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Developing an Intelligent Agent for Managing Web 2.0 Services

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Abstract

The enormous amount of editing applications in Wiki has led to management problems of efficiency, accuracy, and convenience for Wiki administrators. This study therefore developed an intelligent agent system based on web 3.0, namely, the evaluation agent system (EAS), to solve these problems. The EAS included three systems; since the RBES was central to the EAS, empirical data were collected to examine the effectiveness of the RBES. The findings revealed that, compared to the conventional approach, the participants spent less time to finish their tasks and completed their tasks more accurately in the RBES. Moreover, the participants were more satisfied with the RBES than with the conventional approach with regard to convenience.

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1. Introduction

Wiki is a celebrative open source based on Web 2.0 techniques; it is associated with web 2.0 for knowledge reuse and information sharing by user interactions and collaboration. To enhance the effectiveness of a web2.0 collaborative tool such as Wiki, operation time, accuracy, and convenience should be considered simultaneously. The conventional concepts of web 2.0 may lead to malicious damage in web applications. Taking anonymous editing in Wiki systems for example, the error rate of contents has been dramatically increased due to the enormously increased amount of editing [1]. The web 3.0, which can realize the intelligent search, provides solutions to this problem. Accordingly, we developed the evaluation agent system

(EAS) based on the framework of web 3.0 to solve the efficiency, accuracy, and convenience problem encountered in conventional application of web 2.0 in Wiki systems from the perspective of administrators. To achieve our goals, an experiment and real cases were employed in this study.

2. Effective Management of Web 2.0 Services

It is a trend that web 2.0 is developing towards web 3.0 to achieve automate information retrieval, semantic interference, machine learning, rule-based expert system, and other artificial intelligence applications. Based on web 3.0, Wiki systems should have the following properties in order to integrate knowledge from web 2.0 systems into database and to conduct an intelligent management system to provide users helpful information [2]:

2.1. Providing high-authentic knowledge

Domain knowledge is produced by collaborative editing from users in the web 2.0 system. However, the dramatically increased amount of editing has led to serious information management problems for system administrators. Users may receive wrong information because the contents have been maliciously edited, illegally updated via web-robots, or incorrectly cited from published information. Web 3.0 techniques can prevent users from receiving such erroneous information and help them acquire knowledge efficiently.

2.2. Administrator management guideline integration

Dealing with enormous management tasks, the Wiki system should be able to effectively integrate knowledge into database and to share such knowledge among administrators around the world. Unfortunately, such a function is not well-achieved in the web 2.0 Wiki system. The expert system developed in this study can effectively analyze the edited information in knowledge database and produce inference rules that can be shared among the administrators.

2.3. Real time information retrieval

Knowledge is rapidly growing in the Wiki system and the real time information management in web 2.0 is usually achieved by human operation. Such a type of operation is very time-consuming for both the administrators and the users. Usually, the users need to wait for permissions from the administrators. Therefore, an efficient Wiki system should be able to provide automate management and to retrieve real time information immediately to update the edited information from users.

2.4. Cross-platform data transfer

Knowledge database system should take such mobile devices as smart phone and PDA into account. Therefore, data transfer should be able to be correctly executed in different types of platforms or devices.

3. Methods

To solve the current management problems in the Web 2.0 system, this study developed the EAS which included the aforementioned characteristics of effective management of web 2.0 services based on the framework of web 3.0. To further investigate the effectiveness of the EAS, 29 university students aged from

18 to 22 years old were included to participate in this study. The main instrument employed in this study was the EAS which included the following three systems: the testing agent, the Wiki agent, and the RBES agent. In addition, to analyze the effectiveness of the RBES, we evaluated the performance of the RBES based on four criteria: (1) accuracy of knowledge management; (2) time performance; (3) operation convenience for user; and (4) fatigue strength.

3.1. The testing agent system

Based on the updated pages in Wiki systems, we retrieved forty articles and designed six questions concerning article editing and content change. In this study, we examined the accuracy of knowledge management and calculated the total time spent on answering the questions [3].

3.2. The Wiki agent system

The Wiki agent was designed to provide a knowledge management environment for the participants. In this study, the participants answered the designed questions sequentially, by which we evaluated their performance in knowledge management.

3.3. The RBS agent system

The employed techniques in the RBES included web-robot, agent system, Extensible Markup Language (XML), and theories of knowledge management. In the RBES, the administrators executed the routine tasks by web 3.0 technology and the logic inference results were produced automatically; moreover, the operating experiences by users were converted to rules and saved in the knowledge database [4].

4. Results

In this study, efficiency infers to the operation time (seconds) and accuracy infers to the correctness of inferences. The results showed that, in terms of efficiency, the RBES was less time consuming than the conventional approach in each of the twenty-nine tasks as well as in the averaged performance ($M = 332.38$ seconds vs. $M = 1.92$ seconds). The results of t-test revealed that the overall efficiency of the RBES was significantly better than the conventional approach, $t = -19.94$, $p < 0.05$ (see Table 1). Therefore, the RBES is tremendously helpful in terms of time saving.

As for the percentage of accuracy, the conventional approach was 84% and the RBES was 100%. Accordingly, compared to the conventional approach, the RBES had better efficiency and accuracy in matching goals and making inferences.

Based on a five-point Likert type item, we also investigated the participants' perceived satisfaction towards the convenience of the RBES when compared with the conventional approach. The participants responded that they were more satisfied with the RBES than with the conventional approach ($M = 4.45$). The mean score based on 29 participants was significantly different from the median score "3", $t = 9.959$, $p < 0.05$, suggesting the participants thought more highly of the RBES with regards to convenience when compared with the conventional approach.

5. Discussion and Conclusions

Wiki platforms based on web 2.0 technology have been a great vehicle for knowledge sharing and collaboration in the recent decade; they help people acquire knowledge efficiently. However, how to

conveniently maintain the efficiency and accuracy of enormously increased amount of information has become an important issue in Wiki systems. In web 3.0, social networks or digital learning websites share the characteristics of the semantic web and artificial intelligence; it helps to confront the encountered problems. We therefore developed the EAS based on the framework of web 3.0 to improve the efficiency, accuracy, and convenience of knowledge management in Wiki systems. The experimental results in this study suggest that the EAS, especially the RBES, can automatically manage web 2.0 systems and can dramatically increase the efficiency, the accuracy, and the convenience of administration.

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