CHAPTER 2

LITERATURE SURVEY

2.1 INTRODUCTION

This survey is a study of e-learning Systems. It elaborates a list of ontology domains and query templates. It also elaborates on the constraint satisfaction problem in the physiological variable using CSP solver techniques. Finally, this chapter presents the overall survey of the proposed system.

2.2 SURVEY OF E-LEARNING SYSTEM FOR SPORTS DOMAIN

In the e-learning community (Honggang Wu 2002), proposed a XML forms the basic foundation for inter-application communication, however it does not ensure that communication will happen. For example, people speaking different languages cannot understand each other. Even in the same language, such as English, words may have different meanings; the word “football” represents different sports in England and North America. To make communication possible, a set of vocabularies with clear definitions should be shared by speakers. That is what some organizations are doing; developing standards in XML for e-Learning.

A sport plays a key role in maintaining one’s health, bringing about completeness and improves one physically and psychologically. According to Bucsy (2003), the training instruction, where the students receive not only educational support in order that they may survey their own fitness level and
development, but in addition the learning tools to exploit in exploring health developments and athletic maturation possibilities. It was selected physical education topics (Sport recreation, Leisure time sports theory and practice I and II) had been worked up in a digital format, consisting of e-learning materials, in order that the supervision of the education level and effectiveness might be enhanced.

According to Franks (2004), suggested that individuals sometimes cannot regulate the video feedback receive, and the information might exceed the athletes’ processing ability. Therefore, the intervention of a coach is required particularly with inexperienced or young athletes.

Epuran (2005), proposed to the build up the competences required by modern technology, both to the education benefit and for an assisted sports training process. Add that the continuing education process based on the e-learning system provides the learners more and more frequent opportunities to acquire new competences.

Nicholas et al (2006) studied an application of chemistry to sport. Developed a learning resource to aid students to acquire new skills and knowledge. The new knowledge emerges from the content of the e-learning resource and skills and knowledge gained during assessment tasks, and through literature and internet.

The sports development in information communication technologies is achieved especially through multimedia technologies. The key factor of employing these technologies are objectivity and accuracy of information, visualizing power, image comparison and blending and feedback for enhancement of motor performance as presented by Lieberman and Franks (2008). Huay Chang (2008), proposed a skilled system to establish the interactive Sport Teaching e-learning structure.
Learning management system is valid for sport organization focusing on educating Judges. For instance, the Norwegian Athletic Judges association (FDU) aims at improving the sport judging. It is well recognized that Judge’s technical skill or ability are subject to errors or differences, therefore there is a stringent need to enhance the educational environment as stated by Damisch and Mussweiler (2009).

A Sports E-learning Platform in order to provide athletic related teaching materials, such as physical motions and exercise rules. The design concept is based on ADDIE model of ISD (Instruction System Design) theory with the purposes of analysis, design, development, implementation, & evaluation. Via the usage of this physical education E-learning platform, it hope to let players perform efficient self learning for sports skills, indirectly foster mutual help, cooperation, nice norms of law-abiding via the learning of athletic rules, and become skilled at accurate recreation knowledge & first aid expertise. Moreover, coaches can use this system as a teaching facility as presented by Chun-Hong Huang (2010).

Eli Hustad, Aurilla Aurelie Bechina’s (2010), examined that the implementation of a learning management system (LMS) to support education of Norwegian Athletic Judges (NAJ). The NAJ hopes to reach and recruit new judges. The challenges, requirements and opportunities encountered while developing and deploying LMS are presented. This is an E-learning system done in private or public teaching settings focus on lifelong training or vocational education.

Kin Fun Li (2011) reported that the computer based multimedia systems are ideal for E-learning. A multimedia database is used for capturing, cleansing, classification and clustering of some basic tennis swings for indexing the data captured for instructional purpose. The classification of tennis swings using event based matching is illustrated.
In sports domain, 10 physical education teachers from different secondary schools to identify the difficult sports skills that the students commonly face. As per the outcome of the survey the most difficult skill to learn was Triple Jump which requires high level skills. An E-sports based on Simpson Psychomotor Domain theory was developed to help student mastering the Triple Jump Skill. The courseware design was in accordance to Simpson’s Psychomotor Domain Taxonomy namely perception, set, guided response, mechanism, complex overt response, adaptation, to originality, as presented by Wong (2011).

According to Takahashi (2012), proposed a practical tennis class with movie instructions on the web in National Institute of Fitness and Sports in Kanoya (NIFS). The aim of this class was to develop the “diagnosis skills” in sports. The purpose of this study was to present the details of this class and to clarify the effectiveness for developing the “diagnosis skills”. It provides the students’ own movies through the e-learning system and could observe their movies on the web. Those movies contained each student’s techniques of tennis and the game by each other students.

According to Ian Heazlewood (2013), Exercise and sports science is one of the fastest growing disciplines in universities. Professional associations input and demand compliance in terms of micromanaging the subjects and the curriculum in exercise and sports science also university model of compliance for developing and moderating degree programs. The e-learning development enable some universities delivering 70% of their students using this education mode and open universities a 100%.

2.3 SURVEY OF PHYSIOLOGICAL VARIABLES IN SPORTS

Kraemer (1989), proposed a young athletes, like adults, strive to achieve higher performances through improving their health and fitness, with
resistance training being used to enhance an athlete’s performance in sport. The development of muscle strength through resistance training in children is still the subject of some debate and criticism.

Frequency analysis of pulse rate during exercise has shown that sympathetic curve decreased and the parasympathetic is completely removed, indicating the decreased involvement of neural regulation of heart rate during exercise. Presumably, humoral regulation of the immune heart rate predominates during exercise as stated by Kamath (1991).

Brooks (2000), proposed a concept of a lactate shuttle has been developed and there is evidence in support of exchange of lactate between active and inactive muscle during exercise.

Guyton and Hall (2006) stated that during maximal exercise, both the heart rate and the stroke volume are increased to about 95% of their maximal levels. It added that the lower pulse rate after exercise group before exercise.

Myer and Wall (2006), discussed a clinicians would consider resistance training contraindicated in children due to the risk of physical plate injury and because it was believed that children were incapable of increasing their strength or muscle mass through such exercise.

The effect of training on selected physiological and biochemical variables of Indian soccer players of different age groups as presented by Indranil Manna et al (2010).

Faigenbaum and Myer (2010) suggested that the number of young athletes participates in resistance training programmes in school-based programmes, fitness facilities and sport training centers to enhance their
athletic performance and reduce their risk of injury during practice and sport competition. Although some clinicians once considered resistance training unsafe and potentially injurious to the developing musculoskeletal system, evidence related to the safety and efficacy of resistance exercise for children and adolescents has increased over the past decade. The qualified acceptance of supervised and well-designed youth resistance training by medical, fitness and sport organizations is now becoming universal.

Jose (2010), proposed a 3,000 meters running performance and the relationship with selected physiological parameters. Eighteen well-trained male middle-distance runners were measured six times (x3 per year) throughout two consecutive competitive seasons. The following parameters were measured on each occasion: maximal oxygen uptake (VO2\text{max}), running economy (RE), velocity at maximal oxygen uptake (vVO2\text{max}), velocity at 4mmol L-1 blood lactate concentration (V4), and performance velocity (km·h\text{-}1) in 3,000 m time trials. Values ranged from 19.59 to 20.16 km·h\text{-}1, running performance; 197 to 207 mL·kg\text{-}1·km\text{-}1, RE; 17.2 to 17.7 km·h\text{-}1, V4; 67.1 to 72.5 mL·kg\text{-}1·min\text{-}1, VO2\text{max}; and 19.8 to 20.2 km·h\text{-}1, vVO2\text{max}.

According to Laura Juliff (2011), the sport performance and physiological variables to examine the effects of contrast, showers and contrast water therapy on vertical jump and repeated agility performance, skin and core temperature and psychological measures a elite female netball player.

2.4 \textbf{SURVEY OF ONTOLOGY FOR SPORTS DOMAIN}

Sports Event ontology, the match and team concepts and their sub concepts for modeling individual (foot-ball) matches, foot ball teams and clubs. The ontology of sport event domain models at varying granularity like
tournaments, matches and events such as goal shots as well as persons, places also abstract entities like result tables. Though it cannot completely model the whole world of football it can provide a structure for almost all football related information in databases, web pages and books. The Sport Event ontology is based on the smart SUMO foundational ontology as discussed by Daniel Oberle et al (2006).

The detection of semantically significant sequences and objects, such as close-up shots, players and referees, is important for understanding and extracting video semantic content, and modeling and detecting the events in the sports video. The features associated with each sequence and object comprises their definitions in terms of low-level features as used in the context of video analysis. The category of sequences and objects and the selection of features are based on domain knowledge. Sports domain ontology is constructed are described( Liang Bai et al 2007).

According to Tegos et al (2008), the ontology learning involves finding the semantic relations of concepts that have been annotated in the corpus and finding the cardinality restrictions for the extracted relations. The 34-year-old, World marathon record holder and two-time Olympic and four-time World 10,000m champion Haile Gebreselassie of Ethiopia. **Athlete** (name: Haile Gebreselassie, age: 34, nationality: Ethiopia, gender:NotFound). **Sports Competition** (sport-name: 10,000m, city: Hengelo, stadium-name: NotFound, date: 24 May). Domain ontologies consist of concept and semantic relations among these concepts and a set of inference rules. Three core subtasks in process of ontology learning are learning the concepts that will constitute ontology, learning of semantic relations among these concepts and set of inference rules.
According to Changsheng Xu, Jian Cheng, Yi Zhang, Yifan Zhang, Hanqing Lu (2009), is an achievement on semantics extraction and automatic editorial content creation and adaptation in sports video analysis.

Sunitha and Govinda rajulu (2008) suggested that the process for Ontology construction for sports Broadcasted event taken as a source, and based on which, core Concepts, abstract concept class, concrete concept classes, concept instances and the concept hierarchy between them are identified. Concept represent persons, places, events, actions, score, terms, topics or anything that is desirable to mark the presence in the media object. Concepts may be organized in to hierarchies as presented by Sunitha Abburu and Anandhi (2010).

Domain Ontology is a cutting-edge during the era of the Semantic Web. Ontology in the field of sports events and Fundamental Ontology, and then makes a comparison between them. It proceeds to provide recommendations for the improvement. The characteristics of Ontology in the field of sports events are summarized and its logical triples interpreted. The intelligent application of Ontology in the field of sports events is consequently discussed (Jugan Xiao and Jing Chen, 2013).

2.5 IMPORTANCE OF CONSTRAINT SATISFACTION PROBLEM FOR SPORTS DOMAIN

Constraint satisfaction is an intuitively simple but expressively powerful concept. It has emerged as a major research field within artificial intelligence and computer science. It has focused on two areas: firstly the modelling of complex problems as constraint satisfaction problems (CSPs), e.g. in planning and scheduling, scene analysis, combinatorial problems, etc., and secondly the development of search techniques for efficiently solving
such problems as presented by (Kautz and Selman 1996), scheduling (Bejar and Manya 2000).

According to Regin, (1999), constraints useful to be able to express certain items that should be grouped as pairs, for example in the problems of sports scheduling or rostering.

A hybrid tabu search Costa (1995), stated that the respond to the National Hockey League’s scheduling problem has good potential for solving various planning and scheduling problems related to sporting events.

The traveling tournament problems (TTP) had been explored through the use of heuristic techniques (Hamiez and Hao (2001), Ribeiro and Urrutia (2004) involving up to 32 teams. Burke (2004) has worked with the venue allocation problem heuristically.

Sports league scheduling problem approach adopted is based on a formulation of the problem as a Constraint Satisfaction Problem (CSP). Sports League scheduling problem instances of up to 40 teams representing 780 integer variables with 780 values per variable as claimed by Jean-Philippe Hamiez, Jin-Kao Hao (2001)

According to Hassapidou (2001), in sports tournament scheduling is defined as the process of assigning essential sport activities in sequence with the time needed to complete each activity. Sports activities take place at school, college and professional levels. When organizing a tournament at any level, it is important to have a schedule for the sports tournament in order to achieve the sports event’s goal has discussed in Walker and Stotlar (1997), as well as these sports activities need to be done within a timeframe discussed in Lussier and Kimball (2004).
According to Hon Wai CHEN (2002), to solve sports tournament timetabling problems. The sports timetabling problem model as a CSP. The CSP is use to search heuristics.

Lussier and Kimball (2004) and yang (2002), proposed a sports management is a multidisciplinary field that integrates the sports industry and management. Hassapidou (2001) suggested when the interest in sports has increased greatly over the last decades, which are to handle variety needs and requirements as well as these sports activities need to be done within a timeframe.

Sports league scheduling is particularly interesting type of constraint satisfaction problem (CSP) which has attracted significant research interest [refs: sports sched + Tricks website]. The CSP, in general, and sports scheduling, in particular, are NP-hard requiring exponential computing time in the size of the problem as stated by Bistra et al (2004).

Sports tournament scheduling as reflected in the quality of tournament schedule in University. The sports tournament problems that inefficiency of the human scheduler, time-consuming task and unfairness among the athletes that need to be solved gives direction and motivation in investigating the problem of scheduling the sports tournament. An innovative hybrid of a constraint-based search, which is an exploration into alternative and improved methodology in the problem of sports tournament scheduling with special multiple constraints. A scheduling system is then developed. As a result, fair distribution of break or rest times and game venues among the competing teams are achieved in our objectives. It provides the feasible, optimum, efficient and quick solution (Soong et al 2011).

According to Razamin Ramli (2012), the sports tournament scheduling problem in a university campus setting is taken as a case problem
and thus, modeled as a constraint satisfaction problem (CSP). The university sports tournament scheduling problem is modeled as a constraint satisfaction problem (CSP), where a finite set of variables, a function which maps every variable to a finite domain and a finite set of constraints restricting the values that the variables.

Sport development is about helping people from all backgrounds to start playing a sport, to stay in their chosen sport, and to succeed at it. Sport development planning is a process for achieving these goals. However, due to a lack of sport-specific planning tools, sport organisations have long borrowed and applied generic management principles, theories and models (such as situation analysis and strengths, weaknesses, opportunities and threats analysis) Popi Sotiriadou (2012).

2.6 SUMMARY

The design and development of sports e-learning system has been designed for the sports e-learners. Hence the existing methodologies adopted for designing the sports e-learning system are analyzed. In this research work, the sports e-learning system is focused on physiological variables of the e-learners for learning the physical activities involved in sports. The role of physiological variables in training activities is extensively analyzed.

For effective information processing in sports, existing sports ontologies are studied. Finally for identifying suitable physical activity based on individual’s physiological variables and also plan and schedule the training activities, Constraints Satisfaction Problem(CSP) has been analyzed and designed.