COMPUTER SCIENCE

CS-00-1
SEMANTICS OF CONCURRENCY IN JAVA
MD. Anisur Rahman
Prof. Phan Minh Dung

Java supports concurrent programming by means of threads that independently execute code. Such code operates on Java values and objects residing in a shared main memory. Every thread owns a private working memory in which it keeps working copies of all variables it uses or assigns. Structural operational semantics of several aspects of threads is defined in this work regardless of any implementation details. To do this a subset of Java has been selected which is called Mini Java. Semantics has been given for concurrency with threads and synchronized statements. The semantics is based on the environment and state. Two kinds of environment have been used - Global environment and Working Environment. States are also divided into Global state and Working state. The semantics describes the changes in the environments and states at different situation of thread execution.

CS-00-2
DESIGN AND IMPLEMENTATION OF A CODING SCHEME FOR IMAGE COMPRESSION USING ORDERED BINARY-DECISION
Krit Witwiyaruj
Dr. Kanchana Kanchanasut

Ordered Binary Decision Diagram (OBDD) is a directed acyclic graph, which has been used as an efficient tool to reduce the amount of space and computation required for verifying digital circuits by removing redundant copies of sub-functions. More recently, OBDD has been proposed to represent images for image processing where an image can be considered as a large Karnaugh map used in logic design. However, the application of this tool to the problems of image compression has not yet been explored. In this thesis, we apply an Ordered Binary Decision Diagram (OBDD) to represent an image in both bi-level and gray-scaled formats and perform essential operations on the image. A new approach of representing an OBDD data structure linearly using Adaptive Huffman coding is proposed and implemented. We show that linearly encoded OBDD provides an effective lossless coding for photos and bitmap graphics. The typical compression ratio is about 1.3:1-3.4:1, which is times better than well know lossless compression method GIF (Graphics Interchange Format).

CS-00-3
A FLEXIBLE PLUG AND PLAY ARCHITECTURE
Pongtawat Chippimolchai
Prof. Vilas Wuwongse

Plug-and-Play Networking means that a component in the network has the ability to automatically configure itself according to its capabilities, its environment and changes in its environment. In the dynamic plug-and-play system, a component does not have a fixed functionality (behavior). Rather their functionality is assigned to them according to the needs in the system and the component's capabilities. The functionality of a component may be changed later as need arise.

A dynamic component is a component framework that enables the creation of a flexible component that allow its functionality to be change after it has been deploy. A predefined service is the basic capabilities of the component; an installable service is functionalities that can be assigned to the component. An installable service may depend on a component's predefined service. The functionality available at a component is represents by its service interface. Each functionality has exactly one service interface associated to it and vice versa. The dynamic component use remote evaluation paradigm of code mobility to supports its dynamism.

The Simple Dynamic Plug-and-Play architecture (SDPnP) is a dynamic plug-and-play architecture based on dynamic component framework. An SDPnP system consists of two or more interacting instances of SDPnP component, a specialization of the dynamic component. An SDPnP component locates each other by the help of a directory component. If an optional manager component is present, it will monitor and control the behavior of all SDPnP components in the system as well as the overall behavior of the system itself. The manager component also provides the installable service management functionalities.

CS-00-4
A MODEL FOR SELECTION OF SECURITY TECHNIQUE
Piriya Utamachant
Prof. Vilas Wuwongse

Computer technology and expansion of global networks makes information available all over the world. While information technology has developed dramatically, new threats and attacks have also been introduced. The role of computer security is to develop countermeasures for their capture, whence many security techniques have been developed.

Many of these countermeasures have different objectives, advantages and weak points. Such features can be evaluated by measurement models. Unfortunately, none of them can evaluate suitability.

The goal of this research is to construct a general model to assess the suitability of security techniques for employment in organizations. The model takes into account a set of standard criteria that affect an organization.

CS-00-5
FPGA BASED VIDEO COMPRESSION USING BDD
Mongkol Ekapanyapong
Dr. Kanchana Kanchanasut
Recent development on a new paradigm involving image mapping by using Ordered Binary Decision Diagram (OBDD) has significantly shown the effectiveness in both the image compression and recognition. Nevertheless, there are many applications related to image processing that have not yet been explored. Video compression is one such application that could benefit from the use of OBDD as the Boolean operation required by the video compression can be directly applied to OBDD.

In this research, video compression using OBDD representation is designed and implemented. As an alternative to the software based, reconfigurable computing is employed to enable higher degree of computing speed. Using this approach, simulation experiment shows that video compression speed using reconfigurable computing gains thousands times faster than the one based on software alone. The compression ratio ranges from 3:1-10:1 depends on the patterns of video input.

CS-00-6
A BAYESIAN NETWORK MODEL FOR CONTROLLING HYDROGEN PEROXIDE PRODUCTION PROCESS
Kyaw Hlaing Aye
Prof. Ramakoti Sadananda
Bayesian belief networks have proven to be an effective technique for representing and reasoning with uncertain knowledge. A Bayesian network is a graphical representation of a probability distribution. Therefore statistical techniques can be used to construct Bayesian networks from data.

This thesis presents a Bayesian network model of the hydrogen peroxide production process. The purpose of the model is to aid in controlling the process in order to maximize production. The quantity of hydrogen peroxide produced is a function of the relative concentration of the components of the working solution. But measuring these components takes an inordinate amount of time. Therefore, the a Bayesian network was build that can estimate the concentrations of the solution components based on quantities that can be easily measured during production. The network was built using four and a half years of data from one particular production plant. A user interface was constructed that permits the user to enter observations and in response suggests adjustments to the concentrations of the working solution components. The interface is domain specific and does not require the user to have any knowledge of Bayesian networks. The model is empirically evaluated by comparing the predictions to actual values for 60 days of readings.

CS-00-7
REACTIVE MULTIMEDIA SYNCHRONIZATION MECHANISM FOR SML
Chaiwarat Chaiyapotpanit
Dr. Kanchana Kanchanasut
Synchronized Multimedia Integration Language (SMIL) is a temporal specification language, which defines a language for specifying a temporal specification requires a specification dependent mechanism called Multimedia Synchronization to control multimedia objects according to the predefined schedule. The synchronization mechanism for SMIL involves synchronizing the unscheduled events such as user interaction with the scheduled part of the presentation.

Conventionally, there are two approaches to develop multimedia synchronization mechanism either using threads or general sequential process. In this thesis, a new approach based on the reactive system concept is introduced and shown to provide an effective mechanism in handling multimedia synchronization for SMIL with ease in both the design and implementation. Common properties of the reactive system such as synchronous hypothesis, preemption, and signal broadcasting can be utilized to enforce temporal relations within SMIL temporal specification.

CS-00-8
DEVELOPMENT OF AN XML DATABASE ENGINE
Pichai Lertprasitpun
Prof. Vilas Wuwongse
Since modern applications have applied Extensible Markup Language (XML) to encode their data and information, traditional databases including relational and object-oriented databases have been used to handle XML documents. The traditional databases however lack of simple mechanisms for dealing with XML documents' hierarchical structures and require XML data to be translated into a set of related tables or objects, which substantially affects searching performance.

The study proposes an efficient data structure for XML documents based on functional requirements for XML document databases and develops a C++- and main memory- based engine for management of hierarchically structured XML document databases, founded on the proposed data structure. The engine is evaluated by analysis of relationships among four important factors: searching time, database sizes, complexity of query statements and numbers of qualified results. The results illustrate that the engine is efficient: searching time of a certain query is a linear combination of the database size, the number of qualified results and the query complexity.

CS-00-9

DATA MINING WITH CLUSTERING METHODS

Tatpong Katanyukul
Prof. Huynh Ngoc Phien

Clustering is the important preliminary task for data mining. Its result is useful for data reduction and hypothesis extraction from data. The complication of data characteristics can degrade the clustering performance. Multivariate time-series data is one of the complications. In the study, a new method for graphical display was proposed for efficient representation. Three classical clustering algorithms and the self-organizing map with three ways of distance measurement were applied to cluster the multivariate time-series data set obtained from the UCI KDD Archive. The results were inspected by graphical views accompanied with the statistical figures. It was shown that the proposed method can display the results obtained from the four different clustering methods very well. It was found that the Euclidean distance performs very satisfactorily for the data set employed.

CS-00-10

AN AGENT-BASED SOFTWARE ANALYSIS AND DESIGN USING OBJECT-ORIENTED AGENT PATTERNS

Thepparit Banditwattanawong
Prof. Ramakoti Sadananda

It is perceived that only pure object-oriented techniques are inadequate to face challenges effectively in intelligent software development. To overcome this limitation, the agent concept has been used to extend traditional object-oriented paradigm resulting in the important basis for effective intelligent-software developing approach. Yet, almost all software agent-based systems and frameworks in present existence have been doing many of the same things. The differences in the way agents communicate, their level of autonomy, intelligence, and mobility have created difficulties in development. These have led to formalizing wisdom and experiences of developers by formulating the Agent Design Patterns as presented in this piece of work.

Besides the agent principle, the formulated approach in this piece of work has foundations upon the specialization of common activities typically performed in many object-oriented methods, the object-oriented modeling techniques, and the combination of new additional phase termed Agentification into it. The agentification phase plays the role of gateway to embed some useful agents into the developing system. Additionally, every phase of formulated methodology highly expects to gain directly and indirectly the reusability advantages derived from some of captured agent design patterns.

 The proposed methodology and agent design patterns were evaluated with a prototype named Component Upgrader. It consists of mobile and collaborative agents, which were systematically developed by means of the formulated methodology; and all created agent design patterns were fully applied to it to increase efficiency and acceleration of the development. The Java-based Aglet platform was used during its implementation.

CS-00-11

REASONING WITH UML CLASS DIAGRAM AND SEQUENCE DIAGRAMS USING XML DECLARATIVE DESCRIPTION THEORY

Teera Tosukhowong
Prof. Vilas Wuwongse

The Unified Modeling Language (UML) is a standard modeling language for designing objected oriented systems. This study proposes a practical framework for reasoning with UML diagrams that are represented in XML format in order to verify the correctness of input UML diagrams and transform them to other implicitly equivalent diagrams. In this framework, graphical modeling elements are captured in XML elements as facts in a knowledge base whereas a general knowledge in the domain of UML, about consistency and implicit relationships between modeling elements, is represented as a set of rules in XML format. The XML Declarative Description (XML DD) is used as a knowledge representation of these facts and rules. The Equivalence Transformation (ET), a new computation paradigm, is employed as an inference mechanism to process UML diagram encoded in XML format. To allow UML diagrams containing OCL constraints to be reasoned in a uniform way, the framework provides the way to capture these constraints in XML elements with a validation against their DTD. To show the results of this framework, a set of XML DD rules for verifying and transforming UML modeling elements in class diagram and sequence diagram are proposed and applied on an example UML model of an ATM system.

CS-00-12

DESIGNING AND IMPLEMENTATION OF ELECTRONIC COMMERCE APPLICATION FOR MISSION-CRITICAL BUSINESS CASE STUDY: "DOT-COM SOLUTION FOR TRAVEL BUSINESS"

Masroor A. Rajpar
Prof. Phan Minh Dung

This study is about the analysis, designing and implementation requirements of electronic commerce application of doing the mission-critical business for organizations. This study proposes how to design and implement electronic commerce component to do business online. These components are clustering in electronic commerce application to provide scalability, reliability, and availability, web-to-host connectivity, business plan, technology plan, and system component. So in this regard I have taken example of online travel business as my case study.

CS-00-13

PERSONALIZATION TECHNIQUES FOR E-COMMERCE APPLICATIONS IN WIRELESS INTERNET ENVIRONMENT

Nyo Maw
Prof. Phan Minh Dung
Internet access is transforming the way the world operates. The World Wide Web and e- mail are becoming the lingua franca of modern living. In the meantime, the rapidly expanding technology of cellular communication, wireless networks and satellite services will make information accessible anywhere at anytime. Recent advances in wireless data networking and portable information appliances have engendered a new paradigm of computing. In this paradigm the users can carry portable devices have access to data and information services regardless of their physical location or movement behavior. The integration of wireless mobile communications with Internet technology is a challenging trend.

In present dynamic business environment, the companies are forced to become more competitive in order to survive. The user paradigm in wireless application environment has changed dramatically, especially in business applications. Users are more rigorous on their interested information, under the notion of "My" domain. This new trend forced business contents and services on the Internet to become user oriented, customized and personalized ones.

Among many personalization approaches, Web usage mining, which is an application of the data mining techniques, can extract the usage pattern of users and the knowledge of user preferences. In this study, it has proposed, developed and tested architecture and algorithms for personalization process, performing Web usage mining, which will give user preference pattern.

CS-00-14
WIRELESS UNIDIRECTIONAL WEB
Chindaporn Snunkreang
Dr. Kanchana Kanchanasut
With a tremendous growth of interest to access the Internet via mobile devices, Wireless Application Protocol (WAP), has been introduced as a bridge to connect between mobile Network and the Internet world. With the current WAP technology, a WAP gateway is employed to translate data between regular mobile packets to the Internet protocol. If millions of users of the mobile network are moving to the Internet technology, WAP gateway can easily become overloaded. As a result, this thesis proposes to deploy the concept of unidirectional traffic for mobile web access with multiple WAP gateways. With the new system, the return packets from the web server do not have to be channeled through the same WAP gateway.

Improvement on average response time per each client's request was observed in the new system. The number of gateways has been shown to effect the average response time and the new system dramatically improves the overall performance in case of large number of hops.

CS-00-15
AUTHENTICATED VIRTUAL PRIVATE NETWORK
Piti Cherntanomwong
Dr. Kanchana Kanchanasut
Virtual Private Networks (VPN) are used by companies for connecting between their headquarters and remotes branches because the company can eliminate the leased line cost, which is extremely expensive. However, VPN is unsafe because it uses only one-time authentication. A VPN server authenticates its client when the client requests to start a connection. After the verification has been accepted, the connection is established. The weakness of a VPN is that there is no re-authentication while the connection is active. An intruder can avoid an authentication and get into the VPN by faking an authenticated machine's IP address. To provide secured VPN, this study proposes the re-authentication technique that allows a VPN server to re-authenticate a client for as long as the client is connected. The proposed model provides varying degree of security where 100% secured is achieved by re-authenticating every packet. In this study, it was found that the additional time required per packet is 0.4 second. Varying degrees of security could be achieved by changing the frequencies of re-authentication. A hybrid scheme, to mix re-authentication cycles versus extra effort required in re-authentication, is given as a result of this study.

CS-00-16
VOTING ALGORITHM FOR GA BASED FEATURE SELECTION
Huang Qiuwei
Dr. Qi Yulu
Feature selection refers to the task of identifying and selecting a useful subset of features to be used to represent objects from a large set of often mutually redundant, possible irrelevant features with different associated measurement costs and/or risks. Selecting an "optimal" subset of variables from a set of variables is a necessary and important step in many applications, because it can allow classification algorithms to improve their prediction accuracy, shorten the learning period, and form a simple concept.

Genetic Algorithm, a general and efficient search method, is used as a tool for feature selection. Two kinds of classification procedure are used to serve as the evaluation function, namely Linear Regression classification procedure and Linear Discrimination classification procedure. Coefficient of Determination based fitness function and Partial Correlation Coefficient based fitness function are the objective functions for measurement of feature subsets.

Voting algorithm can reduce the error rate of classification procedure by combining the results of multiple classifiers. Two kinds of voting algorithm are proposed in this study. The main difference between them is the way by which the classifiers are generated. The first produces classifiers by using the best individuals in each generation during GA search process; and the second does it by changing the distribution of training set. Majority voting is used for generating the final results.

CS-00-17
PACKET DELIVERY SCHEDULING FOR RELIABLE MULTICASTING OVER UNIDIRECTIONAL LINK

Wacharapol Pokavanich
Dr. Kanchana Kanchanasut

Reliable Multicast is encountered in many applications where there is a need to disseminate information to a large user community in a wireless asymmetric communication environment. To utilize the transmission media effectively, it is necessary to have efficient scheduling algorithms that can balance individual and overall performance, and also can scale in terms of client population and transmission bandwidth.

This paper considers the problem of multicasting over unidirectional links that did not provide any feedback channel. The way to provide the reliability mechanism is to transmit data consecutively until the end of available time period. This study proposed "Multi-level Queue" for the scheduling algorithm and separated each data by the priority. The scheduling used the scheduling pattern to control data transmission of each queue.

CS-00-18
ON THE RELATIONSHIP BETWEEN XML QUERY LANGUAGES

Phan Minh Thang
Prof. Huynh Ngoc Phien

The emergence of XML as a standard for representation on the Web is expected to greatly facilitate the publication of electronic data by providing a simple syntax for data that is both human and machine-readable. While XML is itself relatively simple, it is surrounded by a confusing number of XML-enabled systems by various software vendors and alphabet soup of proposals (XML-Data, XML-Schema, etc.) for XML-related Standard.

Although the document and database viewpoint was, until quite recently, irreconcilable, there is now a convergence in technologies brought about by the development of XML for data on the Web and data in the database community. A constant theme is bridging the gap between logical representation of data and data modeling on the one hand and syntax and functionality of document system on other.

The thesis focuses on three main XML query languages that were adopted to evaluate the database on the Web. It also demonstrates the connection between them.

CS-00-19
LEARNING DOCUMENT TYPE DEFINITION FROM XML DOCUMENTS

Phanom Slisatkorn
Prof. Vilas Wuwongse

Extensible Markup Language (XML) is a new Web standard especially designed for delivering structured data and documents over the Web and currently plays an increasingly significant role in Web applications and data interchanges. XML documents can optionally include rules to restrict the structure of elements and attributes in terms of a Document Type Definition (DTD) or an XML schema. A DTD provides a means to validate the structure of documents. However, since DTDs are not compulsory, there exist XML documents without any DTD. Identifying a DTD from such documents is useful but not readily achievable. Therefore, this research aims at developing a learning mechanism to obtain quality DTDs from given sets of XML documents. We present an innovative concept that introduces the star height of variables into our process for precisely inferring ?, +, * meta characters and enables regular expression pattern detection between input sequences. Together with the factoring, reduction and generalization steps, the concept forms a learning mechanism which can infer concise meaningful DTDs. Experiments are carried out to demonstrate the effectiveness of the mechanism and compare its efficiency with that of the other existing approaches.

CS-00-20
ROUTING IN THE WEB CACHE SYSTEMS

Woralak Kongdenfha
Dr. Kanchana Kanchanasut

Recently, the number of Internet users has dramatically increased. To sustain this growth by reducing high volume of traffic, bringing popular objects closer to the user is an idea of cache system. However cache systems still have many hindrances to be resolved such as redundant storing objects, manual configuration of all neighboring caches in the system and unnecessary inter-cache communication. Therefore a metadata has been introduced into cache system to overcome these problems. This approach is called WebHint system. Nevertheless, existing WebHint system still confronts with some drawbacks, such as the requested objects are retrieved from non-optimal location, since it does not take into account the network topology and network status.

CS-00-21
RELIABLE CONTENT DELIVERY OVER UNIDIRECTIONAL LINK USING IP DATAGRAMS

Nuttamon Kanusattayanon
Dr. Kanchana Kanchanasut

In this thesis, the routing mechanism is applied to improve the performance in proxy location selection for WebHint system in a large distributed caching system, where each cache server may be located in different networks or autonomous systems.

Routing information and decision algorithm of Border Gateway Protocol are proposed to be incorporated into the WebHint system to select the appropriate object's location. The experimental results indicate that the proposed WebHint system (WebHintR) can effectively reduce user's response time up to 63% in the case where cache servers are distributed in different autonomous systems.

CS-00-22
ACCESS CONTROL IN E-COMMERCE SYSTEMS
Jirasak Submanee
Prof. Phan Minh Dung

Electronic commerce, in abroad sense, is the use of computer networks to improve organizational performance. Increasing profitability, gaining market share, improving customer service and delivering products faster are some of the organizational performance gains possible with electronic commerce. Electronic commerce based on Internet technologies is profitable for organizations. But the more Internet makes a organization easily reachable for the rest of the world, it also makes the rest of the world easily reachable for you, including for the bad guys. These guys will try to find vulnerabilities on Internet, and exploit those weak points for their benefits that usually contradict with the interest of that organization.

CS-00-23
SEARCH ENGINE FOR XML DOCUMENTS
Tossapol Piboonkiatikul
Prof. Phan Minh Dung

Hence, a common question is "Is the Internet safe for commerce?" in a sense, this is the wrong question; a better one might be "Can the Internet be safe enough for my business?" Just as we use different locks for houses than for bank vaults, there are many different technical components used for security in Internet commerce, and they depend on such questions as the rinks, costs, and the value of the information involved. This paper, attempts to review the role based access control model along with security requirement including the security mechanisms available in different aspects of Electronic commerce. In addition to a prototype of the model is analyzed, designed and implemented systematically to test its applicability in real world situations.

CS-00-24
FOUNDATION OF GREGORY PATCH
J. Seng Ja
Prof. Huynh Ngoc Phien

The Gregory patch is a modification of the Bézier patch using Gregory's solution for the twist incompatibility in a Coons patch. The main feature of the Gregory patch is that the four cross boundary derivatives are independent of each other. The interior of the surface is interpolated smoothly by the Gregory surface. According to the different blending functions, the shape of the Gregory surfaces is different with the same sub-control points.

The study covers Bézier, Ball and Coon's patches. A generalized form of a set of Gregory patches is presented. It is shown that the Gregory approach to surfaces provides a very good way to develop new surfaces and to interconnect the given surfaces subject to a member of geometric constraints.

CS-00-25
GA BASE DYNAMIC MANEUVER BOX SIZES SELECTION FOR AN ACTIVE TRACKING FUNCTION MODEL
Natee Pantong
Dr. Qi Yulu

Active Tracking Function (ATF) is one of calculation parts used in Air Defense Systems. It performs the important role in calculating the track prediction of aircraft. Active Tracking Function can be divided into three stages, Correlation, Smoothing and Track Prediction. The smoothing stage is used to calculate the smoothing values of position and velocity for predicting track in track prediction stage. The data used for the calculation in the smoothing stage are the radar returns from the radar sites, which will be selected by the Maneuver Box. In present system, the sizes of Maneuver Box are set to some fixed values, which make the tracking system have some undesirable number of track losses. This event reduces the tracking system automatically because the operators have to reinitiate the track to maintain the track of aircraft after losing of track.

In this study, we have modified the ATF to use the dynamic sizes Maneuver Box. The Genetic Algorithm (GA) is employed as the search algorithm for searching the optimum sizes of Maneuver Box by using Cheap Joint Probabilistic Data Association as its fitness function. The experiment is carried out to test the effectiveness of the GA base dynamic sizes Maneuver Box with the different population size and number of generation. The results of the experiment show that using the GA base dynamic sizes Maneuver Box, it is possible to achieve the improved performance of tracking system.

CS-00-26
THE INFRASTRUCTURE OF VIRTUAL MARKETS
Voraluk Phoomratsameewong
Prof. Phan Minh Dung

This thesis proposes an infrastructure for a selling and buying process on the Internet. The infrastructure aims to help users spend their time as less as possible to sell or buy products by applying an agent mechanism and the XML mechanism. An agent is a process that performs a task for a user. It imitates user's behavior after getting user requirements. It performs a task automatically until achieves predefined requirements. The agent informs a user about a processing result before terminating. Sometime a user may visit to many Web sites until get a satisfied product. To imitate this behavior, the agent in this

infrastructure is applied mobility called a mobile agent. In the infrastructure, a mobile agent is a representative of a user who wants to buy product on the Internet. It travels among Web sites until gets products for its owner. For XML, it is used to represent user information and product requirements.

CS-00-27
APPLICATION OF FUZZY CONCEPTS IN CONTROL DECISION MAKING SYSTEM
Khin Ann Mon
Prof. Ramakoti Sadananda
This study aims to understand the fundamental concepts of fuzzy concepts and access its usefulness in the studies of control systems along with the example of elevator group control system. The concept seems to be potentially promising in the system where data set are fuzzy and human experience judgment plays an integral part in the process of analysis and decision making.

CS-00-28
A STUDY ON FUZZY COGNITIVE MAPS AS A DECISION MAKING TOOL
Rajendra R. Sthapit
Prof. Ramakoti Sadananda
Fuzzy Cognitive Maps allow concepts and relations among them to be fuzzy. They can represent a causal type of knowledge, which other kind of conventional knowledge representation schemes cannot process due to the presence of many feedback loops. They exist in a strange region where multiple academics discipline overlaps. Their implicitly qualitative nature is at odds with general practice in the automation of decision-making tools. Nevertheless, the complex behavior of such a simple logical construct is fascinating. We can only hope that some has to be still discovered applications of FCMs that allows their promise to be realized.

In this thesis we review some properties of fuzzy cognitive maps. The framework for fuzzy cognitive maps based on decision-making tool has been proposed as an application. The proposed method is applied in insurgency problem domain.

CS-00-29
CAPACITY PLANNING FOR WEB BASED APPLICATION
Baljinnyam Tserenbat
Prof. Ramakoti Sadananda
The widespread use of the World Wide Web and related applications places interesting performance demands on network servers. The ability to measure the effect of these demands is important for tuning and optimizing the various software components that make up a Web server.

This work examines pitfalls that one encounters when measuring Web server capacity using a synthetic workload and describes WebMT, a tool for measuring Web server performance. It provides ability for generating various HTTP workloads and for measuring server performance. The problem of the approach is to generate client request-rates that exceed the capacity of the server being tested even for short periods of time. To solve this problem, we used a method for Web traffic generation that can generate bursty traffic (Banga and Druschel, 1997) with peak loads that exceed the capacity of the server. Finally, we measured performance of particular Web server using the proposed method.

The results emphasize the important role of operating system implementation that are designed to perform well when running on Web server, in addition to the server application, which consumes a low resource requirement.

CS-00-30
OBSERVED NETWORK INFORMATION IN WEBHINT SYSTEM
Junpen Chunsatit
Dr. Kanchana Kanchanasut
To improve response time and reduce network congestion in the present WWW, centralized directory caching system has been introduced. One such centralized directory caching system is WebHint, which keeps track of proxy contents. However, WebHint does not pay any attentions to the dynamically change network status effecting the speed of the WWW access. This thesis proposed a new version of WebHint system by incorporating the knowledge of the network obtainable from the router layer and find the best web object's location with minimum cost and optimize the use of the network bandwidth available. The results of this study, which was implemented within a single Autonomous System (AS) have shown that the quality of service under the new WebHint system was significantly improved performance from the regular WebHint system.

CS-00-31
MATCHMAKING FOR INFORMATION AGENTS
Nguyen Kieu Oanh
Prof. Phan Minh Dung
The Internet not only provides data for users to browse, but also databases to query, and software agents to run. Due to the exponential increase of deployed agents on the Internet, automating the search and selection of relevant agents is essential for both users and collaboration among different software agents. This thesis research first describes the agent capability description language LARKS. Then the thesis presents an implementation language LARKS. The research did implement the

language LARKS, the matchmaking process using LARKS, checking concept consumption, computing concept distance in Java and XML.

Furthermore, the thesis discusses the research area on concept languages. A concept language is a part from Terminological Knowledge Representation systems, it is characterized by a set of operators that can be used to define complex concepts and roles. A concept describes a set of elements in the domain, and is defined by the conditions that must be satisfied by elements in the set. Several knowledge representation and inference systems, like ITL, CLASSIC, LOOM or KRIS, based on such languages are available.

CS-00-32
ORDERED-BINARY DECISION DIAGRAM FOR WEB IMAGES
Akara Prayote
Dr. Kanchana Kanchanasut
OBDD image representation has been proposed as an alternative of compression algorithm. An encoding scheme for OBDD image representation was implemented to compressed data of bi-level and gray-scaled images. It has been shown to provide better lossless compression for bi-level images than GIF.

This thesis proposed techniques to improve the efficiency of compression. To eliminate dividing a gray-scaled bitmap into eight separate bitplanes, bitplane information was included into OBDD. It has been shown that this technique did not reduce space requirement.

Subsequently, an OBDD was proposed to contain multiple sinks, each of which represents a unique color code. It has been shown that space requirement was reduced, even though it has not been better than GIF.

Hence, the encoding scheme was adjusted to the OBDD characteristics. Adjustment in encoding scheme has reduced images sizes. It has been shown to provide better lossless compression for gray-scaled and 256-color images than GIF especially for images with pixels sharing same color are grouped together.

CS-00-33
A SECURITY ALGORITHM BASED ON "CHAFFING AND WINNOWING"
Wichit Sombat
Dr. Qi Yulu
The essence of securing information in the network environment is a major issue. Cryptographic algorithms are developed for such important task. They offer confidentiality, authentication, integrity, and non-repudiation.

Recently, a threat from law enforcement specifies that there should be "key recovery" for encryption in case serious matters occur: the "key recovery" process assists the authorized person to recover the encrypted message. Though the process is useful for the government duty, it violates the human right of privacy. Among varieties of cryptographic algorithms proposed so far, "chaffing and winnowing" algorithm offers a way to get around the "key recovery" process because it does not employ encryption.

 However, the algorithm produces large ciphertext and lacks of confidentiality. It is not applicable to the real network implementation where the size of transmitted data grows over the years. This study applies preprocessing input transformation to the algorithm to increase the security level and minimize the size of the ciphertext.

CS-00-34
SEARCHING DATA CLUSTERS IN SPATIAL DATA SETS USING R-TREE
Tai Xin
Prof. Ramakoti Sadananda
Data clustering is regarded as a particular branch of data mining. In this thesis, data clustering refers to the problem of dividing N data points into K groups to minimize the intragroup difference, such as the sum of the squared distances from the cluster centers.

In this thesis study, I deal with the important characteristics of clustering in spatial knowledge discovery. In this specialized thesis work, I studied various data clustering methods, and analyze properties and features of the data clusters in spatial data sets. And, on the basis of the existing methods of B-tree, R-tree and R*-tree in spatial data mining, I built up an efficient and smart Clustering Feature Entry R-tree that is an improvement over an R-tree method. The CFE R-tree reduces the problem of clustering the original data points into a simpler and smaller one of clustering the clustered sub-clusters. And, experimentally, I also use some spatial data sets to implement the data clustering searching by using the modified CFE R-tree.

CS-00-35
MIXING DIGITAL IMAGE WATERMARKING TECHNIQUE FOR COPYRIGHT PROTECTION
Agus Susanto Prajogo
Prof. Ramakoti Sadananda
Steganography and digital watermarking are two areas of research, which are generally referred to as "information hiding". Both steganography and watermarking describe techniques that are used to imperceptibly convey information by embedding it into the cover-data. However, steganography typically relates to covert point-to-point communication between two parties.

Thus, steganographic methods are usually not robust against modification of the data, or have only limited robustness and protect the embedded information against technical modifications that may occur during transmission and storage, like format conversion, compression, or digital-to-analog conversion.

Watermarking, on the other hand, has the additional notion of resilience against attempts to remove the hidden data. Thus, watermarking, rather than steganography principles are used whenever the cover-data is available to parties who know the existence of the hidden data and may have an interest removing it. A popular application of watermarking is to give proof of ownership of digital data by embedding copyright statements. It is obvious that for this application the embedded information should be robust against manipulations that may attempt to remove it.

CS-00-36
RELIABILITY OF PROXY SERVERS
Danai Treeratawattana
Dr. Kanchana Kanchanasut

Proxy server is a dedicated server to cache Internet objects, requested from clients. If the object does not exist in the proxy server, it will retrieve that object from the original server. Every time a client access to the Internet, it has to access through a proxy server. Therefore the server has to be reliable and available.

This thesis proposes an approach to improve the reliability of proxy system by using the idea of redundant server. The additional server and program are added without any change to old software system.

There are two levels of failure protection, hardware level and software level. To accommodate hardware reliability, additional server is added. Therefore, when a failure occurs at one server, another server can continue to operate without an interruption. At the software level, the additional program modules are added in order to reactivate dead cache process once detected. Also, a synchronization program is added in order to make sure the caches content between both servers are identical.

Experimental results in this study have shown that, the cache contents of both servers are synchronized during normal operation and after recovery process is performed after cache failures. Moreover, the reliability of the proposed system improved while the hit rates and user's response time is maintained.

CS-00-37
A PARALLEL ARCHITECTURE FOR MPEG-2 VIDEO ENCODING
Kronprom Thirawat
Dr. Qi Yulu

MPEG-2 is an international standard for the compression of video signals. It is a lossy compression algorithm that reduces the number of bits required to digitally encode a video picture by removing visual redundancies and fine details not visible to the human eye. Compression ratios of 100:1 are attainable through MPEG-2 compression. The MPEG-2 standard is distinguished from purely frame-based video compression algorithms by its exploitation of temporal locality in the video stream to create highly compressed intra-frames. The use of intra-frame compression allows MPEG-2 to achieve compression ratios at least 10X greater than either Motion JPEG or the DV standard used in today's camcorders.

Many software base and hardware base have been proposed to increase speed up encoding time. In this study, we proposed the parallel architecture chip for encoding MPEG-2 video. The implementation has been simulated on Red Hat Linux release 6.2. Various numbers of frame and number of processor have been performed and evaluated.

Experimental result in this study shows that using more processors does not always guarantee the best result. Appropriate number of processors should be selected.

CS-00-38
AN XML INFORMATION RETRIEVAL SYSTEM
Pornpavee Wattanajareonrung
Prof. Vilas Wuwongse

The information retrieval system plays a major role in retrieving the relevant information. The attempt to improve the new technique for this retrieving has been proposed and developed. Using of XML file is a proposed model to make its retrieval differs from the plain text document retrieval in traditional IR. The eXtensible Markup Language (XML) allows the authors to give the information of context within tags in markup language as its structure. The document is allowed to retrieve and query in the its logical structure.

By the way, the performance of this retrieval depends on the methodology to manage the XML document. The relational database management system is selected to support the XML information retrieval. The relational database system offers some advantages as the standard feature to query (SQL), the concurrency control, recovery, flexibility and extensibility. In this study, the relational database system is applied into the XML information retrieval system. In this study, the relational database is a selected engine for storing and managing XML documents. The implicit structure of XML document is used to create the explicit structure as the relational schema in database system. This study is proposed the strategy to convert the XML document's structure to be the relational schema. Moreover, the decomposing, querying and composing XML to/from database have been provided to make this system can be provided completely functions of retrieval system.

INFORMATION MANAGEMENT

IM-00-1
A COMPONENT-ORIENTED APPROACH TO DEVELOPING WEB-BASED INFORMATION SYSTEMS
Alvin Co Lim
Dr. Dencho N. Batanov
The current web infrastructure is limited and unable to support Web-based Information Systems. Component technologies such as JavaBeans are capable of extending the limitations of the web infrastructure. Component-oriented tools are already available but only provide support at the implementation level. Formal methodologies are a necessity because they provide support for developers at a higher level such as analysis and design. Currently, component-based methodologies lack the support of component integration to web-oriented systems.

This study attempts to propose a component-oriented methodology that supports development of web-based information systems and support for component integration. This task is achieved by investigating and combining current web application life cycle models and component-oriented models. A case study that applies the new methodology is conducted where issues and concerns are identified.

IM-00-2
DEVELOPMENT OF AN OBJECT ORIENTED DOCUMENT OBJECT MODEL FOR IFLA REQUIREMENTS: APPLIED TO BUDDHIST MANUSCRIPTS
Gauri Salokhe
Dr. Dencho N. Batanov
The traditional data storage in the library environment was done on cataloging cards. With advances in the information technology field, most of the traditional data storage is being automated. New methodologies and paradigms have been shown to be efficient and helpful in the creation of these automated technologies. At the same time, the use of the Internet is growing and its benefits can be harvested via its proper use.

The bibliographic information was limited to card catalogs or local databases in libraries. This study proposes an object-based model for the development and storage of bibliographic information. The study analyzes the basic requirements and creates a data storage model, which is furnished with attributes and operations.

The proposed model is then applied to cover a small problem domain of Buddhist Manuscripts. The metadata used is mapped to the metadata provided by the Dublin Core community, increasing the accord between different sets of metadata. The study then provides an XML DTD for use in creation of documents that can then be transported with ease on the Internet.

IM-00-3
DEVELOPMENT OF A COMPUTERIZED SYSTEM FOR LIBRARY STAFF REQUIREMENT PLANNING
Nwe Ni Win
Dr. Francis Devadason
Staff strength required for a library depends upon various factors such as, number of working days in a year, opening hours, leave allowed in a year, total stock, number of documents added in a year, number of documents circulated in a day, number of reference queries handled per day, types and quantum of services offered, number of readers requiring guidance in a day, updating and backing up the library data and software, and so on. This model is developed as a Windows-based computerized model written in Visual Basic to assist library staff requirement planning taking into consideration the above factors and more. The user of the system (planner) can change the default values and standards set in the model and plan the staff required as per his/her library's needs. The system can be used for checking the present staff strength of a library, for estimating its future requirements and for planning staff strength for a new library. The staff strength is computed and presented as per categories: senior professionals, professionals, paraprofessionals, skilled and unskilled staff. It also displays the functions of the different sections in the library, including the various kinds of services a library can offer.

IM-00-4
THE DELIVERY OF AN ELECTRONIC SCHOOL
Tawatchai Wuttijariyakol
Dr. Vatcharaporn Esichaikul
Nobody is too old to study as long as the education is still developing. The progress of the education system depends on the use of the existing technological resources. Information technologies have a major role in the life for the development of communication and education. This study proposes a new frontier of education, the distance learning of an electronic school on the Internet by using videoconferencing, video-clip, electronic text, and existing Internet services and application. In the past, the distance learning on the Internet did not provide a classroom environment for students. With the proposed electronic school, the students will have a feeling that they are in the real classroom and they can ask questions interactively. The students will need only a computer and the communication access.

IM-00-5
WIND DATA MODELING AND FORECASTING
Sunida Chaokasem
Prof. Huynh Ngoc Phien
In this study, hourly wind speed and direction at Promthep cape in Phuket, are forecasted and simulated using Box-Jenkins and Backpropagation approaches without the use of other external data. It was found that ARIMA models and seasonal ARIMA models are useful for short-range forecasting but are not very good in data generation. Backpropagation network models are good for forecasting and for generating data, which resemble the observed data in terms of the important statistics (mean, variance and skewness coefficient). For forecasting, Box-Jenkins models can perform slightly better than Backpropagation network models. However, for data generation (simulation), Backpropagation models can preserve the statistics of the observed data much better than Box-Jenkins models.

IM-00-6
A TASK ONTOLOGY FRAMEWORK USING XML
Teerapong Auksaraporn
Prof. Vilas Wuwongse
This study emphasizes on Task Ontology, which is a system of vocabulary for describing inherent problem-solving structure.

The purpose of this study is to create a schema of Task Ontology and XML (Extensible Markup Language). The schema is constructed in order to use as a standard framework that can be applied to various problem-solving systems. XML is utilized for representing whole relevant data in the Task Ontology. Moreover, the additional framework of XML DD (XML Declarative Description) is also integrated. This framework is concerned with information retrieving engine and transformation theory that transforms from non-ground terms to ground terms.

In developing the prototype system, ETC (Equivalent Transformation Compiler) Query Engine is selected for designing the query XML document. Its language paradigm also corresponds to XML DD framework. Java programming is also required in order to create a central control unit and communicate information and semantics that are grasped from XML document throughout the network.

IM-00-7
KNOWLEDGE ELICITION FROM MULTIPLE EXPERTS USING INFLUENCE DIAGRAMS
Joshi Ram Saubhagya
Prof. Ramakoti Sadananda
On the basis of the model proposed by Rush and Wallace (1997) for elicitation of knowledge from multiple experts, I seek to implement the model and test the accuracy of the generated central network. The Multiple Expert using Influence Diagrams (MEID) is a technique for generation of an aggregate knowledge representation, called the central network, from several experts each representing ones knowledge in the form of an influence diagram. The main advantage of this technique is that it does not rely upon group interactions.

The measures of the aggregate knowledge representation are the mean central network and the dispersion coefficient of the expert influence diagrams from the mean central network. The accuracy of the aggregate knowledge representation is measured by the confidence interval of distribution of the distance between the central network of the real experts and the central network of the bootstrapped samples of expert influence diagrams. In this thesis work, the goal is to test the adequacy and accuracy of the generated central network of real experts.

The results of the tests show that the two parameters used to measure the aggregate knowledge representation are not sufficient as a measure. There is the need of another factor, which is the total number of vertices used by the experts. The number of vertices affects the confidence interval because the central network of the sample networks depends upon the vertices that are used by the experts. Using the total number of vertices used and the dispersion coefficient from the central network, we can judge the accuracy of the aggregate knowledge representation.

IM-00-8
AN AGENT COMMUNICATION LANGUAGE USING XML DECLARATIVE DESCRIPTION
Supattra Jindadamrongwech
Prof. Vilas Wuwongse
Since many tasks that software agents have to perform on behalf of their users always require more than one single agent to be accomplished properly, the concept of Agent Communication Language (ACL) has been used for the communication among agents. However, many problems about the major components of ACL, which are the communication language, the content language, and the ontology, still exist. The problems are mainly about the practical use and the applicability of ACL with different applications. This study proposes a model, which encodes all ACL components with Extensible Markup Language Declarative Description (XML-DD). XML-DD is an applicable language for the entire ACL because it provided solutions for the problems addressed. However, the model still preserves the original ACL concept that considers each component independently from each other. The design of the model includes XML schemas for ACL and XML-DD statements representing the content of an example domain about business transactions. In order to validate the effectiveness of the model, a prototype system that applies the proposed model is developed. The analyzed features along with the practical aspects observed from the prototype system development reveal the validity and effectiveness of the proposed model.

IM-00-9

INFORMATION INTEGRATION BY USING XML VIRTUAL VIEW

Worawit Rattanataneswilai

Prof. Vilas Wuwongse

As the result of computer paradigm shifted from local usage to network application, Information system becomes more interesting to have an investment by many companies. Usually, in the integration process there are several inconsistency problems. Many approaches were proposed to resolve these problems. This study also proposes a model to resolve information integration problems. This model improves the virtual view integration by using XML framework. XML document is used to represent database schemas instead of the traditional mapping table. With XML virtual view document, the user can understand the database schema easily. Output from this system is in the form of an XML document. This model also including an intelligent module, it performs as knowledge base component to process information semantically. With this characteristic, information integration problems can be resolved in a semantic way. Each word is stored in form of a common word with its description. Before processing to each word, it has to find its semantic set and transform from the local word to a common word. Common words and the semantic wordlist will be used to resolve inconsistency problems with local term and data format between multiple database sources.

IM-00-10

A DECLARATIVE PROGRAMMING LANGUAGE WITH XML

Vichit Wattanapailin

Prof. Vilas Wuwongse

Extensible Markup Language (XML) is a new standard for web data interchange. It is used to represent the data in meaningful ways. However, XML is limited to static documents and it does not describe the way to present, calculate and transform the data. Every Internet application requires these dynamic behaviors, so that Extensible Stylesheet Language (XSL) and scripting languages are applied to deal with these tasks. Nevertheless, XSL is limited to the style-sheet processing and the scripting languages are not designed to work with XML. Using the scripting languages to work with XML is not a good solution because it increases errors, effort, and learning cost.

In this study, the researcher designs and implements a new programming language that works on XML processing domain. This programming language is called XML Equivalent Transformation (XET). XET uses XML syntax and based on Equivalent Transformation (ET) paradigm. It incorporates the fragments of XML documents in to the data types of the language. This makes the user straightforwardly create and access XML documents.

After the design and implementation processes, XET is evaluated by comparing with the other existing XML processing languages and XML encoded programming languages. The results reveal that XET is a very flexible and straightforward way to create and process the XML documents.

IM-00-11

WEB PERSONALIZATION TECHNIQUES FOR E-COMMERCE

Suwimol Sae-Tang

Dr. Vatcharaporn Esichaikul

With the advent of the Internet, there is a dramatic growth of data available on the World Wide Web. To reduce information overload and create customer loyalty, Web Personalization has become a significant tool that provides E-commerce businesses with important competitive advantages. Despite the growing interest in personalized systems, it is difficult to implement such a system. This is because many business-critical issues must be considered before the appropriate personalization technique can be identified. In this thesis, online businesses were classified into a number of categories. After that, personalization techniques that are used nowadays in E-commerce businesses were described. Consequently, guidelines for selecting suitable personalization techniques for applications in each E-commerce business domain were proposed. In the implementation part, a prototype of the Book Recommendation System for Chulalongkorn University Cyber Bookshop was developed. The proposed system provides book recommendations by using a form of computerized-matchmaking called collaborative filtering. Finally, two experimental results demonstrate that the personalized algorithm can produce a better prediction than the non-personalized one and that system performance improves when the number of user ratings increases.

IM-00-12

XDD-BASED INFORMATION INTEGRATION FRAMEWORK

Arinee Cheewakriengkrai

Prof. Vilas Wuwongse

Since there is a wealth of information and knowledge available over the Internet, it might be very useful if it is utilized and reused to help the Internet users making their decision or getting the best service. The integration application always shields the user from having to visit web sites separately and correlate information manually.

The study proposed the new intelligent, powerful, expressive, declarative information integration framework, namely XDD information integration framework. The framework provides a way to develop the integration application easily when the information is represented in XML format. The capabilities of the integration application developed in this framework are not only modeling and computing data in an XML document but also reasoning data into new knowledge. Moreover, the study also shows the effectiveness of using XML as a standard for data exchange over the Internet. Moreover, XML separates the presentation styles from data and allows the developer to present a single document in many styles and formats including HTML, text file, PDF file, and wireless applications.

A Thailand travel agent application is developed as a case study in order to show the effectiveness of the framework. The application services the Internet user by finding the best service among various kinds of transportation according to each user's criteria.

IM-00-13
MEASUREMENT OF DATA WAREHOUSE QUALITY
Monnapa Lertsathitphong
Dr. Vatcharaporn Esichaikul
This study emphasizes on developing a data warehouse quality model, which can be used in measuring the quality of a data warehouse system. The model is composed of four components, which are data warehouse process, data warehouse measurable object, stakeholder, and quality dimension. Each component has a relationship with the other. In the quality measurement process, a stakeholder is the person who evaluates the quality of each data warehouse measurable object by using the quality dimensions as the criteria. Different stakeholders have different viewpoints of data warehouse quality because they have different job responsibilities.

Questionnaire survey and interview are conducted to obtain information about the data warehouse measurable objects that each group of stakeholders involved in the data warehouse system and the quality aspects stakeholders concerned in evaluating the quality of each data warehouse measurable object. Moreover, the general guidelines for measuring data warehouse quality are described.

IM-00-14
ELECTRONIC COMMERCE AND ELECTRONIC BUSINESS IMPLEMENTATION SUCCESS FACTORS
Sivaporn Chavananon
Dr. Vatcharaporn Esichaikul
Currently, Business-to-Consumer Electronic Commerce, Business-to-Business Electronic Commerce and Electronic Business are widely adopted as a new strategy to gain more business advantages over the competitors. Nevertheless, the success in deploying such electronic business applications does not only rely on business contributions but involves many business factors as well.

The purposes of the study are mainly to identify the potential common and specific factors dealing with the success of implementing Business-to-Consumer Electronic Commerce, Business-to-Business Electronic Commerce and Electronic Business, as well as to provide the guidelines for achieving the development of these applications. Principally, the factors are organized into a class of factors: policy factors, organization factors, human resources management factors, business factors, customer relationship management factors, technology factors, security factors and environment factors. Finally, the results of the study will give the useful direction for the future development of Electronic Commerce and Electronic Business in the business environment.

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IM-00-15
AN INTERNET RECRUITING SYSTEM
Kanika Rianarchriya
Prof. Vilas Wuwongse
The Internet Recruiting Services framework is proposed for the Internet Recruiting sites. It contributes a more intelligent system by employing a knowledge system in retrieving implicit information. Due to no standards in job posting and resume documentation, therefore, XML schemas are designed to support the data exchange between systems. The Internet Recruiting Service (IRS) system is developed to prove the effectiveness of the proposed framework. The IRS system provides basic functions for the Internet recruiting site, which includes job posting, resume posting, job searching, and resume searching. The system emphasizes the searching process in order to evaluate system performance.

This study incorporates the advantage of knowledge systems and XML documents to construct the system. The knowledge system plays an important role in retrieving the implicit data and enhancing the search capability. XML has the advantage in providing comprehensive documentation and supporting data exchange.

IM-00-16
INTERNET SUBJECT GATEWAY: ANALYSIS AND DESIGN
Neelawat Intaraksa
Dr. Francis Devadason

 The thesis describes the analysis and design of an Internet Subject gateway with value-added functions in creating and maintaining the system. To create an effective Internet resource accessing system for scholars and academics, the process of resource selection, indexing, abstracting and resource updating are required. This thesis describes design of such a system as well as demonstrates its implementation. The system allows resources to be suggested, the suggested resources to be downloaded, graphics and other tables removed, meta data automatically identified, a summary prepared automatically and presented in a template for indexing and cataloging. The Deep Structure Indexing System based on a faceted pre-coordinate indexing method is integrated into the model to provide logical search terms by the use of deep structure in order to improve recall and precision. Dublin Core metadata element set is applied with for automatic metadata extraction to collect the information of all web documents with the aim to benefit judgments about the nature and origin of the resources. Automatic text summarization using sentence selection technique based on frequency and clusters of the significant terms occurring in sentences is applied to generate an acceptable abstract for each resource to help in determining the relevancy of retrieved records. For resource updating, link checking is used to check the availability and accessibility of resources. The system generates several indexes from the assigned index terms following the facet analysis method and provides a two-step retrieval for the end user. The end user has to just key in any search term and the system will display all the subject heading in which the term occurs, the display being logical and hierarchical. Upon choosing the specific subject displayed the resources are retrieved and displayed. If the retrieved subjects are too many, additional terms could be applied to the retrieved set and the retrieval made more specific. There will be no need for any relevance judgment after the retrieval as all the retrieved resources are on the topic chosen. Synonym control is also built into the system. The system has management functions such as administrator function, subject specialist, cataloguer function and specific authentication procedures for these. The prototype system is developed with all main value-added functions in Internet environment. User's guides for both information user and information provider are presented.

IM-00-17
A TRUST MODEL FOR ELECTRONIC AUCTIONS
Chanisa Thananuwat
Dr. Vatcharaporn Esichaikul

Nowadays the new economics of the Internet is making the auctions popular in consumers, small business, or business-to-business transactions. However there is an important problem of an electronic auction, its untrustworthiness, which is impeding its adoption. Thus, a Trust Model for Electronic Auctions which represents relationships of factor hierarchies affecting trust, buyer trust, seller trust, trust evaluation, and outcomes of the trust was proposed to address this problem. To prove the proposed model, one hundred and five respondents in the buyer case and ninety five respondents in the seller case were samples of a research survey. At first, one-way ANOVA statistic was utilized to compare the opinions about factors affecting trust between each group of a buyer and a seller based on the proposed model. Then a confirmatory factor analysis was performed to test that all sub-factors were included in relevant factor hierarchies. The convergent validity and item reliability assessment of each factor hierarchy was performed. In addition, the maximum likelihood method of parameter estimation was employed in order to measure the goodness of model fit. Finally, the proved model, the refined Trust Model for Electronic Auctions, was implemented in order to apply the model in a realistic situation.

IM-00-18
DECISION SUPPORT SYSTEM FOR SUSTAINABLE AGRICULTURAL LAND MANAGEMENT IN MYANMAR
Khet Khet Oo Tha
Prof. Ramakoti Sadananda

Land is a non-renewable natural resource. It is the basic resource to provide human beings with food, shelter, enjoyment, as well as all other needs. Population growth, technological and social hazards, and environmental degradation have all to be taken into greater account today by policy-makers, resource planners, administrators and individual citizens who make decisions about the land. Agriculture is an important branch of economy and society, and is what land should be dedicated to. The maintenance and enhancement of existing land and natural resources to meet present needs and those of future generations have become major issues in economic and social development.

Decision support system (DSS) is a useful tool for decision makers to survey and understand the complex spatial and temporal land information. DSSs for sustainable development should address decision making contexts and processes in; the development of software toolkits for DSSs including development of databases, knowledge-based systems, geographic information systems (GISs) and process models.

This thesis study adopts an integrated approach, with the assistance of geographical information system (GIS), in collecting and building an integrated land information database for land use study within a certain administrative unit, Magwe division, in the union of Myanmar. It was focused on the generation of data on land resources, specifically soil. The soil map was used in combination with other physical and socio-economic parameters to assess and evaluate the area into suitability classes for paddy. The results are able to show potential land productivity and suitability under respective situations. The decision makers can exercise this DSS for optimum agricultural land use management.

IM-00-19

OBJECT ORIENTED REAL TIME SYSTEM DEVELOPMENT CASE STUDY OF THE AUTOMOBILE ON BOARD COMPUTER
Thomas Viot
Dr. Dencho N. Batanov
Real time applications are usually large and complex systems, raising specific issues in software development, and Object orientation has been an answer for the development of large and complex software. Although a formal standard methodology and modeling language have been developed for object oriented programs (Unified Modeling Language), little effort has been made about the specific development of object oriented real time application.

This thesis shows, through the development of a real life case study (an embedded real time system) the existing methodologies using Unified Modeling Language (UML). It also proposes a tree-based model for fast process discovery, inherited from the Real Time Object Oriented Model (ROOM) "Actor" model. This model is suitable when process interaction is limited, is very useful from the early design stage, and can easily be incremented.

IM-00-20

INTELLIGENT XML-BASED EDI
Maruesha Phathaipruk
Prof. Vilas Wuwongse
Although EDI has been used in large enterprises in order to eliminate costly and slow manual tasks, it has many limitations especially in a cost and complexity. Many frameworks using the Internet and XML technologies have been proposed to improve the traditional EDI. All frameworks available now are concentrating on how to seamlessly exchange business documents among trading partners; however, these frameworks cannot solve the problems of the quality of data received by the internal applications. A high human intervention is still required to investigate and correct these documents.

This study proposes the appropriate framework for a new EDI system with a knowledge-based component for filtering and correcting business documents, named Intelligent XML-based EDI. This knowledge base component is constructed with the employment of XML-DD, which makes it expressive and flexible, in order to improve the quality of data before handing it to an existing application in order to minimize human intervention and errors that can occur. Each data in the business document is verified against facts and rules in the knowledge base, then the incorrect data is corrected or given suggestions for further consideration by human.

This framework can apply to various problem domains. In this study, the Import and Export Investigation system of the Central Bank is developed as a case study in order to show the effectiveness of the framework.

IM-00-21

EVALUATION OF SEARCH ENGINES: A CASE STUDY USING RETRIEVAL EFFECTIVENESS
Aimvalee Varinsathien
Dr. Francis Devadason
Evaluation of Search Engines: A Case Study Using Retrieval Effectiveness describes an experiment to evaluate Web search engines by using an information retrieval evaluation criteria. The aim of this study is to create a standard experiment for evaluating the selected Web search engines. This study does not attempt to evaluate the inner-workings of search engines. The evaluation uses the retrieval performance of Information Retrieval System (i.e. precision, recall and coverage) to evaluate Indexed Search Engines (i.e. AltaVista, Google, Infoseek and Northern Light) and Directory Search Engines (i.e. About, Open Directory, WWW Virtual Library, and Yahoo). The same ten search queries drawn from the thesis topics of the Computer Science and Information Management program of the Asian Institute of Technology are used to test all selected Web search engines. Clarke and Willett's method is applied to estimate the recall value in this experiment. A means to rank the most effective search engine by calculating overall weighted average values from precision, recall, and coverage is proposed. Finally, this research will be useful and could enable Web users to select a search engine appropriate to their specific search needs. In addition, it will eventually help Web search engine developers design even better ones for the Internet community.

IM-00-22

A FRAMEWORK TO DETERMINE APPROPRIATE CONNECTIVITY OF ERP SYSTEMS
Piyanan Nuankhieo
Dr. Vatcharaporn Esichaikul
This research is an attempt to propose the criteria for determining the appropriate connectivity of ERP systems. The result of this research provides a framework assisting ERP adopters in selecting integration approach which are appropriate to their needs. A field study was conducted to obtain information from ERP users to learn about their opinions on factors and criteria affecting connectivity of ERP systems. Findings from the study revealed that data oriented approaches and application integration oriented approaches are the most preferred integration methodologies. Opinions on criteria for evaluating ERP connectivity are nature of business process of organization, availability of technologies and service support, nature of information system of organization, system flexibility, degree of integration, transaction volume, implementation cost, ease of maintenance, implementation time, security, and budget. Finally, the study proposes a framework to determine appropriate connectivity of ERP systems.

IM-00-23

DEVELOPING AN INTERNET SECURITY MODEL FOR AN EDUCATIONAL INSTITUTE

Indira Kumari Challapally
Prof. Ramakoti Sadananda

The utility of Internet and myriad of services being provided have brought forth many issues. One of the primary issues is the issue   of   security.

The concept, approaches and level of security requirements vary according to an entity's environment and the entities information/ security policies. Though many commercial firewalls are developed for corporate security requirements the challenge of information security within educational institutions are unique. The commercially available software are expensive and ill suited to address the unique requirements of an educational institute.

In an educational institute, there exists a difference between public information and confidential information. Public information is such that, it can be published outside for public use. Confidential information requires authentication and authorization to have access to it. In this model, there is a physical separation between these two, thereby reducing the chances of accidental leakage of data. If a trusted user is authorized to have access to confidential information, trusted user will be given a copy of the original information by an application proxy. Data Integrity is maintained between external and Internal servers by a java socket program automatically executing for every half an hour.

A prototype has been developed with the use of FreeBSD, Apache Web server, Squid server. The model makes use of external/ internal servers, authentication to provide, flexible, high security system, at less cost suitable to the needs of an educational institute.

IM-00-24

OPERATIONAL SEMANTIC OF A SUBSET OF JAVA BASED ON JAVA VIRTUAL MACHINE

Nguyen Thuy Linh
Prof. Phan Minh Dung

A restricted subset of Java called MiniJava, which includes variable declaration, object creation, inheritance and passing mechanism, numerical expressions, commands, method call, access control modifiers, and local variables, has been selected. JVM and Java class file serves as an immediate stage in compiling Java program. Using formal and precise notation, the language concept, related bytecode instructions and compilation schemes are presented. The compilation process is divided in two steps: compilation of class declaration and compilation of method body.

IM-00-25

DEVELOPMENT OF AN OBJECT-ORIENTED MODEL OF AN ONLINE INFORMATION SYSTEM FOR INFORMATION CENTERS

Ngo Thanh Loan
Dr. Dencho N. Batanov

In the information age, information centers or libraries need to improve their business by effective use of information technology. In less-developed countries, investment for information technology in non-profit organization such as library or information center is still a heavy burden for organizations due to financial constraint. Therefore, any application, which helps to improve business productivities and requires less resource investment, is needed.

In this study, an object-oriented model of an online information system, which supports information centers in providing some typical information services, is developed. The system has three main functions such as information retrieval service, current awareness service and, selective dissemination of information. Users can search the two bibliographic databases using selected searchable fields. The systems can also provide the current awareness service and personalized selective dissemination information through e-mail. The model is based on the model of client/server architecture. To facilitate modification of the model due to unforeseen changes, the object-oriented approach is applied in both analysis and design phases. Major functionalities of the model are also implemented.