

# Framework Research and Design on Sports Events Information System Platform Based on Multi-Agent Technology

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**Abstract:** With the number of sports events and the participation in sports activities gradually increased, the amount of information of sporting events will show exponential rate of growth, sporting events information provided by traditional library materials and newspaper media is unable to meet the current needs of researchers to study on sporting events. Build an intelligent information platform of sporting events, implement intelligent sports events information collection, sports events information organization, and sports events information retrieval, which has become a prerequisite and basis for in-depth study on sporting events. And the rapid development of information technology, Internet, and artificial intelligence, also provide the appropriate technical support for an intelligent information platform of sports events. Software system design of sports events information platform not only needs to follow the methodology of software engineering, but also needs to consider scalability, adaptability and flexibility and so on of the system. This paper aims at a series of issues currently exists in research area on sports events, i.e. single research information, fragmented, non-system and so on, after a detailed system requirements analysis, and based on the adaptability and scalability requirements of sports events information system platform, research on framework of sports events information system platform. Proposes a framework based on Multi-Agent technology of sports events information system platform, and verified the framework by related design of software engineering, rapid prototyping, system comparison. The results show that, information system platform framework based on Multi-Agent technology has certain advantages in practicality, scalability, adaptability.

**Keywords:** Agent; Sports Events; System Framework; Information Platform

## 1. Introduction

Software system design of sports information platform not only needs to follow the methodology of software engineering, but also needs to consider scalability, adaptability and flexibility and so on of the system. This paper aims at a series of issues currently exists in research area on sports events, i.e. single research information, fragmented, non-system and so on, after a detailed system requirements analysis, and based on the adaptability and scalability requirements of sports events information system platform, research on framework of sports events information system platform<sup>[1]</sup>. Proposes a framework based on Multi-Agent technology of sports events information system platform, and verified the framework by related design of software engineering, rapid prototyping, system comparison. The results show that, information system platform framework based on Multi-Agent tech-

nology has certain advantages in practicality, scalability, adaptability<sup>[2]</sup>.

## 2. Research Object and Research Methods

The research object is framework of sports events information system platform. This paper uses the following research methods for research on framework of sports events information system platform:

### 2.1. Literature and Data

Through library and Internet searches to find the research literature and information relative to aspects of framework design of sports events information system platform, and framework design of other industry information system platform and so on.

### 2.2. Expert Interviews

Through face to face, telephone or Internet online, have non-structural or structural interview with the experts, and scholars in related fields, explore more and more in-depth information and data about framework design of the sports information platform system, etc.

### 2.3. Software Development Method based on Multi-Agent

Use Multi-Agent technology to design architecture of sports information system platform, to address the sports information platform software system scalability, adaptability and flexibility and other issues.

### 2.4. Rapid Prototyping

Rapid prototyping, at first, based on the user's most important requirements, develop a prototype to achieve the most basic functions of a system, and then use the user views of prototype evaluation, repeatedly revise and improve the prototype until the final system can satisfy the customer. Prototype has four stages: identify user needs; prototype design; use and evaluate the prototype; modify and improve the prototype. Framework design of sports information platform system will be based on user needs determination, use a rapid prototyping design.

### 2.5. System Comparison Method

This paper uses system comparison method to verify the framework of sports information system platform.

## 3. Research on Framework and Architecture of Sports Information System Platform

### 3.1. Functional Framework Design of the Overall System

According to system requirements analysis, the study takes sporting events project as main line, around the entire project life cycle of sports events, involving the multi-species, multi-level, multi-dimensional sports information, designs function framework of the sports information system platform: as Figure 1: Agent-based framework for sporting events information platform, includes a total of 8 sub-systems. The sports image management subsystem, the sports image management subsystem, sports literature management subsystem, sports

network information management subsystem, are divided according to sporting events project running life cycle into 8 kinds of information: sports organization and management information; sports events outs, results information; sports news and information; sports marketing information; sporting events held and planning information; sports lottery information; sporting events on policies and regulations; sports venues and facilities information, etc.

Specific functions are as follows: (1) sports photo management subsystem; mainly for sports events management picture. Specific features include. Sporting events at all levels of intelligent image recognition, intelligent indexing, intelligent classification, artificial classification, entry, delete, modify, volume acquisition. (2) sports image management subsystem; mainly for sports video management. Specific features include. Sporting events at all levels of intelligent image recognition, intelligent indexing, intelligent classification, artificial classification, entry, delete, modify, volume acquisition. (3) sports literature management subsystem; mainly for sport management literature. Specific features include. Sporting events at all levels of intelligence literature classification, artificial classification, entry, delete, modify, volume acquisition. (4) basic sports information management system; major sporting events for the basic information management. Specific features include. Basic information of artificial sports category, entry, delete, modify, volume acquisition<sup>[3]</sup>. (5) sports network information management system; major sporting events of all types for network information management. Specific features include. All kinds of sports information network intelligent recognition, intelligent indexing, intelligent classification, artificial classification, entry, delete, modify, volume acquisition. (6) data mining management subsystem of sports information platform; data mining through the spider, or the corresponding intelligent algorithm on the network and internal database of information. (7) Agent management subsystem of sports information platform agent: the existence of the system in a variety of services. Agent management specific features include: Service Agent add, delete, modify, and other operations. (8) Sports information platform of integrated information search engine system: search by keyword queries.

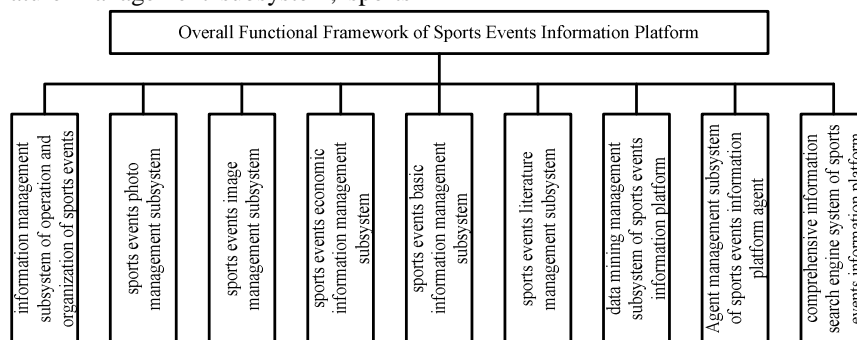
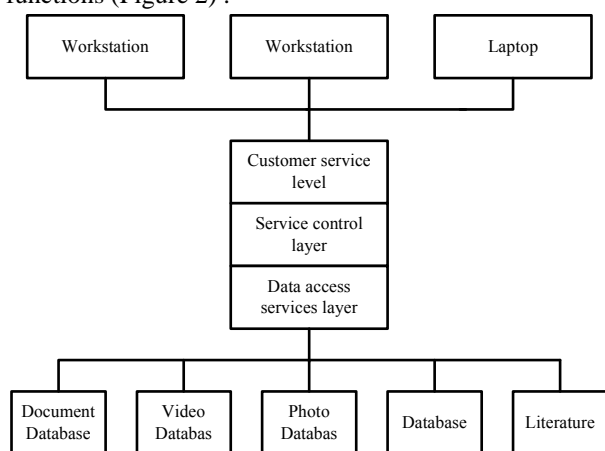


Figure 1. Functional Framework of Sports Events Information System Platform

### 3.2. System Architecture Design

Consider sports information platform should be scalable systems, adaptability and flexibility characteristics, this study designs architecture based on multi-Agent technology platform for sports information system, the architecture includes four structures: the bottom layer is the database including basic information database of sporting events, sporting events photo gallery, sports image database, network information database of sporting events, sporting events literature databases and so on. The second layer is the data access services layer; the third layer is the service control layer; the fourth layer is the customer service level. In addition to the first layer and, in each layer, there are many services the Agent has the appropriate interaction to achieve the level of specific functions (Figure 2).



**Figure 2. Architecture Sports Events Information Platform**

The first layer is the basic database of sporting events information platform. Among them, sporting events literature database can be connected to the library corresponding data source, and through the planning, design appropriate interfaces for data collection; and image library, photo library, network repository, the data collection, data mining through the corresponding mining subsystem, or the use Internet as a data source, design the appropriate intelligence information collection engine, according to the need for regular data collection<sup>[4]</sup>. The second to fourth layer, namely: data access services layer, service control layer, the customer service level are composed by many agents, more autonomous and learning with the ability of evolution composition<sup>[5]</sup>. They are: these Agents process service requests through mutual communication and coordination, and provide service interface for customers, provide a variety of applications. The following describes each agent's specific features in the architecture:

Customer service layer agent: provide a variety of personalized services for information platform users of sporting events, the main functions are: (1) is responsible for

receiving user's request of sports information services platform; (2) perception, filtering and sorting on service requests received; (3) the service request to the appropriate service layer agent; (4) receives the response from the service control layer agent and feedback to the users of sports information platform; (5) communication with other customer service level agent; (6) receive user feedback on its services strategy, and to learn, evolve new service strategy; (7) evaluate the service strategy of service control.

In the design of sports information platform, types of customer service agent include: information filtering service agent; information awareness service agent; information service agent to explain; information service evaluation agent. Agent of service control layer: The main agent for customer service layer, provides application services, its main functions are: (1) identify service request submitted from the customer service agent layer<sup>[6]</sup>; (2) service request from customer service agent layer submitted to the corresponding data access services layer agent;(3) receive response message from data access services layer agent and back to the customer service agent layer; (4) communicate, coordinate with other service control level agent;(5) receive the evaluation from customer service agent layer of its service strategy, learn and evolve.

In the design of sports information platform, type of service control agent includes: information add control agent; information modify control agent; information delete control agent; information retrieval control agent. Data access services layer agent: for each database. Main functions are: (1) receive request from the service control layer agent<sup>[7]</sup>; (2) directly call the corresponding database engine; (3) calls the database to get the results and feedback to the service control layer agent.

In the design of sports information platform, types of data access service agent include different agent according to different data sources for data access.

### 3.3. Prototype Implementation of the Framework of Sports Information System Platform

Framework of Agent-based information platform for sporting events compares to the general framework of the traditional information platform, it has the following advantages:

- Can break structure complex software system down into a number of related subsystems. In a sporting event information platform, for a particular sporting event, it contains many multi-level sports-related information that are independent and interrelated, therefore, use Multi-Agent technology to build Multi-Agent application systems, will be well decompose complex software systems, allowing the subsystems to conduct an independent design and development.

- The adaptability and scalability of software systems are also stronger. Sports information platform system is a complex software system, the system needs will continue to carry out development and change, according to the deepening of the sporting events market, the system started to build will continue to evolve in evolution.
- Effective in optimizing the system architecture. Design and achievement of the corresponding functions of sports information platform system, need a lot of specific functions call each other, complement each other to be achieved. Like a sector, not just one person. A function of the system is equivalent to a functional department, department needs many human resources, uses Multi-Agent architecture, each Agent is equivalent to each position in departments, by department continues to meet the different positions, it is effective to optimize the system management process.

#### 4. Conclusion

This paper is based on the Agent technology, researches on framework of sports information platform, builds an

framework of intelligent information platform of sporting events, on this basis, to achieve and build the entire system of sports information. In future, with the gradually establish and perfect sports information platform system, it will provide convenient information services for sports-related research studies accordingly. And on this basis, by certain intelligent systems for data mining, build the corresponding decision support systems.

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