

# The Development of Athletic Sport Management System (ASMS) Using Context-Based Information Retrieval

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## ABSTRACT

*This study intends to develop a computerized system for athletic sport management (ASMS) that could assist administration in planning and managing the athletic sport activity. This paper proposed the used of context-based information retrieval in searching module to change the traditional key-word system. Moreover, we proposed the use of similar word detection and knowledge based in searching module to enhance the retrieval effectiveness. This paper will discuss the early stages of the development phase which is mainly about context-based information retrieval and present the proposed system architecture for the system.*

### Keywords

*Context-Based, Information Retrieval*

## 1.0 INTRODUCTION

The main goal of information retrieval system is to find a relevant query based on user's input. The common search queries are simple and often from one or two keywords. This simple queries resulting an unsatisfied result when it is returned. Specialized search technique, on the other hand can provide a good result returned from the user's queries. The quality of search result can be measured with the following two criteria such as precision rate and recall rate (Al-Mubaid & P. Chen, 2005).

A search engine usually tries to search from user inputs and built an index and ranked before the retrieved documents are presented as a result. In this research, context-based has been proposed as a new approach of finding a similar and related word to improve the search queries in Athletic Sport Management System (ASMS). ASMS is a web-based application that will ease user to manage sports' data such as registration, event scheduling and scoring and data reporting.

Based on the information retrieval approach the search engine will index a similar and related word for better search queries quality. Given a sufficient result to the user's need may constitute to user satisfaction by providing an efficient precision and recall rate and overcome the queries result overload.

## 2.0 RELATED WORK

The rapid growth of available information in digital format in World Wide Web (WWW) constitute to information overload. In such environment, user would need the assistance of powerful searching and browsing tools to find information desired. Context-based information retrieval has become one of the attention tools to perform the effective and meet the information needed by the user. There are many different notion of context have been used in information retrieval system and information topics or subject has become the most popular notion of context that has been used.

(Chanana, Ginige & Murugesan, 2004) proposed a context-based information retrieval system which each document is assigned with context(s) based on the type of information. The type of information is derived from enlarged range of categories for a document collection based on context and related with users' activity to make the categories easy to understand and intuitive to user. Furthermore (Chanana, Ginige & Murugesan, 2004) indicates a new methodology for assigning context to documents in collection to improve the information retrieval effectiveness and conduct an experiment to prove the effectiveness of the system. This methodology involved assigning one or more context categories to document from a pre-defined set of context categories by using Context Allocation (CA) system. In this activity, 'Context assigner' in the system will read the document then assign the context(s) that best describe the contents of documents. Based on the experiment conducted, the

performance of the context-based information retrieval system that used the methodology was better than the baseline information retrieval system in term of precision ratio, user effort, time spent and user satisfaction.

It is well known that user preferences are complex and difference to each other. Each user has different information needs for his query in different situation therefore, searching and browsing tool must provide powerful searching tool that can handled user with these different preferences (Souldatos, Dalamagas & Sellis, 2006). Due to this matter, (Pan & Wang, 2007) proposed a context-based adaptive personalized web search to improve information retrieval effectiveness. Xuwei Pan indicate three key technologies to implement in the context-based adaptive personalized web search which are semantic indexing for web sources, modelling and acquiring user context and semantic similarity matching between web resources and user context. This research is mainly about adapting the search results according to each user's information needs in different situation.

One of the implementation of context based is in medical area. According to (Laforest & Tchounikine, 1999) they are using qualifiers that are stored in a thesaurus rather than in SGML-like DTD. The retrieval process in the Patient Records collection takes into account the flexibility of the qualifying process while reformulating the queries.

In (Al-Mubaid & P. Chen, 2005) presents a new context-based method for automatic detection and extraction of similar and related words from text indicates that 7 out of 10 searches with both similar words produces higher relevance rate and can be improve by 15%. Besides that the retrieved document quality is improved in two aspects such as probability of retrieving isolated English words in others written documents in other languages is reduced and entries due to lack of details in some documents such as simple summary entry is reduced. Using same method, (Al-Mubaid & P. Chen, 2005) conducted another experiments on specialized search engines such as Business and Economy directory in Yahoo! resulted 85% - 95% similar retrieved documents based on similar keyword queries are given a same result.

### 3.0 ASMS

ASMS is a web-based application that provides features to help user in managing and handling data

for athletic sport event. The main purpose is to systematically manage the record and to ensure the correctness and effective way of displaying overall results. Besides, it is to provide consistency of handling, processing and easier to keep track and maintain data.

As overall, ASMS consists of 8 modules with 4 different users. In Table 1, it shows the different user's module accessibility.

Table 1: Roles vs. Accessibility

Roles	Accessibility
Administrator	<ol style="list-style-type: none"> <li>1. Authentication</li> <li>2. User Account Registration</li> <li>3. Athletes Registration</li> <li>4. Athlete Attendance Registration</li> <li>5. Result</li> <li>6. Event Scheduling</li> <li>7. Report</li> </ol>
Athletic Committee	<ol style="list-style-type: none"> <li>1. Authentication</li> <li>2. Athletes Registration</li> <li>3. Athlete Attendance Registration</li> <li>4. Result</li> <li>5. Event Scheduling</li> <li>6. Report</li> </ol>
Secretariat	<ol style="list-style-type: none"> <li>1. Authentication</li> <li>2. Athlete Attendance Registration</li> <li>3. Result</li> <li>4. Report</li> </ol>
Division Manager	<ol style="list-style-type: none"> <li>1. Authentication</li> <li>2. Athletes Registration</li> </ol>

As being mentioned earlier, there are 8 modules that will be developed and discussed as below:-

#### i. Authentication

In order to access the system, user have to login. The users are divided into three roles which are the Administrator, Athletic Committee, Athletic Secretariat and Division Manager.

#### ii. User Account Registration

Administrator can add, delete, or edit users account. User is either Athletic Committee Athletic Secretariat or Division Manager which the modules accessibility is depends to who they are.

#### iii. Athletes Registration

This module is for Division Manager to register athletes to represents their department. The registration can be done during certain period. During the period, division manager can register, make changes of athletes and events participated.

After the period, the system will be freeze and any changes after the period must go through athletic committee. Athlete's number will be given one the registration completed. Each athlete can only register for 2 individual games and 2 for group. There were 2 categories, senior and veteran.

iv. *Event Scheduling*

This module purposely is to manage athletes' event, venue, and time of the event.

v. *Athlete Attendance Registration*

Before start any events, every athlete must register in order to verify them as valid and registered athlete. Each athlete has to scan their staff id card.

vi. *Result*

After every event completed, the Athletic Secretariat will key in the recorded time. The system will determine the winners according to time inserted. However, the score will be given based on ladder score. For track event, this module will provide function to determine lane for athlete during heat and final event.

vii. *Report*

This module will produce the overall result of the competition and even can show every department achievement. It will be generated in graphical or statistical method. This report can be view by Athletic Committee in the future to keep track/view previous result.

viii. *Searching module*

This module implements the Context-Based method of IR. The overall work flow is shown as below:-

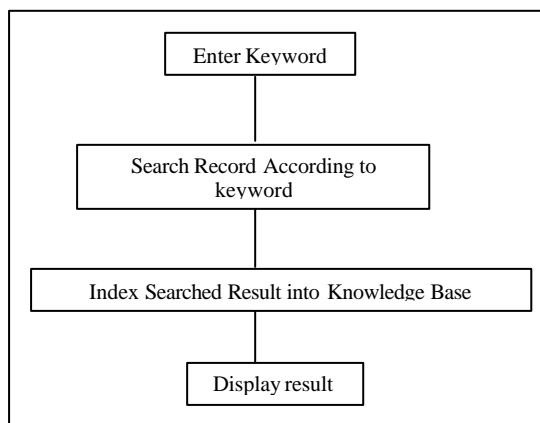


Figure 1: ASMS Searching Work Flow

As refer to Figure 1, there are several steps to execute the searching process.

1. Firstly, the user will enter keyword to do some searching. For example is to search previous result.
2. Then the searching process will begin to search from the knowledge base.
  - 2.1 If result found, the result will be taken from the knowledge base.
  - 2.2 If not found, the searching process will find the result from related tables.
3. Indexed the new search result to knowledge base for future usage.

4.0 SYSTEM OVERVIEW

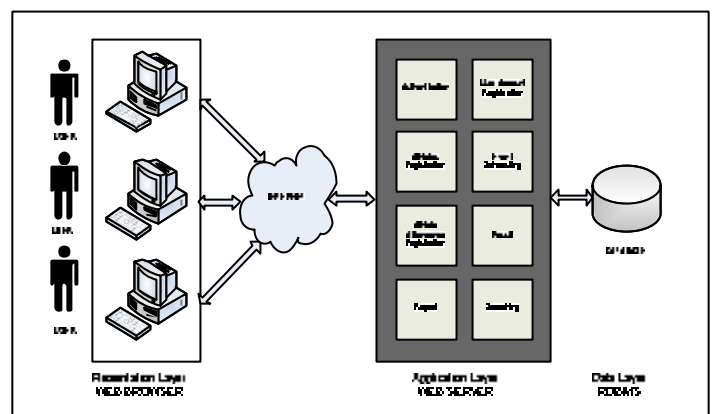


Figure 2: System Architecture

ASMS is a system developed using PHP and Javascript. For the data storage MySQL is being used and Apache as the Web server. Figure 2 above shows the architectural overview on ASMS which can be divided into three layers which are presentation layer, application layer and data layer. The presentation layer is the user interface of the system. Here, the user uses web browser (for instance, Internet Explorer) to access ASMS via online. In the application layer, the web server receives user's request. The server may retrieve data from data storage for processing the request, before returning relevant results to the web browser.

5.0 CONCLUSION

This paper presented the early stages of the development phase of athletic sport management system (ASMS) using context-based information retrieval. The aim of this project is to develop a

computerized system to manage athletic sport activity more easily. Furthermore, in order to provide each user with more relevant information while searching information, we proposed a context-based information retrieval approach combine with similar word detection and knowledge based. This technology was chosen because it provides suitable approach and it is thought can give better result compared to conventional system in order to improve the retrieval effectiveness. Part of our future work will be concerned with designing, developing and evaluating the proposed system architecture and approach.

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