

Research on network environment application model based on multi information fusion theory

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Abstract

As a new theory and technology, information fusion provides advanced and reliable theory and method for the information processing and decision making in the information age. This paper establishes a framework of multi-sensor and full source information fusion theory based on network environment, and establishes the information fusion model and implementation method based on multi-sensors and network environment. In view of the complexity and universality of information fusion, this paper is aimed at the fuzzy theory, neural network theory and the fusion of the information fusion. Based on knowledge fault diagnosis and the detection of industrial field bus and the connection of Internet/Intranet, it is studied on the subject of multi platform network transmission

Keywords

fusion, membership function, fuzzy optimization, FNN, inference, failure diagnosis, field bus, network connection, network communication.

1. Introduction

Information fusion is a new technology, which provides an advanced and reliable method for the information processing and decision making in the information age[1]. In this paper, the problems in the field of information fusion, and the problems that can not be solved, are deeply studied. In the analysis of information fusion, the core is the abstract and integration of various information sources, and the modeling of complex non structural systems. Information fusion based on multi-sensors and network environment, we must fuse multi-sensor information and explore new methods of integration. Fuzzy optimization method and fuzzy pattern recognition neural network method are studied[2].

At the same time, the research and design of the intelligent node detection system based on CAN and the cross platform network transmission based on Java are realized, which lays the foundation of hardware and network for the multi-sensor information fusion system. Further, how to study the connection and protocol conversion of a variety of networks is studied, and the theory and technical preparation for the establishment of a unified global data and control network are studied. The application of the new model, structure and method, creating a precedent for the application of information fusion system in the industry, improve the performance of the network system, but also make the system to achieve the practical level, for the future development of the industry has laid a theoretical and practical basis. At the same time, it will provide a more effective method to solve the problem of integration, and provide the model and analysis method for many information processing problems in the information age.

2. Establishment of theoretical system

For multi-sensor fusion systems, fusion can occur on many different levels. By the analysis and comparison, the level structure of high, medium and low level three level fusion is summarized. Advanced fusion is the fusion of local decision making, decision fusion is usually determined by binary input. Middle level fusion is the fusion of the local feature parameters, the medium level data fusion is the characteristic statistics[3]. Low level fusion is the fusion of the raw data generated from

the various sensors, with multiple inputs that may eliminate a certain amount of noise and uncertainty.

The higher the fusion level, the less the amount of information transmitted through the system. So as to reduce the time required to complete the decision-making. And for the lower level convergence it will have more information on the system to be effective. Therefore, the integrated system (see Figure 2.1) can make a more comprehensive decision and provide a more detailed description of the system environment.

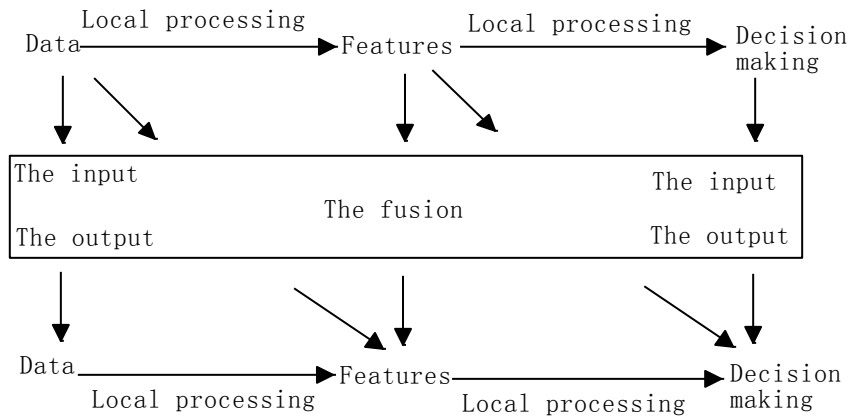


Figure 2.1 a network of processing steps involved in a local processing of a network at different levels of the hierarchy, and the data is transmitted over the network. A system can be described in a system to do three things that will be transmitted from each sensor to the original data into a common representation, extract local features, or the original data from various sensors to extract characteristics. Finally, it can make the system decision

3. Research on fuzzy evaluation method

The study of multi-objective fuzzy optimization model has special significance for the practical application, and many complex nonlinear decision problems have to be optimized. And this kind of problem is very bad. It can only be judged according to the individual indicators, can not be integrated into all the factors that affect. Based on multi-sensor information fusion method, the complex system is modeled and effectively, and the fuzzy optimization system with relative membership function is used to evaluate the complex system modeling problem which can not be solved by traditional methods[4]. In this paper, the relative membership functions of fuzzy sets are used to describe the sensor data and the practical problems of fuzzy theory are solved. Through the establishment of fuzzy optimization evaluation system of power supply system based on relative membership function, the concept of adjusting coefficient is introduced, and the effective use of power system is obtained; 3 through the establishment of the motor operation efficiency evaluation model, this paper makes a comparison and analysis of the factors affecting the evaluation results.

4. Fusion method of neural network and fuzzy theory

Artificial neural network and fuzzy set theory are artificial intelligence methods to solve complex problems. They are based on the given input / output information. The system nonlinear input / output model is established. Although the neural network has a strong adaptive learning ability to the environment. However, from the perspective of system modeling, it is a typical black box (Black Box) learning model[5]. At the same time, the artificial neural network has a strong dependence on the sample data. That is, only the sample data is enough, it is possible to guarantee the generalization ability of the network. For the system with less sample data and other qualitative information, it can not get satisfactory results. On the contrary, the fuzzy system is built on the basis of the law that is easily accepted by people, and can be reflected in the system. However, the ability of the fuzzy system to adapt to the changes of the system is weak, lack of the ability of self-learning. Therefore, in

practice, often rely on the experience of the experts "manual" adjustment, real-time is not ideal, and the numerical calculation ability is poor[6].

From the connection form and function of the fuzzy neural network, the fusion of neural network and fuzzy system is divided into four categories: 1) loose type. 2) network learning model. 3) structure equivalent. 4) neural network model fuzzy information input / output.

5. System implementation and Network interconnection

The fundamental purpose of knowledge expression is to realize the knowledge representation which is in line with the human habit, but also to help the identification of the machine. This intermediate form is convenient for reasoning, and it is the basis of correct reasoning. A fusion reasoning strategy based on knowledge processing technology is established. The framework and realization method of the fault diagnosis system of industrial equipment is established by using the knowledge based reasoning method, and it is applied to the actual industrial equipment and electrical fault diagnosis system[7]. Because of the signal acquisition (see Figure 5.1) part in addition to the monitoring tasks of its own node, it also communicates with the host computer, receive commands from the host, and send the monitoring data of the node. So this part should have CAN controller. At present, the CAN controller is mainly independent and in two forms. In practical application, the CAN controller must be combined with the microprocessor to realize the function of CAN communication so the controller with high performance CAN communication capability is used to make the structure of the nodes stable and reliable[8].

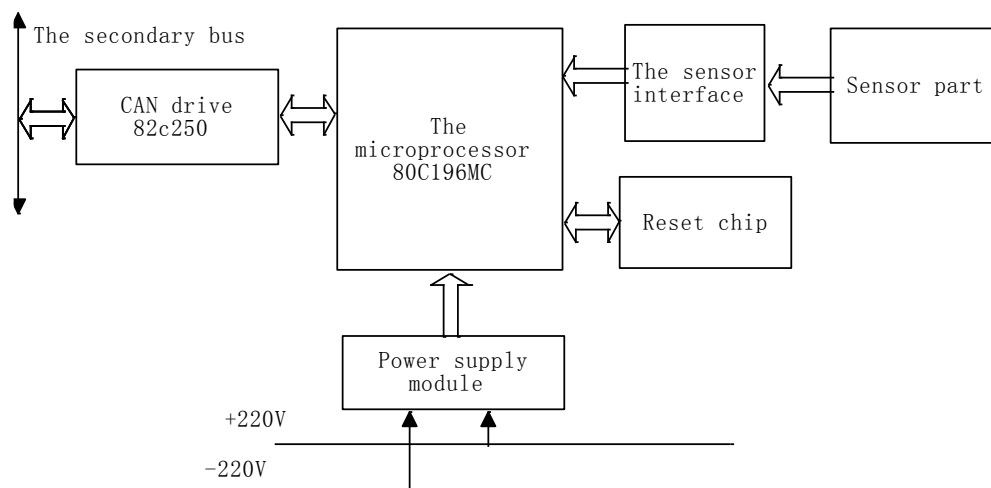


Figure 5.1 Signal acquisition is based on the 196MC 80C microcontroller as the core of the signal acquisition board to complete the work, it is responsible for monitoring the status of the device signal.

Using the method of information fusion, this paper will make a seamless connection between the industrial enterprises' management network and the field bus control network. In this paper, the management of industrial enterprises and the field bus control network are integrated. Using CAN for TCP/IP and NOVELL local area management network, we will extend the communication network structure of CIMS/CIPS system to the production site equipment, so as to realize the integration of micro control of industrial scene and macro control decision of enterprises; use the method of general internal data format to realize the protocol conversion design of the special gateway, and complete the address change from the table. And the problem of data frame format conversion is solved by using the packet length conversion technology and the flow control technology. Internet, Intranet, and Infranet (local control network) are unified, then we form a unified data and control network, which lays a framework and foundation for the future of network society[9].

The communication mechanism of the measurement and control network based on Java system is designed, which solves the problem of reliable transmission of multi platform information in information fusion system: 1 this paper establishes a communication circuit based on Socket and the

selected resource, and uses the network to read and write resource information flow:2 we use Java to write the JDBC application Application and Java Applet, to achieve the distribution of different databases on the network to access, the development of Web applications, such as network database:3. The method of network data file access based on input / output stream and URL is established. The process of network communication becomes the process of processing standard stream object.

6. Conclusion

This topic uses the idea of information fusion to solve the multi-sensor information based on the network environment. The key issues in the process of information fusion based on multi-sensors and network environment are established. Implementation method, for the field of technological innovation and practical application has a certain guiding significance. The main results and conclusions of the research are as follows:1) a theoretical system and structure model of information fusion based on multi-sensors and network environment is established;2) a fuzzy optimization evaluation system of power supply system based on multi-objective fuzzy optimization theory is established;3) the theory frame of neural network and fuzzy theory is put forward, and the algorithm of fuzzy pattern recognition neural network prediction model is improved;4) solve the problem of qualitative analysis of complex system forecast;5) the framework and method of fault diagnosis system for industrial equipment based on knowledge are established; research the communication mechanism based on Java system and program design.

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