

ABSTRACTS-YEAR 2004

THESIS

COMPUTER SCIENCE

CS-04-01

SEMANTIC WEB GIS

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In this work, a framework of Semantic Web GIS based Web service has been proposed which allows implicit information to be extracted intelligently. This framework is based on XML Declarative Description (XDD) for performing intelligent data inference. GML has been selected as a format to store and manipulate data instead of ordinary RDBMS or XML format. A prototype web application with a domain of healthcare planning is also provided to demonstrate the power of XDD. A number of techniques have also been used in the implementation in order to fulfill the goal.

CS-04-02

PERSONAL INTELLIGENT SPAM FILTER

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Communication via email could have been more reliable if there were no unsolicited commercial email so-called spam. Unwanted advertisement and materials attached with spam have cost time and money of both normal user and business. This study demonstrates an efficient, intelligent way of spam filtering based on Naive Bayes classifier to detect spam at the server level. The filter tailors itself to each individual user by enabling correction for misclassified emails to make a better result. The filter prototype is installed on the mail server to demonstrate real usage scenario.

CS-04-03

NORMALIZATION FOR XML DATABASES

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This thesis takes a first step towards the design and normalization theory for XML database. As relational databases, an XML database may contain redundancies; consequently, the redundancies may result in data inconsistency and storage waste. The redundancies are caused by functional dependencies among the subtrees in an XML tree. The goal of this work is to find an approach to convert an arbitrary DTD into a redundancy-free DTD, so that avoids those problems. In order to achieve the goal, firstly, a data model, an unordered tree, is proposed for an XML database. Secondly, the functional dependency is defined based on the data model. The implication of functional dependencies is discussed, too. Then a normal form, together with a justification for it, is presented. Finally, an algorithm for converting a given DTD into the normal form is stated.

CS-04-04

COMPARATIVE ANALYSIS OF SOFTWARE ARCHITECTURE DESIGN METHODS. CASE STUDY: WEB-BASED EDUCATION MANAGEMENT SYSTEM

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The role of software architecture has changed. A number of software architecture design methods answering the needs of individual software systems have been developed but there are no available studies comparing them. Two methods for designing software architecture of individual software systems are ADD, and QASAR. In this thesis, an evaluation framework is introduced for comparing software architecture design methods for individual software systems. The framework considers the methods from the points of view of method context, user, structure and validation. The selected design methods are evaluated according to the framework and the results are described in the form of a comparison table. The comparison of the two design methods largely rested on the available literature and an actual use of the methods on a case study, WBEMS, where both methods were applied to design the software architecture.

CS-04-05

TEACHING AND LEARNING CLIENT/SERVER PROGRAMMING WITH JAVA TSOCKETS IN WEB-BASED ENVIRONMENT

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The World Wide Web provides good opportunities for education over the Internet. The web together with other network tools can be used to create a computer-based tutoring system that can help students in solving programming problems, which has significant potential for improving the quality of programming education and reducing instructor's workload.

The purpose of the study is to develop an interactive Web-Based Teaching and Learning Model to client/server programming (WBTLM) with Java sockets. WBTLM will allow students to undertake programming exercises by "filling in the blanks" of a partial Java program presented in a web page, run client/server program demonstration simulating how actually a specific

network program works. The aim is to provide a learning environment which meet students' needs, giving greater flexibility in time and place of teaching and learning.

This thesis's work describes an educational resource that can help students understand client/server programming. A series of Java applets and explanatory material have been developed to illustrate Java socket concepts. Two types of sockets are discussed and mentioned: TCP socket and UDP socket. Each type of socket is expressed as a learning object. These learning objects can be used, re-used or referenced during network programming support learning.

Students can learn client/server network programming with Java sockets using a top-down approach, starting with general concepts and progressing down to more concrete ones. Each learning object begins with a client/server application as a whole, what socket procedure calls are used during client/server communication, how object interactions are expressed and arranged in time sequence. Then viewing the source code of client and server program is implemented in flexible interactive manners, seeing the explanation together with source code indication. Application demonstration and practice tests are helpful for students not only to revise the lesson but also to practice tests on their comprehension of the principle of sockets. And finally, students can verify their understanding by modifying the client and server source code with coding exercise assessments.

CS-04-06

A LAST-MINUTE AUCTION IN TRAVEL INDUSTRY

Le Thi Nhan

Dr. Vatcharaporn Esichaikul

Electronic Auction (e-auction) has rapidly become one of the most widespread applications in Electronic Commerce. Everyday, there are many buying and selling transactions happened in auction sites, and most of them take place in forward auctions. Within those e-auctions, the online products are almost everything such as electronic parts, artwork, vacation packages, airline ticket, collectibles, etc.

In this thesis, the reverse auction was studied and implemented by proposing the suitable bidding mechanism for last-minute product, which have a limited lifetime, like hotel rooms. These vacant rooms should be sold as soon as possible before their value becomes nothing. Therefore, the Last-Minute Auction not only helped the buyers get their desired rooms, but also helped the sellers sell quickly their rooms.

Besides, this research combined the Hungarian algorithm and Branch-and-Bound search to match the buyer's demand and the seller's supply and optimize the auction owner's profit. These algorithms yielded the approximately optimal solution that satisfied the conditions of research's problem.

CS-04-07

AN INTERACTIVE WEB-BASED ENVIRONMENT FOR TEACHING JAVA RMI USING LEARNING OBJECT

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Learning to program is hard, but teaching to program is harder. Using a proper model for teaching programming language is very important. The objective of the study is to describe in details an instructional design of Learning Objects to create an interactive Web-based teaching and learning environment. As a result, it is used to teach Java Remote Method Invocation for Information Technology students in university undergraduate courses.

The proposed system named Wormy is a combination of the Question and Answer framework, the extension of BlueJ environment, and the learning domain including Learning Objects to create an Web-based instructive environment that helps learners to improve their programming skills and self-taught abilities, to have a clear understanding of RMI concepts, and to ask good questions to Question and Answer system. The demonstrative application with visualization approach is implemented to illustrate how to design and implement a distributed application using Java Remote Method Invocation. Finally, WebRMI can help instructional designers to be able to update contents of existing learning objects or to make a new learning object based on a given template.

CS-04-08

DESIGN AND DEVELOPMENT OF A CERTIFICATE ISSUING SYSTEM

Tran Van Canh

Prof. Phan Minh Dung

Design and implement a digital certificate issuing system is the goal of this thesis (such system is called Certificate Authority). A Certificate Authority (CA) is a trusted organization that accepts certificate applications from clients, authenticates applications, issues certificates, and maintains status of information about certificates. A CA may provide a Certificate Practice Statement that clearly states its policies and practices with regard to issuance and maintenance of certificates. We choose X.509 v3 digital certificates as the product of our system; this is because of the wide used and extensible of X.509 v3 standard for security solution developments. The system is constituted from "client supported tools" and "admin tools" which are built in this study. People who need to have digital certificates use "client supported tools" to generate their public/private keys and also create "certificate request" files as the secure means to transfer the public keys to CA. The system also provides an implemented protocol to support users to change their keys bound on their certificates so easily.

The CA "admin tools" contains a very certain components of a CA, such as "certificate registration", "certificate generation", "change key on certificates", "Certificate Revocation List generation" and "certificate distribution". Even though most widely used, X.509 v3 certificate standard still does not support any mechanism to protect sensitive attributes on each certificate. X.509 v3 allows us to add extension attribute fields into a certificate, but these additional information on certificates are used without any privacy consideration. From this point of view, we offer a solution to improve the current system in order to deal with the problem of protecting sensitive attributes on certificates.

INFORMATION MANAGEMENT

IM-04-01

APPLICATION GENERATOR BY DOCUMENT TRANSFORMATION IN SPECIFIC DOMAIN (RENTAL APPLICATION)

Ms. Arpakorn Tantisirithanakorn

Prof. Vilas Wuwongse

The problems with existing object models for distributed applications forced developers to look for alternatives. With the rapid adoption of Web standards, it is natural that solutions based on Web standards would be considered. This led to the evolution of Web services. The Web services paradigm enables automated web application interoperations. The first step toward this interoperation is the location of other services. Although there are many service brokers performing location of Web services, most of them do not allow a client to search for Web services by their capabilities. The traditional UDDI search is restricted to keywords and key reference matching. Moreover, with the evolution of Web service technology networked services will not only become increasingly sophisticated, but also move into the area of business-to-consumer interactions. This study suggests a Web service modeling and interface design for teaching programming language on the internet such that users without technical and domain knowledge could take the benefits and learn programming on the web. The resultant guidelines aim to provide feasible Web Service modeling to the new environment with minimum amount of workload, such that maximum amount of resources could be reused from the present system to work on the new environment. The prototype system is constructed as an E-Learning framework. A prescribed strategy and a set of guidelines have been adopted on the Q&A e-learning system as an implementation.

IM-04-02

WEB SERVICES AND INTERFACE FOR SUPPORTING E-LEARNING SYSTEMS

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Dr. Dencho N. Batanov

The problems with existing object models for distributed applications forced developers to look for alternatives. With the rapid adoption of Web standards, it is natural that solutions based on Web standards would be considered. This led to the evolution of Web services. The Web services paradigm enables automated web application interoperations. The first step toward this interoperation is the location of other services. Although there are many service brokers performing location of Web services, most of them do not allow a client to search for Web services by their capabilities. The traditional UDDI search is restricted to keywords and key reference matching. Moreover, with the evolution of Web service technology networked services will not only become increasingly sophisticated, but also move into the area of business-to-consumer interactions. This study suggests a Web service modeling and interface design for teaching programming language on the internet such that users without technical and domain knowledge could take the benefits and learn programming on the web. The resultant guidelines aim to provide feasible Web Service modeling to the new environment with minimum amount of workload, such that maximum amount of resources could be reused from the present system to work on the new environment. The prototype system is constructed as an E-Learning framework. A prescribed strategy and a set of guidelines have been adopted on the Q&A e-learning system as an implementation.