Application of Intelligent Integration Technology for Automatic Monitoring of Urban Rail Transit Engineering

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Abstract. Intelligent integration technology is used to monitor urban rail transit system. Intelligent integration technology can provide real-time information about the operation of the whole urban rail transit system, including its safety and reliability. What is the application of intelligent integration technology in automatic monitoring of urban rail transit engineering? It is a system that provides real-time data about the performance and operation of urban rail transit system. Automatic monitoring is to continuously and real-time measure and record the data of various parameters related to the performance and condition of urban rail transit system. The information obtained from these measurements will be used for maintenance planning, system optimization, traffic management and other operational activities.

Keywords: rail transit · Automatic monitoring · System operation

1 Introduction

The construction quantity and scale of urban rail transit projects are becoming larger and larger. The society also puts forward new requirements for the monitoring quality and efficiency of projects [1]. Urban rail transit project is the most critical main force in urban public transport, and it is also a key project running through the lifeline of the city. However, the construction of rail transit in the middle of densely populated cities is a high-risk project containing a variety of dangers. Therefore, it is necessary to adopt scientific and reasonable technology to ensure the safety of itself and the surrounding environment. In order to improve the scientificity and accuracy of urban rail transit engineering monitoring data, relevant units should innovate and reform with information technology more in line with the requirements of the times, make the establishment of traffic monitoring points more scientific and reasonable according to the existing urban planning and engineering construction, reduce the possibility of wrong data, and actively adopt automatic monitoring and management intelligent system, Comprehensively improve the accuracy, effectiveness and scientificity of urban rail transit engineering monitoring information, and lay a good foundation for the development of China's transportation industry.

Generally speaking, in the short term, rail transit must be a key social development project. It will not be replaced, but will be carried forward. In the long run, no one

J. C. Hung et al. (Eds.): FC 2023, LNEE 1132, pp. 205–210, 2024.
https://doi.org/10.1007/978-981-99-9538-7_30

can guarantee whether there will be more rapid, efficient, concise and environmentally friendly transportation modes in the future, but it can be predicted that even if there are, rail transit will still exist. Just like the famous saying of Mr. Lu Xun at that time: there is no road in the world [2]. When more people go, it becomes a road. As long as there are people, how to achieve more convenient and efficient transportation is an essential topic, just as even now there are high-speed railways and expressways, traditional highways, national highways and even green cars have not lost their charm.

2 Related Work

2.1 Automatic Detection System

For modern software R & D, continuous, rapid, high-quality and low-risk delivery of demand characteristics is the main demand of business for R & D. To achieve this, in addition to good architecture design and excellent engineering ability, fast and reliable test feedback is also a very important part. To achieve this, we need to rely on test automation [3]. Figure 1 below shows the automatic detection and testing system.

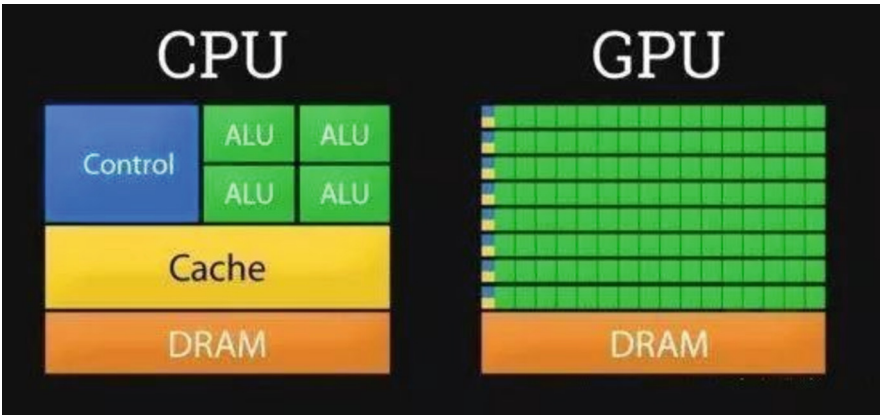

Fig. 1. Automatic testing system

As a Devops platform for enterprise developers, cloud efficiency provides rich capabilities to help you implement test automation practice in Devops process. Focus on the predictive maintenance of motor equipment, and reduce the loss of unplanned shutdown of equipment caused by motor failure as the goal of phase I. Adopt the principle of "overall planning, standardization and distributed implementation" to gradually carry out predictive maintenance of rotating equipment. Taking the "astrologer" 5g edge calculator as the core hardware, the characterization data (vibration, noise and temperature) of the field equipment under different operating conditions are extracted through the preprocessing module, and the various mechanical characteristic values of the equipment vibration, noise and temperature are compared with the historical characteristic values under various operating conditions stored in the database server [4], Using the

trained machine learning algorithm model, identify the real-time operation state (normal or abnormal) of the production equipment, and then evaluate and analyze the fertility fault type and health evaluation index of each equipment, which will be displayed in the front-end application UI interface in real time.

The astrologer 5g edge calculator is used as the core to realize the real-time monitoring of equipment operation status data, collect the status data before, during and after equipment failure, establish the mathematical and logical relationship between equipment status data and equipment failure phenomenon, build the equipment failure analysis model library, and realize the intelligent analysis of equipment failure causes and maintenance decision-making.

1. Test automation cases are stored in Git warehouse of cloud effect code platform;
2. Test steps used to execute test automation, and create custom step capability based on cloud effect
3. Cloud pipeline that triggers and concatenates code, builds and automates testing;
4. Notification mechanism;
5. The quality data report can be directly displayed in the pipeline test results, or the data can be sent to the self built data report service for display.

2.2 Rail Transit Engineering Inspection

In the construction process of many new urban rail transit projects, a certain number of safety accidents have occurred, and the traditional risk mechanism can not adapt to the modern social environment. Therefore, the use of intelligent integration technology to provide innovative and optimization means for the automatic monitoring of urban rail transit projects is not only a problem that must be considered in the development process of relevant units, but also a research topic of many transportation units at this stage. Always in a controllable range and state, and give full play to the maximum utility of monitoring in urban rail transit engineering. At present, the monitoring of rail transit in many cities in China is still in the traditional manual operation stage. Even if a certain link has been automated, the project as a whole lacks practical linkage and application. With the continuous development of science and technology, China has made great breakthroughs in automatic monitoring instruments, wireless transmission system and computer technology, which can gradually realize the assumption and implementation of automatic monitoring of urban rail transit engineering, and make comprehensive linkage become the basic function of automation application. Relevant departments shall use the integrated technology to optimize the urban rail transit project, improve the original risk monitoring loopholes, realize the effectiveness and timeliness of urban rail transit risk monitoring, ensure that the track can have clear safety guarantee in the process of construction and operation, and finally realize the dynamic monitoring and management of on-site conditions. The trend of dynamic detection and management is shown in Fig. 2 below.

The construction department should strengthen the monitoring intensity for some risk prone locations in order to reduce the possibility of safety accidents. For example, setting monitoring points at the location of deep foundation pit and grass-roots slope, strengthening the inspection of the construction site and surrounding environment, and timely feeding back the monitored data and conditions to the construction department

Fig. 2. Dynamic detection and management trends

can effectively reduce the risks and safety problems encountered in the construction process. With the continuous expansion of the number and area of cities, the difficulty of construction monitoring of urban rail transit projects is becoming more and more obvious. Using scientific and reasonable technical means to provide effective guarantee is one of the measures that can effectively maintain urban safety.

3 Research on the Application of Intelligent Integration Technology for Automatic Monitoring of Urban Rail Transit Engineering

Before the application of intelligent rail transit technology, it is necessary to make timely preparations for the practical application of urban rail transit automation technology. Based on the application experience of automatic monitoring intelligent integration technology and combined with the specific situation of urban rail transit project, actively carry out frame design.

The framework design of automatic monitoring intelligent integration technology is to integrate and manage the monitoring technology, make overall planning, scientifically integrate it into the automatic monitoring system, and coordinate the urban rail transit project to complete the monitoring task. Intelligent integration technology involves signal transmission, diversified software, sensors and other technologies. It integrates urban rail transit engineering to carry out all-round and multi angle monitoring in a micro and macro way. At the same time, it also takes into account the construction status of envelope structure and the application of key technologies in rail transit engineering. With reference to the relevant data of automatic monitoring, this paper analyzes the future development trend of urban rail transit project, and scientifically prevents major accidents of urban rail transit while ensuring the safety of rail transit project. The intelligent integration technology framework also includes the intelligent software system, which increases the link of early warning analysis model while constantly monitoring the track project, timely transmits the project information and early warning analysis results for the intelligent monitoring software platform, and achieves the synchronous adjustment of risk early warning scheme.

The reference point on the track is the core control point in the urban traffic monitoring system, and it is also the necessary basis for the construction department to carry out the measurement data. Generally, the setting position of the reference point is preferably above the relatively stable bedrock, which is relatively safe. Therefore, it

can provide a basic guarantee for the stability of the monitoring data of the reference point. When carrying out deformation monitoring, relevant departments shall carry out re measurement after determining the position of the datum point, and study and analyze the results of the re measurement data. Once there is a large gap between the analysis, that is, the instability of the datum point, the position of the datum point shall be adjusted immediately to ensure the smooth progress of the detection work. In addition, after the location of the reference point is determined, relevant personnel shall plan the scope of tasks to be contracted for the monitoring point, and ensure that the monitoring work will not be covered or blocked by objective factors according to the actual situation of urban rail transit project construction and external environmental factors. Generally, the polar coordinate method will be adopted in the deformation monitoring of urban rail transit projects. After the datum point is determined, the monitoring instrument will determine the accuracy of the measurement.

4 Simulation Analysis

In order to improve the monitoring quality and efficiency of urban rail transit projects, relevant departments should adopt more advanced technology and equipment in order to obtain more scientific and reasonable data. For the automated test of the whole product or a subsystem, we suggest that the automated test cases be kept in a separate code warehouse; For automated testing for a specific application, we suggest that its test cases be saved in the code warehouse of the application and use the same branch as the development (recommended).

Managing automated test cases and application code in the same code base has many advantages:

1. Test cases and codes match each other and are up-to-date, so that automated testing can be involved in time in the development stage;
2. Directly reuse the branch mode of development without considering the version management of automatic use cases;
3. Develop and test excellent practices such as ATDD based on git code base and close cooperation;
4. It is easy to integrate into the pipeline. When the test code or development code is changed, it can be quickly executed and fed back, so as to speed up the positioning and repair of problems.

Therefore, the transportation department will install the system and equipment of intelligent monitoring integration technology with a high degree of automation at the road section that needs to be monitored, and form a more flexible linkage mode with the originally set safety device in the process of practical application, which can make the obtained data more comprehensive and true. For any hidden corner, the monitoring efforts should be strengthened, usually automatic monitoring intelligent integration technology.

5 Conclusion

To sum up, for urban rail transit engineering, the application of automatic monitoring and intelligent integration technology is an important way for intelligent development, and it is also an effective method to improve the monitoring level. In the practical application of automatic monitoring intelligent integration technology, on the basis of recognizing its application value, it is necessary to start from different rail transit construction links, select monitoring equipment, formulate monitoring scheme, and clarify the monitoring purpose and precautions. Therefore, the application efficiency of automatic monitoring and intelligent integration technology is improved, the ideal monitoring effect is achieved, and the monitoring ability of urban rail transit project is further strengthened.

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