**Coping with Java Threads**  
Bo Sandén

Java has built-in multithreading support that gives the virtuoso thread programmer considerable freedom. Its popularity and the many technologies developed for it have prompted Java’s use in ever-wider application sets, but its thread model has inherent limitations as well as easily abused constructs that present many pitfalls for less experienced programmers.

While Java is adequate for many kinds of concurrent software, it remains a risky choice for critical real-time applications. Programmers who choose to implement concurrent software, it remains a risky decision for critical real-time applications. It offers. Restructuring a site to individual user interests increases the computation at the server to an impractical degree, but organizing according to user groups can improve perceived performance.

An unsupervised clustering algorithm based on adaptive resonance theory adapts to changes in users’ access patterns over time without losing earlier information. The algorithm outperformed the traditional k-means clustering algorithm in terms of intracluster distances. A prefetching application based on the algorithm achieved a hit accuracy rate for Web site page requests ranging from 82.05 to 97.78 percent.

**Adaptive Neural Network Clustering of Web Users**  
Santosh K. Rangarajan, Vir V. Phoha, Kiran S. Balagani, Rastko R. Selmic, S.S. Iyengar

**Crime Data Mining: A General Framework and Some Examples**  
Hsinchun Chen, Wingyan Chung, Jennifer Jie Xu, Gang Wang, Yi Qin, and Michael Chau

The volume of crime data is increasing along with the incidence and complexity of crimes. Data mining is a powerful tool that criminal investigators who may lack extensive training as data analysts can use to explore large databases quickly and efficiently.

The collaborative Coplink project between University of Arizona researchers and the Tucson and Phoenix police departments correlates data mining techniques applied in criminal and intelligence analysis with eight crime types. The framework has general applicability to crime and intelligence analysis because it encompasses all major crime types as well as both traditional and new intelligence-specific data mining techniques. Three case studies demonstrate the framework’s effectiveness.

**A Software Infrastructure for Authenticated Web Metering**  
Carlo Blundo and Stelvio Cimato

The Internet has become a mainstream, multibillion dollar advertising channel. The popularity mechanisms that rule traditional advertising economics also rule online advertising, but traditional systems for measuring ad exposure are of little value. Even a trusted host site can generate statistics that don’t correspond to real usage.

Advertisers and auditing companies haven’t adopted a standard technique to accurately measure the number of visits a site receives and hence the advertising exposure. A proposed framework based on hash chains minimizes the overhead associated with the additional communication required to implement a counting technique. Testing in a prototype implementation indicates that the framework also guarantees security and nonrepudiation of the produced proof of visits.

**XML-Based Specification for Web Services Document Security**  
Rafae Bhatti, Elisa Bertino, Arif Ghafoor, and James B.D. Joshi

Web services provide standard protocols for document exchange among data repositories. At the same time, they expose data and functionality to risks that traditional security models do not address.

An XML-based specification language provides content-based, context-aware document access that models the elements of role-based access-control. The model provides explicit support for conceptual-level access control on underlying data repositories as well as dynamic updates of user profiles. The authors have validated the model and implemented a software architecture that disseminates secure documents for a single-enterprise Web services application.

**Outperforming LRU with an Adaptive Replacement Cache Algorithm**  
Nimrod Megiddo and Dharmendra S. Modha

The policy of choice for managing cache memory has been to discard the least-recently-used item. LRU has consistently outperformed other policies by virtue of its simplicity and low overhead. However, an adaptive replacement cache algorithm offers a low-overhead alternative that shows substantial performance gains over LRU.

ARC’s online adaptation continually balances between a workload’s recency and frequency features, eliminating the need for the workload-specific pretuning that plagued many previous proposals to improve LRU. The algorithm has the additional advantage of being scan-resistant so that one-time sequential requests can pass through without polluting the cache.