



Foreword

Guest Editors: Special Issue in Advances in e-Technology and e-Services

Rapid technological progress in such fields as Internet Technologies, Mobile Technologies, P2P/Grid Computing, Intelligence and Agents, Security and Trust and Web Services, is pushing the advancement of e-commerce/e-business/e-industry/e-government. Research and development in these fields focus on the design and implementation of advanced technologies. However, they are not primarily concerned with how their creations influence, determine, constrain, or enhance the way enterprises/industries/governments think, act, work, and collaborate, in their processes, applications, services, intelligence procreation, *etc.* In light of these rapid changes in technologies, it is a continuous challenge for the field of e-themes enabling technologies to keep its collective eyes on the enterprises/industries/ governments using the technologies, and understand and design the ways that enterprises/industries/governments interact with their customers, suppliers, employers and partners.

This issue of ISF contains articles from practitioners and researchers to highlight various aspects of the current and future e-themes enabling technologies, charting the future course of the e-themes technology revolution. The papers present both practical and theoretical views on an evolutionary picture of the fundamental e-themes enabling technologies on trust/privacy, payment, automated negotiation, customer intelligence and mobile location-aware intelligence.

A core issue in the context of the e-theme enabling technologies is the development of trust mechanisms that can decide whether to believe or disbelieve information asserted by others in the world of global connectivity. The paper “Propagation Models for Trust and Distrust in Social Networks” by Cai-Nicolas Ziegler and Georg Lausen advocates the need for local group trust metrics and presents a trust mechanism of Appleseed (that is based on spreading activation models in psychology). This paper situates Appleseed within the Semantic Web infrastructure (Web of Trust). However,

Appleseed also suits other application scenarios, such as group trust in online communities, open rating systems, ad-hoc and peer-to-peer networks. Furthermore, Appleseed also addresses the semantics and propagation models of distrust that are useful for users to debug their Web of Trust.

In parallel to trust mechanisms, privacy-enhancing mechanisms underlie a great number of e-themes information systems. For instance, privacy friendly loyalty systems can attract customers (that usually refuse to become members of a loyalty program since they fear infringements of their privacy), retaining customers and increasing the incentive for repeated buying. The paper “Improving Customer Retention in E-Commerce through a Secure and Privacy-enhanced Loyalty System” by Matthias Enzmann and Markus Schneider presents two variants of privacy-friendly loyalty systems (that do not allow vendors to link customers’ transactions): a simple token-based approach and a counter-based approach. These two methods differ in efficiency. The counter-based approach is more efficient while preserving the privacy and security properties. Moreover, the counter-based loyalty system prevents customers from pooling their collected loyalty points.

When discussing transactions, the issue of payment mechanisms naturally arises. The paper “*e-coupons*: An Efficient, Secure and Delegable Micro-Payment System” by Vishwas Patil and R.K. Shyamasundar presents a payment mechanism (named *e-coupons*) for micro transactions (in which the need is to cater to a large volume of transactions of low intrinsic financial value and the challenge is to keep the cost of each transaction to a minimum on an average). *e-coupons* is a micro-payment system satisfying the requirements of security, low-cost per transaction, efficiency, and a provision to delegate the spending capability. *e-coupons* extends the PayWord framework to handle delegation of users’ spending capability through SPKI/SDSI (underlying PKI framework) and TESLA (handling

payment security). The ability of *e-coupons* is to support concurrent payments for a subscribed service from different service access points simultaneously and enable the facility of delegation by allowing the users to use the passwords fully (in terms of gifting them to others, instead of getting them expired and unspent).

Use of the automated negotiation approaches to build complex and dynamic e-themes information systems is an interesting area of research. The paper "Combining Cooperative and Non-Cooperative Automated Negotiations" by Jen-Hsiang Chen, Kuo-Ming Chao, Nick Godwin and Von-Wun Soo presents a multiple-stage co-operative automated negotiation architecture, including a sophisticated negotiation strategy and protocol, to resolve the agents' conflicts. Each agent in the infrastructure incorporates two major components: Genetic Algorithms (GA) and a No-Fear-of-Deviation (NFD) equilibrium algorithm. The employment of GA is to explore possible agreement space and the use of NFD is to distribute the payoffs and find an optimized point. Each agent implements a loop over the generation and selection of strategies, the encoding of a payoff matrix and the determination of an optimized point. This iterated negotiation process between co-evolutionary and NFD approaches is then called a multiple-stage negotiation.

In most existing e-themes information systems, it is often crucial to provide customers a large choice of relevant offers. Accordingly, intelligent user interfaces are needed that can generate automatically expanded queries to the item database and proactively enrich the ongoing dialogue with recommendations of suitable items. The paper "The Layer-Seeds Term Clustering Method: Enabling Proactive Situation-Aware Product Recommendations in E-Commerce Dialogues" by Libo Chen, Marcello L'Abbate, Ulrich Thiel, Erich J. Neuhold presents a term clustering method, the Layer-Seeds Method, which is designed to exploit on existing e-commerce category systems. The clustering method works on terms that are extracted from the documents in a certain category and organizes them in a thesaurus, which features a tree-like hierarchical structure. The thesaurus is then applied in an e-commerce application for automatic query expansion. Since the construction process is based on an existing category system, the thesaurus has much better elements and structure than many other automatically constructed thesauri. The usage of such a thesaurus for automatic query expansion has enhanced the performance of information retrieval and the whole e-commerce system.

Customer Lifetime Value (CLV) is an important area of work in customer intelligence, impacting on the ability to intelligently influence both business process policies and IT related decisions pertaining to customers. The paper "e-CLV: A Modeling Approach for Customer Lifetime Evaluation in e-Commerce Domains, with an Application and Case Study for Online Auction" by Opher Etzion, Amit Fisher, Segev Wasserkrug presents an algorithm for the derivation of an e-CLV model from the availability of a large body of historical data regarding the customers' behavior. This algorithm both ensures that the modeled customer value is influenced by past behavior, and provides an automated methodology for creating such models. The algorithm is a combination of two methods: Markov Chain Models (MCM) and RFM (recency, frequency, monetary) analysis. The learned models succeed in not only predicting the future income generated from customers successfully but also ranking these customers with a high degree of accuracy.

Last, but not least, the mobile environments impose a slew of new opportunities of location-aware intelligence to e-themes information systems. One of the most fundamental technical problems for providing location-aware services is to monitor and provide fast answers to continual range queries that locate the moving objects inside the query boundaries. The paper "Efficient Processing of Continual Range Queries for Location-Aware Mobile Services" by Kun-Lung Wu, Shyh-Kwei Chen, and Philip S. Yu presents a novel query index (COVET) for efficient evaluation of continual range queries against moving objects. The objective is to quickly provide answers to continual range queries that locate the moving objects within the query boundaries. The basic ideas of COVET are strictly covering a range query with one or more tiles, removing the ambiguity of whether a point is inside the boundaries of a range query and taking advantage of the incremental changes in object locations. COVET outperforms existing relevant index schemes by capitalizing on incremental changes in object locations.

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