**Analysis Of Target Detection**

**Based On**

**Machine Learning and Distributed Computing**

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V 2.0

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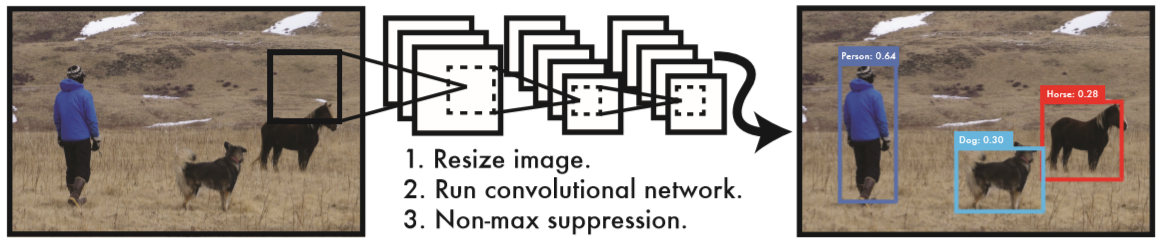
# Project Introduction

## 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.**

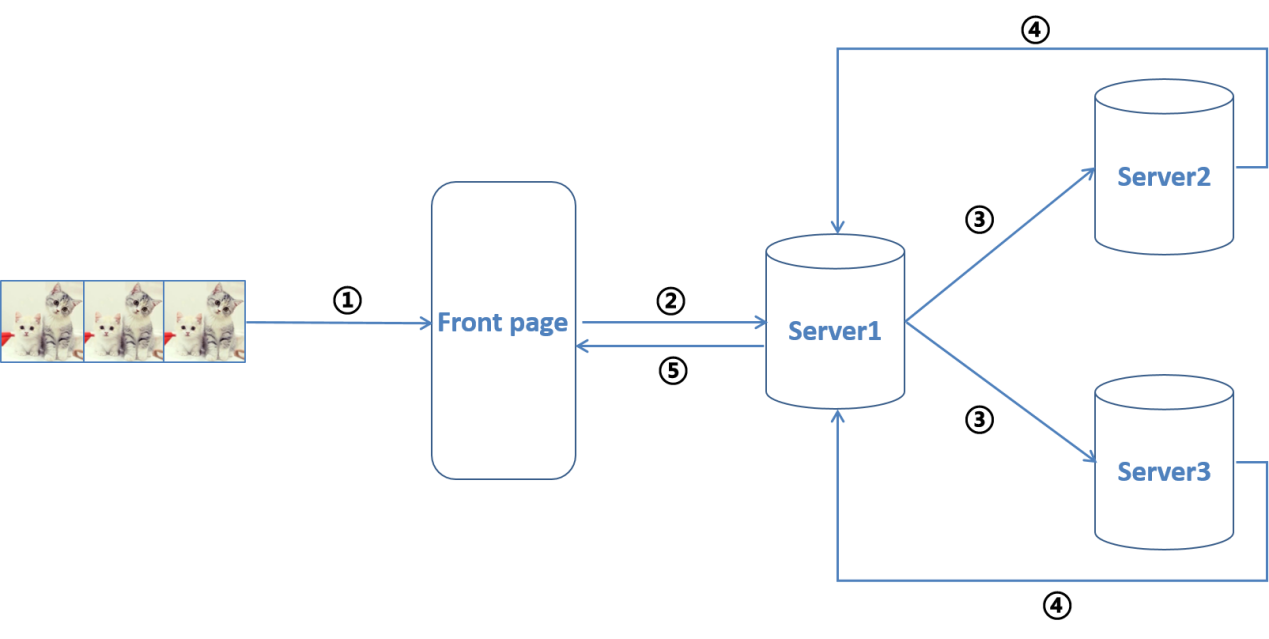
In addition, the analysis of target motion by computer vision also involves many different fields such as engineering, physics, and biology, such as drones, unmanned driving, and visual navigation of handling robots.

## 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, track, motorbike and trafficlight and so on, and processing service requests through multiple servers, we obtained approximate ideal image recognition.

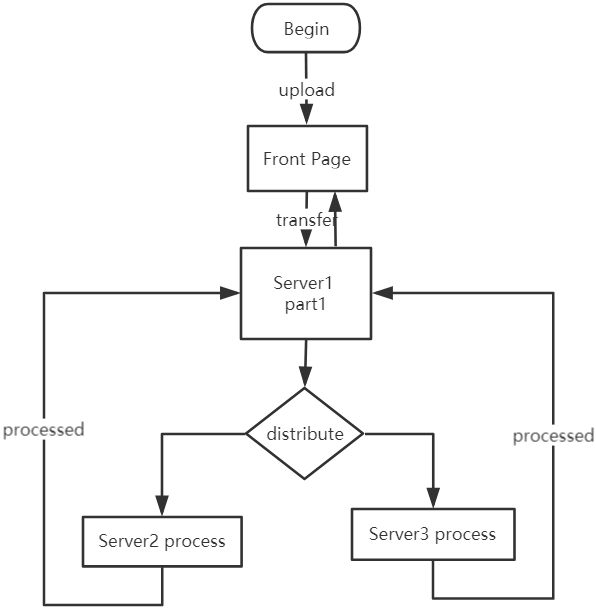
Figure 5 shows our distributed system architecture.



**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.

# The Problem Of the Project

## 2.1 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.

## 2.2 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.

### 2.2.1 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".

### 2.2.2 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.

### 2.2.3 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".

## 2.3 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.

### 2.3.1 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.

**2.3.2 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.

## 2.4 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.

## 2.5 Product Analysis

### 2.5.1 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 need 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.

### 2.5.2 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.

### 2.5.3 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.

## 2.6 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.

### 2.6.1 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.

### 2.6.2 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.

### 2.6.3 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.

### 2.6.4 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.

### **2.6.5 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.

# SOLUTIONS

## 3.1 Requirements management

### 3.1.1 Demand collection

Demand sources can come from market, user research, operation, testing, development, user feedback, product managers, etc. they will often ask you for demand in the normal work process, and will often interrupt your work to a certain extent. The correct way is to make clear the demand collection cycle, which can be a half month or a month for a summary of demand collection.

The normal process is to collect periodically, but there is a situation in which the business side never raises the demand. At this time, you need to take the initiative to talk with the business side to understand the business side's planning and participate in the business planning of the other side, which will make you have a higher understanding of the whole large product, and then dig more potential demand.

### 3.1.2 Demand sorting

After receiving the suggestions from the business side, we need to conduct a preliminary sorting, remove some invalid requirements, and record them into the requirements pool. How to eliminate invalid requirements: the demander will only tell you a solution. You need to ask the demander why, to understand the real requirements behind, to find out whether the existing solution has been solved or to save it in a better way online or offline. If you can, you don't need to put it in the demand pool.

After filtering the invalid requirements, record the remaining requirements into the requirements management tool (the management tool can be various online tools or excel, which I prefer personally). Requirements need to record information including requirements, requirements description, purpose and value, requirements source, requirements classification and requirements label. Requirements are classified into requirements to be discussed and functions to be developed. The requirements to be discussed are not clear whether they need to be done and how to do them. Such requirements can be discussed with other product colleagues or with business parties to reach a conclusion. Requirements to be developed: requirements that are clear and can be developed. Requirement label: divide several business domains according to product planning, each of which has clear objectives, and then divide these requirements into business domains. One advantage of this is that it classifies the scattered requirements and has a general goal, rather than a single point of demand. Take online education front-end business as an example, it can be divided into the following:

### 3.1.3 demand priority

The demand scheduling in actual work may be based on the product's own feeling, which is very unscientific. In the Internet industry, a popular way is to use Kano model to prioritize.

Demand is divided into exciting demand, expectation demand and basic demand. Priority: basic needs > expected needs > exciting needs. There are many introductions about Kano Model on the Internet. In Zhihu, an article by Ma dale is for your reference: Kano Kano model function priority ranking model.

Specific scheduling: the personal approach is to meet the needs with high priority, but it is also necessary to insert some lower priority needs in the middle, otherwise the excitability needs may never be ranked.

## 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 graSG 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.

1. 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.

1. Estimate progress

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

1. 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.

1. 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.

1. 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).

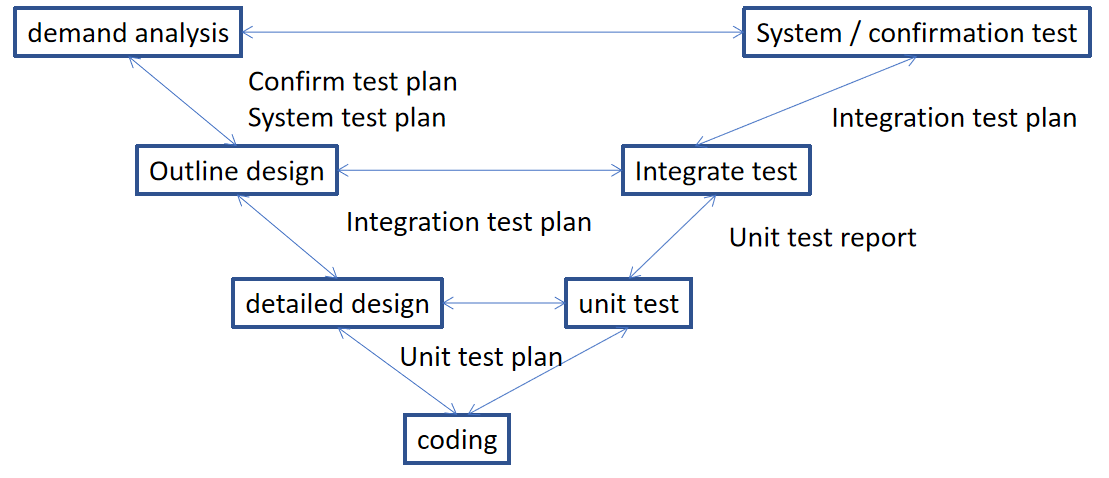
**SG 1.2 Establish estimates of work product and task attributes**

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 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.

## 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.**

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? 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.**

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. We must pay close attention to whether the risks have changed and consider whether new risks will occur.。

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

We 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.

**SP 1.7 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, we need to check the project status again to ensure that there are no errors in these key places.

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.**

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.

## 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):

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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 × 1.5 × 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 × K% × 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 × 1.5 × 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, every occurrence | 200 yuan |
| 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

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**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**

## 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.**

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.**

Objective evaluation should also 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.

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.**

When we 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.**

We 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, we find the cause of the non-conformity, and then we should record it. We should avoid the same problem when performing image tracking of cars.

## 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 |  | 1. Formulate the Configuration Management Plan 2. Create and maintain a configuration repository 3. Release configuration items and baselines |
| CCB | Senior Manager, Project Manager, Product Manager, Technical Leader, Quality Manager, Configuration Engineer, Test Manager | 1. Authorize software baselines and identify configuration items / units 2. Approval of software products generated by the software baseline library 3. Ensure that every change in the baseline takes into account its relevant parts, and that each change must be approved before it can be implemented 4. 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-level 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 |

## 3.7 Technical solution

SG1: Product or product-component solutions are selected from alternative solutions.

SP1.1 Develop detailed alternative solutions and selection criteria.

SP1.2 Evolve the operational concept, scenarios, and environments to describe the conditions, operating modes, and operating states specific to each product component.。

SP 1.3 Select the product-component solutions that best satisfy the criteria established.

Although the scheme of this project is relatively clear, we should not think that we do not need to consider multiple design schemes. Such an idea is very lazy and will cause great risks. We still need 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, we use python to encode, but we can also use alternative Matlab when python shows obvious disadvantages.

SG2 Product or product-components designs are developed.。

Once the best candidate is determined, specific design work can begin. SG2 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.。

SG3: Product components, and associated support documentation, are implemented from their designs.

In SG3, we can perform coding activities according to the design, and develop and maintain user documentation. The effect of the design in SG2 needs to be reflected in the specific coding. During the encoding process, we can judge whether the original scheme is good enough and decide whether to use alternatives, for example, to try another neural network. When coding, we should also adjust the previous design.