Design of Quality Management and Inspection Platform for Industrial Control Integration Based on AI

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Abstracts. With the application and development of industrial internet, the third-party software testing is facing new problems. In order to solve the problem of multi-region, distributed, multi-role and dynamic testing in third-party testing and realize the functions of centralized control, distributed management, traceability, resource sharing, paperless and networked office, this paper designs an integrated quality management testing platform based on AI for industrial control. The establishment of this platform will fill the gaps in the technology of integrated testing platform for third-party software testing and evaluation of China's industrial Internet, and further promote the construction of testing capability and quality management level of China's industrial Internet enterprises.

1. Introduction
As an important mode of software testing, independent third-party software testing has been developing for 20 years in China, making important contributions to the development of China’s software industry. In some important application fields in our country, such as e-government, entry, security, aviation, military, etc.[4], software testing and quality supervision process are gradually entrusted to the third party through the contract relationship, and the expected effect of ensuring the quality of software products has been achieved. This model has been gradually recognized by software users and enterprise users.

In this case, due to the lack of dedicated third-party test management tools, test teams spend relatively more energy on test management [3]. Testers often rely on experience to test the system, and the knowledge and skills of experienced testers are difficult to share, which is not conducive to the improvement of the overall software testing level.

With the application and promotion of Industrial Internet, the digital coverage of enterprises is realized through the application of information technology. For informationization and digitalization transformation, enterprises use digital workshop to construct an automation and informationization network[2] which covers all kinds of management processes horizontally and integrates industry data and enterprise data, and develops industrial intelligence application by combining industry, management rules and artificial intelligence algorithm accumulated by industry.

In this environment, the difficulty of software testing will increase. In addition to the problems of third-party software testing mentioned above, there are also some new problems in industrial software...
testing. In the process of industrial software testing, user field testing is an important stage. Real user field testing may find bugs that are difficult to find in the simulated test environment. In practice, the risk of field testing is relatively high. Traditional field testing is usually carried out at the last stage after full testing in non-user field testing environment and before delivery to users. However, many software under test need a long time of on-site testing to verify the quality more accurately. This is often in contradiction with the time limit of project delivery. It is easy to cause on-site testing "time-intensive, heavy tasks" after a long period of development and internal testing [1]. How to solve these problems is a challenge and an opportunity for the third-party evaluation organizations. It is necessary to establish an intelligent and efficient integrated implementation of software testing, which can not only cope with user site changes, but also cooperate with user site environment.

2. Overview of Platform
Through the construction of the core platform, it is to solve the problems in Industrial Internet testing as a starting point, through the application of new technologies, to achieve the purpose of providing testing services for users of industrial enterprises, thereby improving the quality of industrial software and escorting the development of industrial intelligence in China.

The construction of "AI-based integrated quality management and testing platform for industrial control" (referred to as "integrated platform") needs to meet the requirements of AI construction and the requirements of ISO 17025, ISO 17020 and CMA of ISO 9001, ISO 20000, ISO 27001 and CNAS. A quality management system platform is established to solve the multi-regional, distributed, multi-role and dynamic testing [2] in third-party testing. The functions of centralized control, distributed management, traceability, resource sharing, paperless and networked office are realized. At the same time, the platform also needs to solve the problem of knowledge sharing and reuse of use case base, establish domain test defect database, test specification, industry use case database and industry knowledge base, and improve the reuse rate of use case base and knowledge base through automatic acquisition, intelligent search, automatic matching and other technologies.

In addition, the integration platform needs to integrate multiple detection platforms, and to adapt to the complexity of third-party evaluation process through the protection of various testing tools. Reduce the economic investment of Industrial Internet software enterprises in purchasing tools and services for a certain type of testing, and intensively manage software evaluation to provide high quality, safe and credible services for enterprise users.

3. Platform design

![Platform Structure Diagram](image)

Figure 1. Platform structure
The security integrated vulnerability assessment system supports scanning, WEB scanning, security baseline detection and database detection. It provides two verification tools, one is general verification, the other is SQL injection verification, which can be verified by adding URLs and problem parameters manually. Through centralized management and periodic scanning, vulnerability scanning and overall assessment analysis of all systems or websites in the network environment can be carried out from multiple dimensions to provide effective risk assessment methods and reinforcement schemes for network managers.

Website monitoring and early warning platform can actively monitor website security issues and monitor website vulnerability. Mainly from three aspects of website usability, integrity and security, it monitors the website uninterruptedly in an all-round way. Its design idea is to help customers find problems actively, deal with and respond to problems in time, and facilitate the monitoring of large-scale websites, so as to reduce customer labor costs and so on. And provide professional repair advice to reduce safety risks and prevent them from happening. It also provides a website monitoring platform for continuous monitoring for 7 * 24 hours to maintain the continuity of monitoring. When a sudden attack occurs, timely input response and processing, build a sound website security system. For a wide range of websites, automation technology is used to monitor and reduce labor costs. It provides technical basis and key indicators for unified supervision by means of unified indicators for all-round monitoring.

With deep static detection technology, dynamic detection technology and source code scanning capabilities, comprehensive assessment of application security issues, accurate location of the root causes of the problem, present detailed details of security issues, and provide code repair examples. The following services can be provided:

1) Source Code Audit Service
   Through reviewing the development documents and source codes of industrial APP, the problems of logic structure, security and function realization of industrial APP were found.
   Audit the whole code quality from the security point of view, find out the potential safety hazards of industrial APP, and provide the corresponding safety reports and repair methods, so as to improve the overall security level of the application, and help the R&D personnel to enhance the security development capability.

2) Penetration Testing Service
   By means of simulated attack, with the help of manual and automation tools, we can find out the security loopholes and defects in industrial APP, help developers to repair and improve the security level of applications, and avoid the risks in subsequent operation, maintenance, audit and supervision.
   Test the application security, data security, communication security, authentication security and business security of industrial APP by manual service, and provide penetration test report remotely.

3) Android Application Detection
   The evaluation projects for Industrial Internet enterprises are mainly divided into seven categories: self-security, program source file security, local data storage security, communication data transmission security, identity authentication security, internal data interaction security, malicious attack prevention capability, covering 65 evaluation projects. In each category of evaluation projects, Industrial Internet enterprises can be supported to choose by themselves.

4) IOS Application Detection
   IOS evaluation projects for Industrial Internet enterprises mainly focus on mobile applications’ own security, encryption security, internal data security and data transmission security, covering a total of 26 evaluation projects. In each evaluation project, Industrial Internet enterprises can be supported to choose by themselves.
   Improving self-management level is of great significance to the development of the company and win the trust of customers. As a third-party evaluation company, through CMA and CNAS certification, it shows that it has the technical ability to carry out testing and calibration services according to the corresponding accreditation criteria. In order to strengthen internal quality management standards, improve work efficiency, provide customers with high-quality, safe and credible services, enhance
market competitiveness, win the trust of government departments and all sectors of society, it is necessary to build a third-party evaluation company. It is particularly important to develop laboratory testing platform.

As an important part of the "AI-based industrial control integrated quality management testing platform", this platform is an important reflection of the business model of the third-party evaluation company. The platform integrates the testing of APP detection platform and security detection platform by using AI and cloud computing technology. It can be provided to industrial enterprises by means of micro-service, and can test the Industrial Internet.

4. Conclusion
At present, "Integration Platform" has no strong competitors in the industry. The effective implementation of this project may cultivate the leader in this direction and improve the company’s influence in the industry. The establishment of process standards and test validation for integrated platform of third-party software testing and evaluation will fill the gaps in the technology of integrated platform of third-party software testing and evaluation of Industrial Internet in China, and further promote the construction of test capability and quality management level of Industrial Internet enterprises in China. Establishing an "integrated platform" will play an exemplary role in promoting the development of technical capabilities of third-party software testing and evaluation institutions in China, and it has very important practical significance.

Through the construction of "integration platform", we can promote the rapid development of Industrial Internet, reduce the security risks of software enterprises, and avoid the security problems in software development, which will have a serious impact on the economy and society.

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