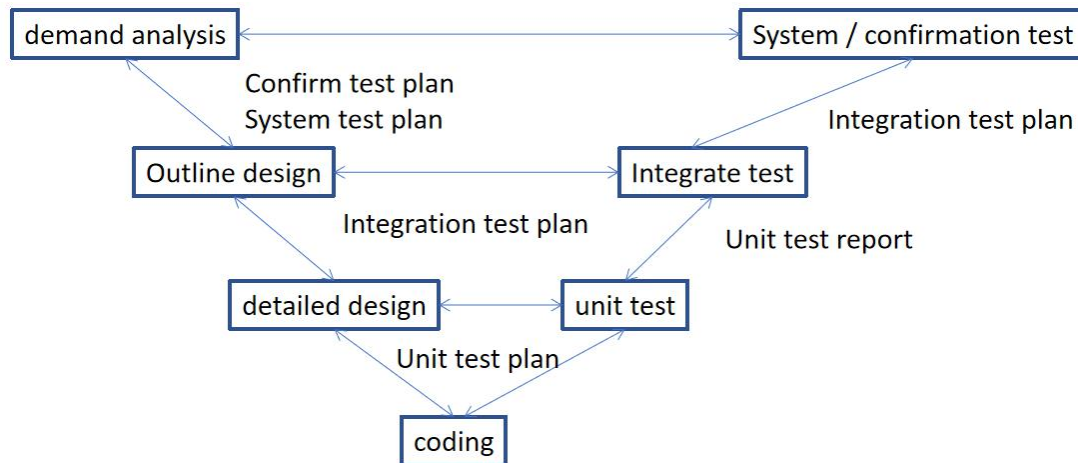
Establishing the estimation process of work product and task attributes will be divided into three aspects to practice, determine the product technical route, analyze product characteristics, determine the estimation method, and estimate based on WEBs.

After the estimation, the following estimation results will be produced. The results include function points, lines of code, business, functional item interfaces, etc. In this process, it is necessary to record the difficulty, complexity, assumptions and processes of analysis.

SG 1.3 defines the project life cycle

It is very important to choose the "v model" for the project declaration cycle, and

to clarify the project life cycle and phases. The "incremental development model" is used to define the project life cycle and achieve the phase delivery model. The project can be continuously displayed or delivered to the customer within the determined phase. In terms of demand flexibility, this model is at an intermediate level.



SG 1.4 determine workload and cost estimates

Collect methods or historical data used for estimation, use estimation methods or historical data to estimate project workload and costs. In the estimation, consider the basic resource requirements of management, development, testing, production, etc. Analyze risks, human resources, tools, methods, Environmental impacts can be analyzed through cost and budget tables.

SG 1 Excepted Result

The above scheme provides an estimated solution. After you have a software project estimate during the project development process, your company can accurately estimate the size of the object and defect, the cost of the workload, the progress control, and the overall cost control. Will effectively solve the following problems:

Effectively solve the problem of project extension, which will not cause a lot of labor costs;

Will effectively solve the problem of unreasonable workload arrangements to avoid the occurrence of overloading of manpower;

Progress control will be carried out in an orderly manner, and project completion will be completed on time or in advance.

In general, after your company estimates the project, it will save a lot of expenses outside the project and maximize the project profit.

SG 2 make a project plan

SG 2.1 establish budget and schedule

The budget and schedule are established here to reflect the project progress and budget implementation:

project name	Modeling and Implementation of Image Recognition Based on Distributed Computing				
Project start time	2019.12.09	Project completion time	2019.12		
Project budget schedule settlement progress and review					
Financial signature		Project manager signature		Review and sign	
Receiving time		Submission time		Review time	
Project settlement statement settlement progress and review					
Estimated cost		Actual cost		Review and sign	
Receiving time		Submission time		Review time	

SG 2.2 Identify project risks

Identifying risks is the process of judging which risks might affect the project and recording its characteristics. The main role of this process is to document existing risks and accumulate knowledge and skills for project teams to predict future events.

The input can be:

- ① Risk management plan
- ② Cost management plan
- ③ Schedule management plan
- ④ Quality management plan
- ⑤ Human resources management plan
- ⑥ Scope benchmark
- ⑦ Activity duration estimate
- ⑧ Stakeholder Register
- ⑨ project files
- ⑩ Purchase documents
- ⑪ Career environmental factors
- ⑫ Organizational process assets

The work employed can be:

- ① Document review
- ② Information collection technology
- ③ Checklist analysis
- ④ What-If Analysis
- ⑤ Graphic Technology
- ⑥ swot analysis
- ⑦ Expert judgment

The output can be a risk register.

SG 2.3 data management plan

Part of a business plan is arranging how to use data in project development. This is why companies need a good and stable data management plan. This plan helps everyone to know exactly what they need and what to do if they need it. The following steps are available:

(1) Define everyone's role

There may be many people involved in a company's project. However, even if there are only two or three people, the role of each person needs to be clearly defined. In this way, when you need to do something, you can refer to the plan and give

suitable candidates. In the long run, this will save a lot of time because companies often cannot find the right people through hiring in the short term.

(2) Avoid passive voice

The passive voice is ambiguous because it does not define the subject. This makes the planning document difficult to read because the reader cannot be sure what is said. For example, "you need to pay before the plan is signed", "do not tell us", etc. These words. Instead, it should be "the developer will pay the fee because the park and recreation department will sign the plan."

(3) outline the data being collected

Businesses need to think clearly about what is being collected and why it is being collected. List each type of data that needs to be in the data plan and the reasons for doing so. If the question needs to be answered, this makes it possible for everyone to answer.

(4) Delete unnecessary words

When writing a document, pay attention to the number of words used. Generally, planning documents do not need words and phrases that are not meaningful to the text. If you cannot express your opinion, you need to streamline.

(5) How to collect data plan

Businesses need a plan to explain how they are looking to collect data. There may be several different approaches, so make sure they are all included. When collecting data, at least one person needs to be assigned the task of viewing this data.

(6) Decide how to protect the collected data

Once a business has data, it needs to be protected according to the laws of the region in which it is located. This is an important step, so make sure you don't ignore it. The business also needs to outline how to ensure that no plagiarism will occur and quote all of its source.

(7) Split text with subtitle

When writing a plan, you can split the text with subheadings. This clearly highlights each part of the plan and makes it easier to read. In addition, it will be easier to backtrack and find the information you need if you need it later.

(8) plan how to store data

People know how data is stored. The stored data needs to be secure and accessible only by authorized personnel. In addition, businesses need a backup plan in case of a hard drive failure or other disaster. A good way to do this is Keep your data storage in at least two different physical locations so that if one is damaged, there is still a backup.

(9) Points of use

They are often easier to read if they are used in a plan. They are especially useful when detailing the steps required to execute the plan. It will be easier when you want to review the plan later, so it is usually a the best choice.

SG 2.4 required knowledge and skills plan

Technical skills refer to the ability to understand and be proficient in a specific activity, especially activities that include methods, processes, procedures, or techniques. A good project manager should have the relevant technical experience or knowledge required for the project. Technical skills are included in specific Expertise and analytical skills to apply management tools and techniques in situations such as:

(1) Special knowledge of using project management tools and techniques

Implementing project management in the field of economic construction, especially in the construction of construction projects, is of great significance for improving the quality of the project, shortening the construction period, and saving costs. Goals and functions.

(2) Related expertise

Only after mastering certain professional knowledge in these aspects, in the process of project implementation, can you be handy when encountering events related to related majors, and be invincible when dealing with economic problems.

(3) Project technology and methods

Knowledge of cloud computing, distributed systems, and machine learning is required in this project.

(4) Related project knowledge

The project manager should also understand the relevant project knowledge and

understand the methods, processes and procedures of the project. Only with these comprehensive knowledge can various management techniques be flexibly applied in the project management process.

(5) Rich practical experience

The project manager has to deal with various problems that occur in the project operation at any time, so he should have rich project practical experience in order to quickly make decisions on various problems that arise at the construction site.

SG 2.5 plan stakeholder engagement

In this project, the project participants include the project developer and the requester. Here, it can be called Party A and Party B.

SG 2 Excepted Result

After your company has formulated the project plan, it is expected that the completion time of the construction period will be shortened and the project cost will also be shortened. The team has established a budget and timetable for your company, where your company can effectively control the duration and workflow according to the time node. Strict implementation of planned work arrangements. At the same time, it can also effectively identify the risks in the project, adopt risk aversion or risk tolerance strategies or risk transformation, and effectively predict the risks in advance to reduce the negative impact of risks.

Here, risk management plan, cost management plan, etc. are provided for your company, and your company can handle it according to your actual situation.

After implementing the above plan, we expect that your company will have a lot of improvements in the following areas:

Clear roles and optimal work efficiency;

Effective identification of risks and corresponding identification measures and solutions;

All functions of all members of the team are matched with current positions, and the staff is efficient.

3.3 Project monitoring & control

SG1 Actual performance and progress of the project are monitored against the project plan.

SP1.1 Monitor the actual values of the project planning parameters against the project plan.

Problem: In this project, the actual values are uncertain. For example, after training, how many types of things do we aim to recognize? Of course, we need to identify everyone on the road, but do we need to spend the cost to train so that the final machine can recognize the traffic lights on the road?

Solution: We must make an accurate estimate of the scope and cost of the project. And, during the project, we must pay close attention to whether the actual situation of these parameters is consistent with the estimated situation.

SP1.3 Monitor risk against those identified in the project plan.

Problem: For the risks that have been identified in the project, for example, the wrong results may be predicted in this project, and then the adversarial samples need to be used for correction. In image recognition, even small changes that are not visible to our eyes will cause completely different results.

Solution: The use of adversarial samples can greatly reduce the risk of image recognition errors, but the risks still exist. We must pay close attention to whether the risks have changed and consider whether new risks will occur. Your company must also establish a quantitative criterion for risk assessment, and when the risk of errors exceeds the scope, adjustments should be made quickly.

SP 1.6 Periodical review the project's progress, performance, and issues.

Problem: In this project, your company has not clearly stipulated the project inspection dates, so that problems in project progress and performance cannot be found in time. This creates a lot of hidden dangers and it is likely to reduce efficiency due to some errors.

Solution: We need to plan our project's progress, performance, and issues. The actual ability of the project to execute according to plan, such as the ability of

members to complete tasks, the quality of documents and the quality of code, should be carefully checked at certain determined times. Different training steps of the neural network are interrelated. If there is an error in the parameters trained in the previous step, this error will continue to the subsequent training, and a wrong result will be obtained. Therefore, the members' tasks at each stage must be checked regularly.

SP 1.7 Review the accomplishments and results of the project at selected project milestones.

Problem: Your company also does not value inspections at key points in the project. The milestones of the project are the key to whether the project can be successfully completed and accurately meet the needs, and should never be ignored.

Solution: When the key nodes of the project, such as the requirements are determined, the architecture design is completed, and the software is released, we need to check the project status again to ensure that there are no errors in these key places.

SG 1 Expected Result :

After improving according to the SG1 standard, your company has established a relatively complete inspection mechanism. In this way, your company has established a complete set of inspection standards, and established a process and milestone inspection mechanism, thereby effectively ensuring that the previous plans are well executed.

SG2 Corrective actions are managed to closure when the project 's performance or results deviate significantly from the plan.

SP2.1 Collect and analyze the issues and determine the corrective actions necessary to address the issues.

SP 2.2 Take corrective action on identified issues.

SP 2.3 Manage corrective actions to closure.

Problem: In fact, the progress of the project will not always be in line with the plan. When the process deviates from the plan, your company does not have detailed corrective actions. This will cause your company to be unable to make adjustments in

a timely manner if there are errors in the project, thereby delaying progress.

Solution: These are the three steps for your company to solve issues in the project: collecting and analyzing the problem and then identifying corrective actions, implementing corrective actions, and managing corrective actions. It is not surprising that the actual situation deviates from the planned situation. The reason may be that the plan itself is not perfect, or the actual work has problem. SG2 emphasizes the need to analyze the cause, find out the source of the problem, take appropriate action to solve the problem, and make the project proceed as planned. Under normal circumstances, most of the deviations from the plan are delayed schedules, larger budgets, and other estimates beyond the plan. As a project manager, he should not easily change the plan and make the plan consistent with the actual situation. Instead, he should strive to improve the actual situation. The meaning of the plan is lost. However, it is indeed possible that you have made an "impossible" plan. In this case, it is indeed a need to change the plan.

SG 2 Excepted Result:

With the establishment of standards for Corrective actions, your company's resilience will be greatly improved. When the reality deviates from the plan, your company has the ability to respond quickly, so that you will not be panicked because the plan is disrupted.

3.4 Supplier Agreement

Party A: xxxx company

Party B: software development company

I. General

In order to ensure that Party B provides high-quality products and services to Party A, and meets the quality requirements of Party A, and avoids losses due to product quality or service problems, the two parties provide quality requirements for Party B's supply. The parties reached a consensus and signed this agreement through friendly negotiation between the two parties. At the same time, when there is a quality

problem with the software provided by the supplier, the supplier will perform quality assessment management to ensure that the company (hereinafter referred to as Party A) provides satisfactory products and services.

Scope of application

1. This agreement applies to the management of software and quality assessment and claims provided to Party A.

2. This agreement takes effect on the date of signing and stamping by the legal representatives or entrusted agents of both parties (Party B is the leader in charge of quality or sales and Party A is the supplier in charge of quality) (unless a new agreement is re-signed)), Each party holds one copy, with the same effect.

Party B shall strictly carry out effective contract review in accordance with the specific requirements of this agreement. If there are any questions or ambiguities, please contact Party A in time to obtain written confirmation, and Party A will not recognize any oral agreement.

This agreement applies to the following products (software numbers):

_____ .

If it can't be clearly described here, you can add additional instructions.

3. Acceptance requirements

1. Party B delivers the software product before the specified date, and Party A performs system testing and verification upon receipt.

2. Party B shall formulate a software development plan according to the characteristics of the product, which shall be signed and confirmed by the relevant engineers of the technical department of Party A, and shall be implemented in accordance with it to ensure the availability of the software product and meet the quality requirements.

3. Before Party A receives the software from Party B, Party B submits a report in accordance with our company's "Supplier Project Development Management System", and Party A will confirm based on the samples and corresponding reports provided by Party B. Party B shall ensure that the quality of the batch products is consistent with

the sample quality (Note: Product consistency: refers to the consistency between the batch of products in terms of appearance, performance and reliability based on the consistency of function, performance and safety, especially in non-quantifiable products. The measurement index should ensure the consistency of the product.) If necessary, the two parties can seal the sample. If a quality dispute occurs after the two parties seal the sample, the quality requirements of the sample shall prevail. On the basis of ensuring that all processes are controlled, it should be clear. Process, raw material requirements.

4. For each batch of products and raw materials delivered, Party B shall attach the factory's routine inspection report. Party A has the right to reject the report without the report. Party B shall also submit the original code, product-related performance test, and type test on a regular basis (every 12 months). And reliability tests. The test report recognizes that it must be carried out in a testing institution with national testing qualifications or designated by Party A. If it is not submitted on time, it will be assessed 10,000 yuan, and if it is deemed unqualified by Party A or the customer, each of the key items is evaluated 100 million yuan, 5000 yuan each for regular items.

5. Party A's acceptance is not exempt from Party B's inherent quality responsibility for providing receivable products, nor can it be ruled out that the subsequent failure of products and requirements may cause Party A to reject or hold Party B accountable.

6. Party A has the obligation to properly keep the products provided by Party B after the acceptance and acceptance, and use them correctly.

Fourth, sample management

Party B shall complete the sample production, small batch production and delivery according to the time node, quantity and quality requirements specified by Party A, otherwise, it shall bear any losses that may occur as a result.

Five, change management

1. When there are any changes in relevant standards, materials, etc., the two parties shall notify the other party in a timely manner in the form of controlled documents for confirmation.

2. When Party B makes major changes in the process of development, design, hardware equipment, production location, equipment or manufacturing (including the suspension of production of a provided product), it shall be implemented in accordance with our company's "Change Management System". All losses shall be borne by Party B.

Six, non-conforming product handling

Return

Party A receives the product according to the zero-function-loss criterion. When random inspection finds non-conforming products, fills in the "Return Function Form for Non-Conforming Functions". All the products in this batch are returned. Party B shall accept and bear the losses caused by this and include them into the monthly supplier. Quality performance statistics. Party B returns the product after receiving notification from Party A (48 hours for internal units and 72 hours for external units); if the product is not returned within the time limit, Party A will notify Party B in writing to process it within a time limit, and it has not been confirmed on time. It is deemed that Party B has waived its ownership and Party A shall dispose of it.

2. Concession acceptance

Concession acceptance of non-conforming products should be based on the principle of not affecting the safety and performance of the use, and operation. If production is urgently needed and does not violate the above principles, concession acceptance procedures can be handled. The concession receipt documents must be signed by the supplier (or the client) in writing. Review again (Note: The foreign supplier entrusts Party A's procurement department to handle the concession and acceptance procedures and must be authorized in writing). The specific claim plan is as follows: (1) When the first occurrence occurs, Party B shall bear 15% of the supply amount as quality compensation. For the second time in each year, the responsible supplier bears 25% of the amount of the supply as quality compensation. For the third or more or the deviation is particularly serious, the responsible supplier bears the amount of the supply in each batch. 50% is for quality compensation. The specific reduction percentage is indicated on the concession use list for non-conforming

products according to the above provisions. (2) Party A shall bear all additional economic losses due to Party B's product concession acceptance.

3. Pick and use

If only a small number of non-conforming functions exist in Party B's batch of products and cannot be conceded to accept, Party A's quality supervisor will allow Party B to send someone to select and use, and after the selection, the product will be re-tested. "Return order", which is included in the ppm value statistics. If Party B's products are unqualified and need to be reworked and repaired at the production site, it must be approved by Party A's quality supervisor, otherwise Party A will be responsible for implementation, and Party A will charge a labor fee of 25 yuan per person per hour; If other losses are caused due to Party B's unqualified products being repaired and reworked, Party B shall pay compensation according to the price. The claim shall be directly deducted from Party B's payment.

4. Unqualified procurement parts are found during online production and finished product inspection. They are sorted by the inspectors after they are sorted. After being signed by the Minister of Quality, they are judged to be waste. The production department organizes the return to the warehouse, and the procurement department transmits the non-conforming information in a timely manner. To Party B, if Party B does not arrive for confirmation within three working days after receiving the information, it is deemed that Party B has given up ownership and Party A will dispose of it on its own.

5. If the products provided by Party B are found to have the following non-conformities, they shall be fined 500 to 5000 yuan in quality and compensate for the corresponding economic losses: (1) indirect failure of functions; (2) problems with additions, deletions, changes, and investigations of data. (3) users report bad reviews; (4) system problems continue; (5) users complain.

Seven, quality claims and processing

1. Relevant departments and duties of Party A's quality claim execution

-Quality Department: Responsible for communicating with suppliers, confirming software quality defects, collating and confirming the labor time loss in the quality

department, and organizing and verifying related losses, confirming the amount and amount of claims, and issuing relevant documents to the financial department and the purchasing department.

- Procurement Department: Responsible for communicating with suppliers and handling claims procedures.

- Production Department: responsible for calculating labor time loss caused by supplier quality problems.

- Logistics Department: Responsible for collecting and keeping defective products of suppliers, and organizing returns.

- Finance Department: Responsible for deduction according to the quality claim documents of the purchase parts, and issue financial receipts or invoices according to the requirements of the supplier.

2. Definition

Material cost claim-In the production process of Party A, due to the quality problem of the purchased parts provided by the supplier, the product is returned and exchanged, and a claim for unqualified parts is required.

Concession claim-when the purchased parts provided by the supplier cannot meet the product quality requirements, but because there are no qualified products or the number of qualified products cannot meet Party A's production and other reasons, Party A needs to implement concession acceptance for this outsourced component. Claims to be made.

Labor claim-A claim for expenses incurred in the selection, handling, re-inspection, rework, rework, return or destruction of labor services such as software or hardware facilities provided by the supplier to Party A due to the supplier's reasons.

Additional Material Claims-Claims that need to be made for the loss of related environmental parts or materials due to the defect of the purchased parts provided by the supplier.

Outage claim-claim for loss caused by Party A's outage due to the quality of supplier parts or materials.

Supplementary claim-due to the quality of the supplier's products or services, the

quality of the corresponding assembly of the Party A at the OEM or the end customer, the OEM therefore submits a quality claim to Party A, and Party A will make an additional claim to the supplier .

Reputation claim-when the software provided by the supplier fails to meet the product quality requirements, when the product is delivered to the customer, Party A's quality reputation in the OEM is damaged. (Note: A clear amount claim is made at the OEM. At this time, because it already contains a claim for Party A's reputation, Party A will take the supplementary claim as the basis and will not consider the credit claim from the supplier.)

Claim settlement

3.1 Incoming Inspection Quality Claims

Claim calculation formula: claim amount = material waste claim + labor service claim + concession claim (determine the claim item according to the actual situation)

Material waste claim = unit price of product purchase \times 1.5 \times number of defective products

Labor service claim: According to the actual working hours, the unit price is 25 yuan per labor hour

Concession claim = unit price of purchased parts \times K% \times total number of purchased parts. (K value: the first time in one year that concession received the purchased part, k = 15; concession received the second time for the purchased part, k = 20; the third time and (The above or the difference is particularly serious, k = 50.)

3.2 Purchasing parts quality claims in online production and finished product inspection

Claim calculation formula: claim amount = material waste claim + labor service claim + additional material claim + line suspension claim + concession claim
(Determine the claim item based on the actual situation)

Material waste claim = unit price of product purchase \times 1.5 \times number of defective products

Labor service claim: According to the actual working hours, the unit price is 25 yuan per labor hour

Additional materials claim = unit price of related environmental parts or materials × quantity of loss

Loss of line suspension claim: If Party A's production line is stopped due to Party B's purchase parts, the claim will be made at 20 yuan / minute for 4 hours and less, and the claim will be 50 yuan / minute for more than 4 hours.

4. Disputes and Arbitration

After receiving the "Software Claim Form" of Party A, if Party B has any objection, it shall submit a reconsideration request to the Quality Department within three working days. If there is no reconsideration request after more than five working days, it shall be deemed as the default. For the reconsideration request of Party B, the Quality Department Organize the technical department, procurement department, production department and other relevant departments and suppliers to conduct arbitration together, and give an arbitration conclusion within three working days.

5. Claim method

Party A's software quality claim is based on Party B's first compensation method, that is, after Party B confirms the number of related quality defects and the degree of damage, the Quality Department submits a quality claim document to the relevant department and Party B. After the appeal period expires, the Finance Department according to the claim document Compensation information is directly deducted from Party B's payment (Note: The claim amount does not include tax).

Eight, quality assurance commitment

1. Party B promises to pass the ISO9001: 2008 third-party quality system certification and gradually meet the requirements of passing ISO / TS16949: 2009 standards.

2. Party B is obliged to accept Party A's second party quality evaluation, quality confirmation, risk assessment, production part approval, on-site acceptance and other related activities in accordance with Party A's regulations, and actively support and cooperate; Party A's acceptance cannot be waived Party B's responsibility.

3. Party B's quality commitment: The product quality guarantee period is the same as the entire vehicle's quality guarantee period. Party B promises to recover all problematic parts due to hardware or software quality problems under the national legal framework (such as the national automobile recall system), and undertake This results in all economic and reputational losses for Party A, the relevant OEM, and the end customer.

4. Party B shall provide Party A's related technical support and services in a timely manner and provide training if necessary.

Nine, daily management

1. Quality problem handling: Party B should respond within 8 hours, complete the temporary countermeasures within 24 hours, and reach the a stage of the pdca of the permanent countermeasures within two weeks.

Liability for breach of contract

2.1 In one of the following situations, early warning management methods are implemented: warning (Party A conducts batch review, reduction, adjustment of the supply ratio in the contract, or suspension of supply processing), serious warning (stopping or canceling supply) qualifications).

2.2 One of the following situations is handled as a warning:

a. Party B appears during the production process and the user's use process: a non-main item quality problem, inadequate service, the first time the quality problem is not rectified, or the quality requirements are not met after the quality improvement.

b. The software is serious and the function is serious.

2.3 One of the following situations shall be dealt with as a serious warning:

a. In software development, repeated requirements are not met.

b. Frequent errors occur during the production process and the user's use.

c. Party B's cumulative assessment items are negative items.

d. The OEM requires a veto, or there are quality problems above v2.

e. Refusing to execute the relevant documents or failing to meet the requirements after more than 2 rectifications.

f. There are 1 or more serious non-conformities in Party B's quality evaluation.

g. Those who cause fatal failure due to Party B's product quality problems and cannot be resolved in a timely manner, causing significant losses to the economy and reputation: ① those that cause direct economic losses of 30,000 yuan or more; ② those exposed by the company and other units

3. Performance evaluation

Party A ranks the supplier's quality performance evaluation monthly, and organizes a quality improvement promotion meeting based on the supplier's quality performance to assist in solving or improving the supplier's product quality.

4. Performance evaluation

project	Examination content	Assessment criteria
Acceptance rate (ppm)	Less than 100% of the indicators for the month	1000 yuan
	100% ~ 200% over the indicator for the month	2000 dollars
	Over 200% of indicators in the month	3000 yuan
Quality issues	One batch quality problem	1000 yuan
	Repeat the same quality issues during the quarter	2000 dollars
	Repeated more than three batch quality problems or two major quality problems during the year	5000 yuan
Attitude / communication	Party B's service is not timely or refuses service	500-5000 yuan, and bear the loss at the same time
	Party B's service causes the OEM to evaluate Party A's quality	500-1000 yuan, and bear the loss at the same time
	Quality information, feedback not required,	200 yuan

	every occurrence	
	Quality improvement measures were not completed on schedule, each time	200 yuan
	Quality information improvement measures need to be followed up repeatedly, and the assessment will be doubled each time	500-1000 yuan
	Supplied product with false self-inspection report	200 ~ 500 yuan
	Failure to submit functional and performance test reports on time	500 yuan, 50 yuan deducted daily
	Do not participate in quality improvement meeting	500 yuan
	Uncooperative and poor attitude	200-500 yuan

4.1 If the product quality problem still fails to meet the requirements after the third rectification, it will be assessed at 4 times the assessment amount of the relevant provisions. At the same time, Party A's quality department will propose to cancel Party B's supply qualification.

4.2 After receiving the notice of assessment, Party B will sign the contract within three working days. If there is any objection to the relevant assessment matters, the written appeal materials will be submitted to the quality department of Party A within three working days after receiving the assessment form. The signing of the assessment form will be considered as the default, and an additional attitude / communication assessment of 500-1000 yuan will be added.

5. Party B's daily quality information receiver, contact phone number, and email address

_____。

X. Other requirements of this agreement

1. The validity period of this agreement is one year from the date of signing. If

the two parties fail to sign a new agreement, this agreement will be automatically extended.

2. Party A may add or modify the contents of this agreement at any time in consultation with Party B according to the requirements of quality improvement. The changes are attached to this agreement.

3.The outstanding matters shall be settled by both parties through negotiation.

Signature bar

person A person B:

(Seal) (seal)

Authorized Agent (Signed): Authorized Agent (Signed):

Phone: Phone:

Fax: Fax:

Date: YYYY Date: YYYY

Excepted Result

During our conversation with your company, we found that your company did not complete a standard agreement on cooperation. Here, we provide your company with a supplier agreement. Greatly facilitate your company's business dealings with other companies. Through the supplier agreement, your company will achieve the following effects:

Can shorten the supply cycle of suppliers and increase supply flexibility;

Can reduce enterprise management costs and speed up capital turnover;

Improve the quality of software products;

Can strengthen communication with suppliers, improve the processing of orders, and improve the accuracy of material requirements;

Can share supplier's technology and innovation achievements, speed up product development speed, shorten product development cycle;

It can share management experience with suppliers and promote the improvement of the overall management level of the enterprise.

Establish and maintain agreements with suppliers. Determine what type of

purchase is required for each product or product component. The project needs to purchase some software and hardware to meet the needs of the project due to technical and time reasons. Evaluate whether the supplier meets the specified requirements and certain standards, and select the appropriate supplier. To select a supplier, first of all, the supplier must be able to provide products or services that meet the needs of the project. Sign and maintain formal agreements with suppliers. After determining the content to be purchased and selecting suppliers, it is necessary to sign an agreement with suppliers to clarify the rights and obligations of both parties. At the same time, the agreement will put forward specification requirements, time requirements and price requirements for the products and services provided by the supplier. This agreement is very important, has legal effect on both parties, and is also the benchmark used to manage supplier activities.

3.5 Process & product quality assurance

SG1: Adherence of the performed process and associated work products and services to applicable process descriptions, standards, and procedures is objectively evaluated.

SP1.1 Objectively evaluate the designed performed processes against the applicable process descriptions, standards, and procedures.

Problem: Your company does not evaluate the process against certain criteria. After the completion of a training session for this project, your company did not evaluate the training according to standards. For example, you did not use the validation set to check the accuracy rate.

Solution: We should set certain criteria for the project process and evaluate them objectively. For example, we should divide the data into two sets , training set and validation set. After a member uses the training set to obtain weights and completes a neural network, we should test it with the data in the validation set to objectively evaluate the accuracy of the neural network. In this way, we completed the test quickly, preventing a neural network error from affecting subsequent processes.

SP1.2 Objectively evaluate the designated work products and services

against the applicable process descriptions, standards, and procedures.

Problem: Your company has not established an objective standard for evaluating work products. For example, you have not determined a pass standard for the accuracy of the image processing system you have completed, nor have you tested it with this standard. This will lead to a loss of quality for your company's results.

Solution: Objective evaluation should be done on the products that have been completed. We should check the accuracy of image tracking and determine a standard. Only when the accuracy of the product reaches this standard can it be regarded as qualified. If it does not meet the criteria, we should find further improvements and then evaluate again.

SG1 Excepted result

After clear standards for processes and work products have been established, “qualified” standards are accurately defined, and your company can perform inspections against them. The standard of the process can ensure the smooth progress of the project, which greatly improves the work efficiency; the standard of the accuracy of the product can ensure the quality of the final image tracking model.

SG2: Noncompliance issues are objectively tracked and communicated, and resolution is ensured..

SP2.1: Communicate quality issues and ensure resolution of noncompliance issues with the staff and managers.

Problem: Your company's division of labor and communication are still insufficient. Although there is strong collaboration among members, there is no standardized assignment of tasks.

Solution: When your company find a problem with a member's task, other members should communicate with him objectively so that he understands the deficiencies of his work. Don't point it out too radically and subjectively. Instead, just talk about the problem.

SP2.2: Establish and maintain records of the quality assurance activities.

Problem: In this project, your company has not established a record of quality

assurance activities. The quality inspection is not recorded, so that when similar problems are encountered in the future, there will be no examples for reference.

Solution: Your company should record every activity related to quality assurance, which was not done before in this project. Establishing such records can effectively avoid repeated errors and greatly improve efficiency. For example, if the inspection of human image tracking is unsatisfactory, you find the cause of the non-conformity, and then you should record it. You should avoid the same problem when performing image tracking of cars.

SG2 Excepted result

After quality assurance communication and records, your company has a better division of labor and cooperation mechanism. And has left a record of improving quality, which can be used as a reference when encountering similar problems in the future. This is very helpful for improving the quality and efficiency in future projects.

3.6 Configuration management

purpose

The purpose of this plan is to define software project teams for configuration management activities, tasks, and responsibilities; define the tools, techniques, and methods that support configuration management activities and reporting.

Scope of application

This plan defines all configuration management activities of the project team during the project.

References

Configuration Management Guide

Configuration Item Change Procedure

"Configuration Audit Procedures"

"Baseline Generation Product Regulations"

Terms and acronyms

ccb: Software Configuration Control Committee, Change Control Committee

People and responsibilities

prompt:

(1) According to the role assignment in the Project Plan, determine the configuration manager and ccb (configuration control committee) members.

(2) The number of CCBs depends on the size of the project. Generally, the project manager is the person in charge of CCBs.

Roles	personnel	Responsibilities
Configuration administrator		<ol style="list-style-type: none">1. Formulate the Configuration Management Plan2. Create and maintain a configuration repository3. Release configuration items and baselines
CCB	Senior Manager, Project Manager, Product Manager, Technical Leader, Quality Manager, Configuration Engineer, Test Manager	<ol style="list-style-type: none">1. Authorize software baselines and identify configuration items / units2. Approval of software products generated by the software baseline library3. Ensure that every change in the baseline takes into account its relevant parts, and that each change must be approved before it can be implemented4. Ensure that all application changes are consistent, reviewed and approved.5. Ensure that every important modification and redo must be approved by scbb before proceeding
project		

manager		
Developer		
designer		
Integrator		
Testers		
Acceptance staff		

Software and hardware resources for configuration management

prompt:

(1) The configuration manager determines the configuration management software for this project, such as Microsoft Visual SourceSafe, Excel or CVS.

(2) The configuration administrator determines the computer resources (considering memory, external storage, cpu, etc.) according to the configuration management software used.

Configuration management software and hardware resources	Description
Configuration management software name	Company, software version, etc.

Configure library structure and permissions

Configuration library list

Types of	tool	Features	Description	Maintenance personnel
Development library	VSS	Uncontrolled, space for developers to work and test verification	Machine name: c23 IP: 10.6.50.53 Directory name: cmmi5 \ spi_vss	
Controlled library	VSS	Controlled, including baseline and non-baseline work products, only configuration administrators can modify	Machine name: c23 IP: 10.6.50.53 Directory name: cmmi5 \ spi_vss	
Baseline library	VSS	Controlled, establish baselines according to plan, and incorporate baseline products into the baseline database	Machine name: c23 IP: 10.6.50.53 Directory name: cmmi5 \ spi_vss	
Product Library	VSS	Controlled, store project final product without modification	Machine name: c23 IP: 10.6.50.53 Directory name: cmmi5 \ spi_vss	

Configuration library structure

The main configuration library structure is mainly used, and you can adjust it according to your actual situation.

Personnel authority

Roles	Name	log-in name	Configure library permissions
project manager		syp	Read-only, check in, check out, add, modify, delete
Senior Manager			
Organization-l evel qa			
Project-level qa			
Item-level cm			
Project team members			
client			
CCB			
Requirements Developer			
System designer			
Coding group leader			
Test team leader			
Testers			
Purchasing manager			
Training			

administrator			
customer service			
Product maintenance staff			
Project Analysis Team			
Project decision-making committee			

Configure library backup schedule

Tip: The configuration administrator makes a configuration database backup plan, indicating "who" (when) (where) the configuration database is backed up to "where".

Backup frequency, time	Backup person	Backup content, destination, method, etc.
Every Friday	Configuration administrator	Full backup, CD

Expected Result

We have provided a configuration management solution for your company, which will effectively standardize your company's management process. Through the adoption of a standard configuration management solution, we expect to achieve the following results:

All versions of the work product are retained and will not be lost or overwritten

All work results of the project are completely retained and can be well shared and used by other project team members

The loss caused by staff resignation is reduced, which also ensures the safety and

integrity of the project content results, and at the same time better solves the problem of disordered versions, which greatly saves the overall project cost.

4 Solution overview

After a detailed investigation and analysis of your company's software project development process, it provides your company with a software project management solution based on the CMMI standard specification. The collated solution is divided into three modules. The first is a summary of the original project. The second is to analyze the problems in the original project. The third is to propose specific solutions to the problems in the original project. At the same time, the expected results and expected benefits of your company based on the proposed solutions are given.

From the above analysis, we can see that if there is no standard management project, it is difficult to guarantee the profit margin of the project. For the entire company, the risk of loss is very large.

In your company's project development process, the original project has problems in cost, personnel, schedule, quality, and risk. This can actually be attributed to the problems caused by the lack of effective project management and the lack of effective projects. Management will lead to low maturity of the entire project. This may lead to a project being completed quickly, but this is only possible, and there is still a great risk of failure and other risks.

After adopting the software project management scheme proposed above, the entire process of software project development will be very standardized, and at the same time, the work efficiency of the entire project team will be greatly improved, project planning properly arranged, configuration management, risk management, etc. After good project management, adopting standardized management will reduce product research and development costs and other non-project development costs, greatly reduce product research and development costs, and increase the profit of the entire company.

Through our improvement, your company has successfully improved from CMMI level 1 to CMMI Level 3. We help your company manage and improve the

software engineering process, enhance the development and improvement ability, so as to develop high-quality software on time and within budget.

