Study on Multimedia Expert Diagnostic System of Chicken Diseases

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Abstract

Adopting the method of user weighting fuzzy mathematics, the author accomplished the subject titled "Study on Expert System of Chicken's Common Diseases Diagnostics", which could properly diagnose 30 kinds of chicken's common diseases and the accordance rate reached 80% verified through 244 disease cases. On the basis of the accomplishment, the multimedia technology was adopted further more to establish a system, which integrated with the input, display, query, and processing of sound, picture and text etc., combined with the previous chicken disease diagnostic expert system, make the output information of computer more rich and comprehensive, and the accordance rate of disease diagnosis could be improved. The system consists of database, knowledge base, graphics and picture base. This system is easy to operate and interface of which is vivid and intuitive. It could output diagnostic result and prescribe rapidly, so that, such a system is not only adapted to large, medium chicken farm but also to grass-roots veterinary station for developing health care and disease diagnosing. It is sure that the system could have wide prospect of application.

Keywords:

Chicken Disease, Expert System, Multimedia

By adopting improved Bayesian models, Xu jianqin conducted an experiment concerning chicken disease diagnosis using computer in 1992, but the accordance rate shows only 40.5% after test and verification of 121 disease cases; by using fuzzy mathematic and the approach of user secondary weighting, an expert system on common chicken disease diagnosis (ESCCD) was carried out in 1994, the accordance rate reached 80% validated by 244 disease cases. Because of various reasons, the understanding of many users is different from the actual presentation of clinical symptom and pathological dissection while using the system, which restricted the ability of computer diagnosing diseases, so it is necessary to search a new approach and method.

1. System design

On the basis of original chicken disease diagnosis expert system, utilizing multimedia technology, an efficient multimedia expert system on chicken disease diagnosis was studied, based on fuzzy reasoning mechanism and reason interpreting system. By using computer technology, various media was integrated and processed based on original system, including text, sound and picture, so user can obtain pathologic dissection picture of specified organ and clinical symptom cartoon showing different stage of ill chicken on computer, and compare the clinical symptom and pathologic dissection with the actual symptom of ill chicken while inputting some related information, so user can input more precise information, thus the ability of computer on disease diagnosing was improved.

1.1. Collecting of ill chicken's clinic symptom and pathological dissection pictures.

By using MUSTEK9600 color scanner, pathological dissection picture, text and data of various chicken diseases was scanned; by using sound card, sound was collected and transformed; by using MGA RAINBOW video card, video was captured; all of above became the external condition for computer to have the ability to make multimedia system.

1.2. Database design of ill chicken picture.

By using FoxPro 5.0 software, multimedia database of ill chicken's pathological dissection picture was established, also the index of database was created, the picture can be searched based upon key words. One disease may have several pathological dissection pictures, and that one pathological dissection picture also may be corresponding to several diseases. Thus, it's the most important technical key to the system that the corresponding relationship between picture and disease should be reasonably established.
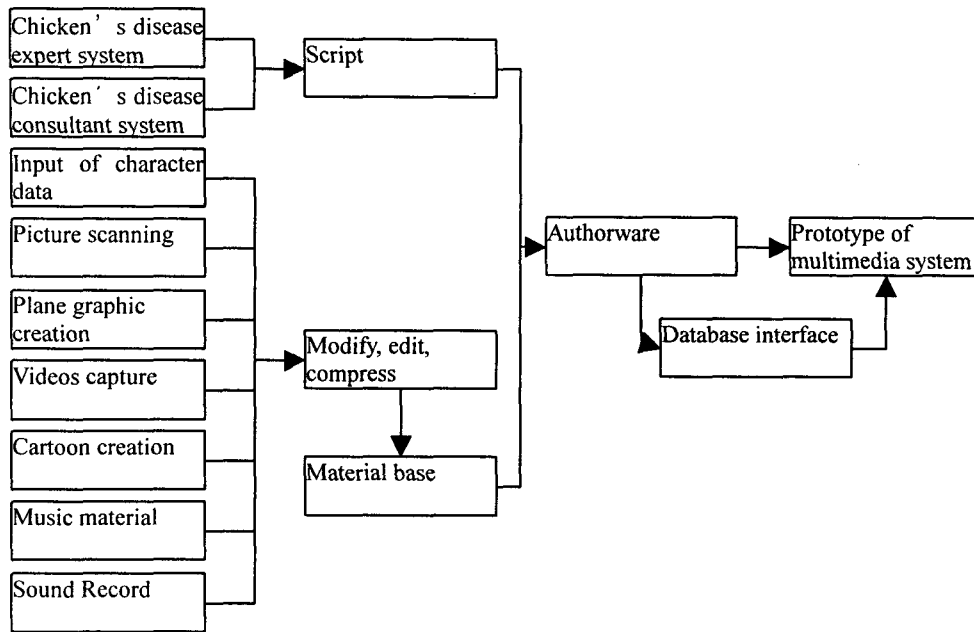
Fig.1 Rudimental draft of multimedia chicken' s disease expert system

1.3. The rudiment of multimedia chicken disease expert system research.

Through the build-in function of computer and application software (e.g. PhotoShop), graphics, text and data was processed. Then using multimedia software, such as Authorware etc., video, sound, picture, text, data and cartoon was processed and integrated together organically. Combined with original chicken's disease expert system, The rudiment of multimedia chicken's disease expert system was formed (Figure 1).

1.4. Domain knowledge collection

Domain knowledge is one of the most essential sections for building expert system. The theory and experience of domain expert on chicken's clinical and pathological analysis was collected, and the reasoning thought of expert in chicken diseases diagnosis and clinic practice was also recorded; the regulation for clinical laboratory examination and poultry commonly used medicine knowledge, as well as food sanitation examination regulation and microbiology standard also was collected, and more, a large amount of clinical veterinary 's sensible understanding was collected. In comparison with laboratory diagnosis, repeatedly abstracting, a set of chicken's disease logical reasoning diagnosis methods was formed gradually. Furthermore, we made informal discussion with professor Cai Baoxiang and other experts; the diagnosis knowledge (including disease history, clinic symptom and dissection analysis three part) on chicken's common disease diagnosis and treatment, prevention and laboratory diagnosis project was concluded and classified.

1.5. Collection and classification of suitable cases

It is essential that the cases should be well colleted and classified which are suitable to the project of chicken disease rapid diagnostic multimedia expert system.

2. System objectives

The ESCCD should be such a multimedia chicken disease diagnosis expert system, which integrated sound, picture and text etc., and the input, display, query, and process of these assorted information, combined with previous chicken's disease diagnosis expert system, the goal of rapid diagnosis could be reached.

3. Experimental project

The experimental project of the system was shown in Figure 2.

4. Conclusion and Result

Aiming at the increasing requirement and pressure of chicken's disease prevention and treatment on intensive chicken farm, on the basis of accomplishment of the subject "study of chicken's disease expert system", which is the "eight-fifth" important point animal husbandry research project of Ministry of Agriculture, drawing support from multimedia technology and it's information processing ability to various media, by adopting various input approach, such as sound, picture, text etc., the input information could be more abundant and more comprehensive, and the goal of rapid query, online help and diagnosis was reached. The system can diagnose chicken's main infectious diseases, nutritional metabolic diseases and parasitic diseases, such as Newcastle disease (ND), Marek's disease (MD), Infectious bursal disease (IBD), Avian infectious brochittis (IB), Infectious laringotrachitis (ILT), Mycoplasma infection of poultry (CCR), and give the prevention, treatment measures and prognosis to the certain disease. System can output experimental operation
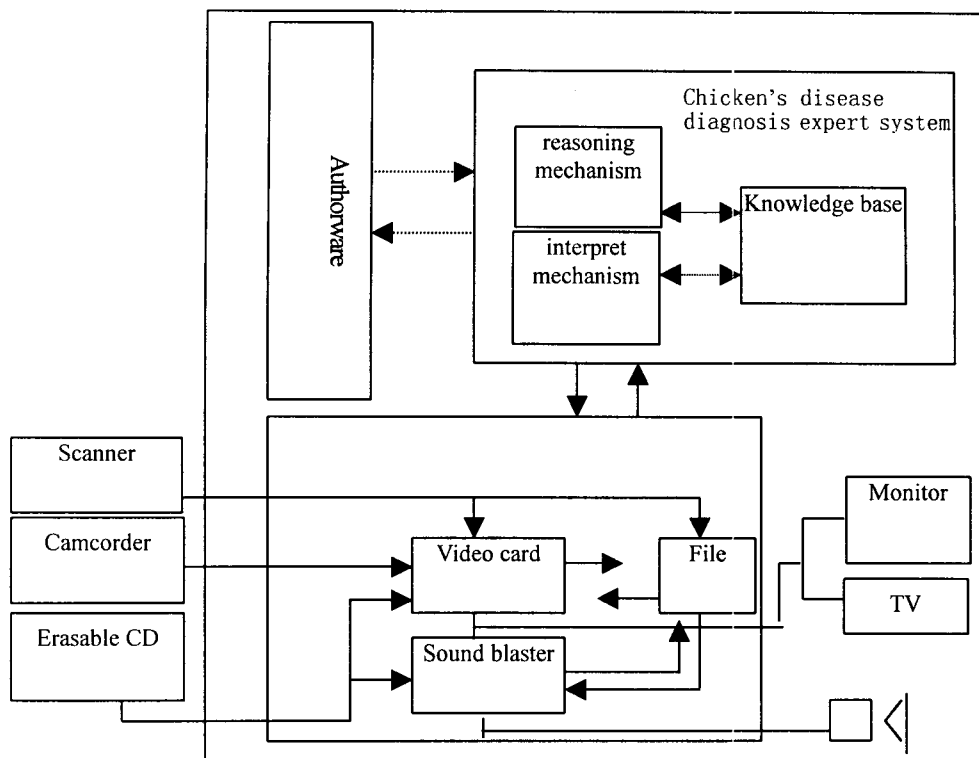
Fig.2 Configuration of system software and hardware for development

procedures and explanation of reasoning. The accordance rate reached over 80%. The system has been used in Nanjing Jiangning Veterinary Station and was reported that "in 13 disease cases, there are 10 of them accurately diagnosed, 2 basically diagnosed, 1 failed diagnosed". The system also provides veterinaries and chicken raisers with an practical electronic book with over one million words about chicken disease diagnosis and raising consultation, user can query information concerning pathogeny, symptom, diagnosis, treatment and prevention of 9 categories and 83 kinds of chicken diseases, this makes chicken's disease diagnosis expert system and consultant system more scientific and practicable.

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