On the Research of Three-dimensional Model Supported by Computer Data Collection in the Teaching of Highway Route Selection

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Abstract. With the continuous development of our society and technology, computer is becoming more and more common, which has been widely used in our life and it has brought great convenience to our life. Computer has a lot of advantages, it has large storage capacity and fast data processing speed. With the characteristics of high speed and high precision, many highway departments have also actively quoted the relevant advanced technology in the computer now and adopt the data acquisition system in the aspect of releasing high data, which provides great convenience for the realization of highway digital management. At present, the computer data acquisition system is also widely used in highway detectors. Through data collection, it can allow the highway department to quickly, accurately grasp the status of each section of the highway and take effective measures in time to see if damage occurs. It can be said that computer data collection system effectively promotes the efficiency of highway work, it improves the quality of work[1].

Keywords: Three-Dimensional Model, Highway Route Selection, Computer Data Collection

1. The main window of the computer data acquisition system

1.1. System main window
The main window of computer data acquisition has a panel called virtual instrument, which has a front-end operation interface, and can work alternately between humans and machines. It can deal with various problems in time. The data collected by the computer can be effectively processed. The steps of data display, query, waveform processing, waveform marking, data statistical calculation, and regression analysis are all very timely. After that, these data can be copied in the form of pictures or reports, which is very convenient[2].

In the control panel of the system, we can achieve many functions, because there are many function buttons, such as the copper drum motor, we can perform operations of different nature. These functions are composed of text label controls. During the use of this main window, we can move and zoom in and out at will, but if we want to close this page, we can’t use the control button. On this page,
we can see the initial state of the frame of the operation interface is evenly distributed. If you need to adjust it, only need to drag the border with the mouse. If we want to show the observation data more clearly, we only need to use the mouse below the motor to zoom in. If you want to query previous messages and data, you can directly click on the historical message bar, and at the same time, you can save and process historical messages.

1.2. I/O interface
The I/O interface driver is carried out in the background. We cannot directly observe all aspects of data. The driver is mainly used to manage and control the hardware circuit so as to realize the instant collection of data and the analog-to-digital conversion and transmission. The output and display of the results must be instantaneous, and it can be displayed immediately. After setting the relevant parameters on the system page, the parameter file will be automatically saved, so that every time the computer is started, the file will automatically restore the settings, and the data will be more secure and will not be lost. The parameters in the drive system are different and can be classified according to the different parameters. It is divided into two categories. One is for the configuration of the entire system, in order to see if there is an error, the operator checks the entire system with the parameters provided by the system. This parameter has a wide range of applications and can be applied to all types of this system[3]. In addition, there is another parameter, but the scope of use is very narrow. Through the above understanding, we can understand some basic operations of the computer acquisition system and realize different functions through various buttons on the page.

2. Channel calibration and signal preprocessing

2.1. Channel calibration
The computer data first collects the data, and the collected information needs to be further converted. First, we need to use a data acquisition card to measure. The measured data information is essentially a voltage value. However, in actual applications, national standards must be used to display information, graphics, and text. Therefore, we cannot do it without manual input of the data we want to use, so that the data meets the national standards and requirements. The artificial bottom hole performs the data conversion coefficient and the whole process of the data signal to convert the data into the required form.

2.2. Signal preprocessing
What we call information preprocessing is to drive the various software interfaces of the hardware card through the background, and at the same time process the digital data generated in the system. In actual operation, we do not need to save the academician data, which will occupy memory, so we have to filter this information and save valuable information, such as the maximum value, minimum value, and valley of data information. Information such as value and peak value can be saved. In addition, the preprocessing of the system can also be through data conversion, compression, etc[4]. For example: in the process of rutting experiment, the speed of each car passing through the experiment is the loading speed of the car. In the process of data processing, we preprocess the data through logical judgment. Compared with the maximum and minimum data processing, this method is much simpler. Use the search function to find the data for comparison. Why can this happen? Because there is only one maximum and minimum under any circumstances, the acquisition of information data is still very simple. The processing of maximum and minimum values is much simpler than the processing of valley and peak values. In contrast, valley and peak values are processed. At times, the requirements for the environment are relatively high, and a safe environment is needed, which cannot be affected by other interference systems, otherwise the judgment data will be inaccurate. Therefore, when processing these two pieces of information, you must find out the valley and peak values in the channel first, and also set up anti-interference devices in the channel. The purpose of this is for the accuracy of data collection, so as to obtain more accurate peaks and valleys[5].
3. Data processing

3.1. Playback waveform and intuitive data processing
The functions of replaying waveforms, visually observing data, and processing information are all essential, which are also the most basic functions of a computer data acquisition system. To play back the waveform, we can move the mouse until it becomes a cross. Move the cursor to the frame, so that the position of the mouse can be displayed. It is very convenient to observe, so that the data in the curve will be synchronized in the menu bar. At this time, the digital software for revisiting the waveform graph will be activated, and the noise interference signal in the waveform graph will be processed. The software does not consider whether the information is useful or not during processing, so in actual applications, we need to combine specific conditions and we set the parameters. If you want to zoom in and observe the waveform, just move our mouse and click to complete the operation. In this graph, we can only see the maximum and minimum spikes, and only a small part of the data points can be displayed\cite{6}. Therefore, in practice, we have to use a combination of dots and lines to draw graphics, so that the data obtained is more comprehensive.

3.2. Playback waveform and special point processing
When the computer acquisition system is applied to collect data on the highway, it will form some complex waveform data, which has no reference value at all. We also take the rutting experiment as an example. On road surfaces of different materials, the rut depth produced by the same car is different. If in this experiment, we only let the vehicle pass on the road once, then the sensor will react to each situation of the rut one by one, and then the data will be processed to draw the graph, and we can get a graph. The highest point, lowest point, and data coordinates are all clear at a glance. We can find through observation that the depth of the rut will change according to the change of time\cite{7}. The condition of the road surface will also seriously affect the data, such as the level of the road surface. As the vehicle continues to move in the experiment, its position will also change.

![Figure 1. Rutting data processing curve.](image)

In order to make data processing faster and more accurate in the process of computer data collection, we must establish related engines. The engine must contain the following contents: peaks, valleys, time points, data points, synchronization values, etc. information. In this way, the data search is very convenient, and at the same time, it can be truthfully drawn online. If you want to open the correct index file, you must perform related processing when you open the data file for the first time.

4. Data output and printing of corresponding reports
Computer data collection olefins are widely used on highways, and many related data collection and experiments have been done before, and data must be processed. But in order to make the system more widely used and open, the operator can use the software in the PC. The maximum, minimum and some special values in this data can be displayed in the form of text, and the users can also use Data processing software to process the data, which is very convenient to use. The overall preview of the data only needs to use software such as office. When the data meets the requirements of the standard, we can print it out on paper for easy storage\cite{8}.

5. Conclusion
The application of computer data collection system in the highway department can be said to be of great significance. It improves the work efficiency of the highway department, and can make the information collection of the highway department more convenient, accurate and fast. It will bring great significance to the development of the highway department. It also saves a lot of manpower and material resources and makes major contributions.

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Analysis of Factors Affecting Expressway Route Selection and Research on Reasonable Design.

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