

The Evaluation System for Physical Performance based on The Fuzzy Knowledge Database through the Internet

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インターネットにおけるファジィ知識データベース を用いた運動評価システム

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Abstract

The criteria of an expert were local and subjective but very useful and important for evaluating physical performance. An expert who have knowledge and experience can evaluate some complex objects. Though the criteria can be expressed fuzzy knowledge database, these database system are local system. It was seeking to sharing the fuzzy knowledge database, but there are not. In this paper, We propose the Fuzzy Knowledge Database which extend for the network, and we make the fuzzy expert system supported for improving physical performance through the internet. Our approach have the following benefit:

1. The system can treat subjective data because of fuzzy theory,
2. This system have the utility of the database from everywhere in the world,
3. This approach can be applicable for the many field,
4. The transported criteria have potability of subjective evaluation,
5. The extension to the network are independence of machine architecture.

keywords:Fuzzy Reasoning, Fuzzy Knowledge Database, Physical Performance

1. Introduction

The human subjective evaluation is very efficient for the evaluation of physical performance. It's difficult for the other people to use, since this criteria of subjective evaluation was peculiar to the individuals. The re-usability and the accumulation of these human subjective criteria have not been tried as the knowledge database in the network. It is very

important for the evaluation to improve the physical performance that these re-usability and the accumulation. We have been indicated that the human subjective criteria can be transported on the computer by using fuzzy theory^{4,8)}, and confirmed the usefulness of the transported subjective criteria on the computer. Though we can use the human subjective criteria as the fuzzy expert system application software, this system were for the

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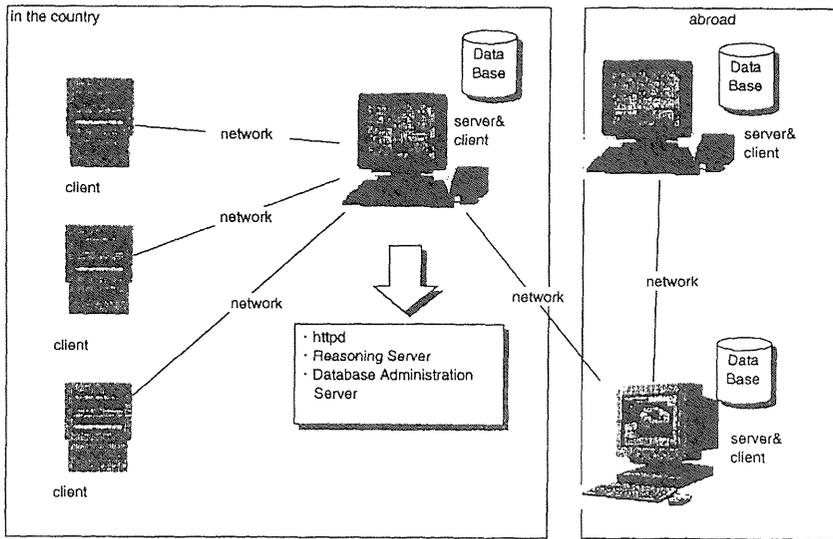


Figure 1. The concept of the distributed administration of Knowledge database

particular system. This system can accumulate the human subjective criteria and evaluate physical performance, but there are lack of the function which is re-usability of human subjective criteria for many people. So in this paper, we propose the fuzzy knowledge database system which is extend for the network, and we make the fuzzy expert system supported for improving physical performance through the internet.

2. System Construction

The system construction is shown in Figure 1. In this system, every programs are independent and the place of these programs are not matter because we use DO (*Distributed Object*) technology. The Distributed Objects system allows an application to send a message to an object that exists in another application.

We use these message to communicate httpd and another programs in this system (Figure 3). These Database and Reasoning Server can be used the WWW browser from the internet (Figure 2).

The efficiency of using internet are;

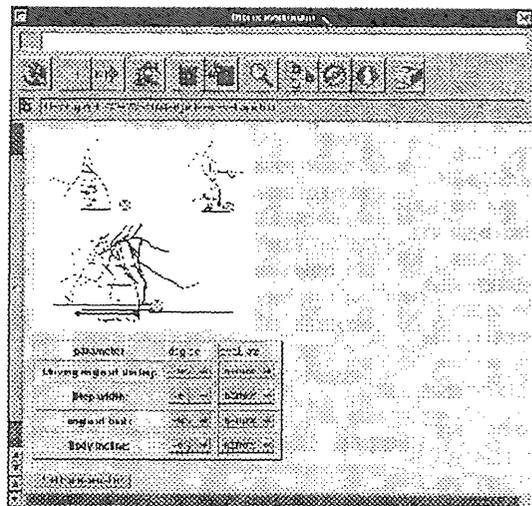


Figure 2. The access page

1. The utility of the database from everywhere in the world
2. The applicable for the many field

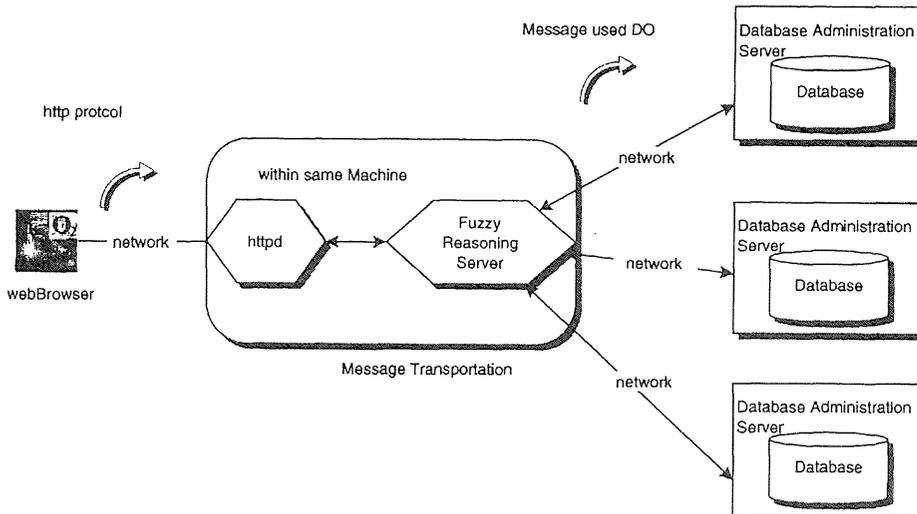


Figure 3. The role of programs

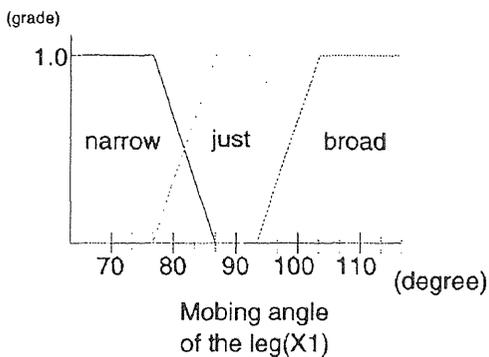


Figure 4. One of the membership function (Moving angle of the leg)

3. Server and membership function

3.1 Fuzzy Knowledge Database Server and Reasoning Server

The function of our system were divided individual Server, which are Fuzzy Knowledge Database server and Fuzzy Reasoning Server (Figure 3). Each sever are independent and distributed. These architecture can achieve sharing fuzzy Knowledge efficiently.

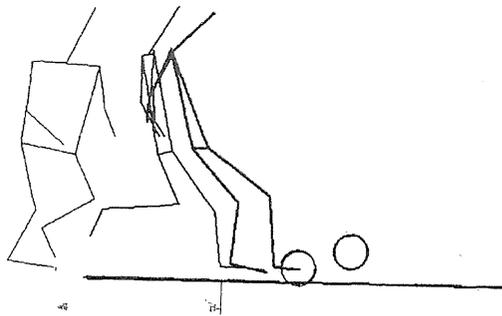


Figure 5. The source of reasoning

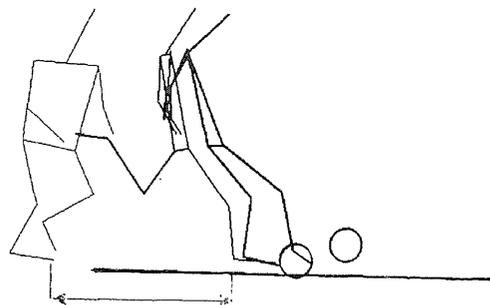


Figure 6. The result of reasoning

3.2 Membership function

Z shape membership function⁷⁾ are made from expert. The membership functions are shown in Figure 4.

This membership function were made from the 30 kick video evaluated by 3 soccer coach. For example if the evaluate such as “The moving angle is narrow” (Figure 4) are get from these expert, the biggest value are set the az parameter⁷⁾ to the Z shape membership function, and the smallest value are set the as parameter⁷⁾ to the Z shape membership function⁴⁾.

4. Result

The example of getting result of fuzzy reasoning are shown in Figure 6. This result calculated from the source data are indicate in Figure 5. The access can be achieve from standard web browser which are available every computer system. The sharing of subjective evaluation criteria was achieved in this system. We can show the demonstration of improving performance from fuzzy reasoning.

Summary

We proposed the fuzzy expert system which make the subjective evaluation for the physical performance through the internet. We can confirm that this expert system have the following benefit:

1. The utility of the database from everywhere in
2. The applicable for the many field
3. The portability of subjective evaluation
4. The independence of machine architecture

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