Information Technology Laboratory Newsletter

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TEXT RETRIEVAL CONFERENCE SERIES SUPPORTS INFORMATION RETRIVAL RESEARCH COMMUNITY

Started in 1992 and cosponsored by the Department of Defense, ITL's Text REtrieval Conference (TREC) series of evaluation workshops is designed to support the information retrieval community by providing the infrastructure necessary for large-scale evaluation of text retrieval methodologies. Over the years, the workshops have evolved based on emerging information retrieval technologies. The evaluation effort has grown in both number of participating systems and the number of countries represented.

Each TREC is organized around a set of focus areas called tracks. TREC participants use their own search engines and a common data set to perform a track's task. They submit their search results to NIST, which uses the combined result sets from all participants to build evaluation resources that are then used to score each participant's submission. Both the evaluation resources and the participants' submissions are made publicly available through the TREC website to support the larger retrieval research community.

TREC 2014, the 23rd conference in the series, was held on November 19-21, 2014. The conference included eight tracks that drew 75 participating teams representing 20 countries. The tracks investigated topics ranging from risk minimization in web search to search over microblogs to efficiently monitoring the information associated with an event such as a natural disaster in real time.

TREC 2014 added an exciting new track called the Clinical Decision Support (CDS) track. The goal was to develop systems that can support healthcare providers by finding clinically relevant information within the vast biomedical literature. This initial year of the track used case narratives developed by physicians at the National Library of Medicine as patient surrogates. A case report is a well-formed narrative summarizing portions of a patient's medical record that typically describes a challenging medical case. The literature base was the open-access portion of PubMed Central. The systems' task was to retrieve articles that contained pertinent information for one of three clinically relevant questions for the target patient: What is the diagnosis? What test should be performed? What treatment should be undertaken? Twenty-six teams participated in the CDS track. The retrieval results suggest that the task is challenging, but feasible, for existing search systems. See the TREC website for more information.
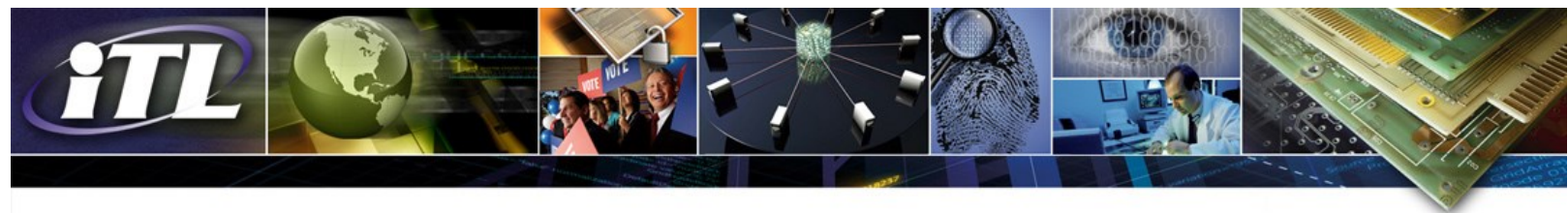
Update on NIST Cybersecurity Framework

Under Executive Order (EO) 13636, *Improving Critical Infrastructure Cybersecurity*, NIST was tasked to work with stakeholders to develop a voluntary framework for managing cybersecurity risks to critical infrastructure. NIST released version 1.0 of the Framework on February 12, 2014. The Framework allows organizations—regardless of sector, size, or degree of cybersecurity risk or cybersecurity sophistication—to apply the principles and best practices of risk management to improve the security and resilience of critical infrastructure.

ITL recently held its 6th Cybersecurity Framework workshop to discuss organizations' initial experiences with the Framework, with a focus on resources to help organizations use the Framework to improve their cybersecurity risk management programs. The 300+ attendees included representatives from a variety of sectors, including banking, chemical, telecommunications, information technology, and energy. The workshop featured several topic-specific sessions on authentication, automated indicator sharing, the cybersecurity workforce, supply chain, standards, and the Framework's privacy methodology. Participants discussed challenges and possible paths forward in each of these areas. See the framework website for additional information.

ITL and IEEE Collaborate on Election Results Reporting Standard

On the recent November 4th election night, the State of Ohio made their election results available to the public using an XML standard format designed largely by ITL working with the IEEE Voting System Standards Committee (VSSC). ITL and the VSSC developed the standard to reduce complexity in election results collection and publishing, especially on election night when deadlines are tight and many opportunities for error exist. The standard specifies two data interchange formats—XML and JSON—for reporting data exported from equipment used to manage elections and tabulate results. It allows for reporting on election information known in advance, election night results, and updates and certified results from postelection canvassing. The standard is edited by ITL, and the final version is expected in early 2015. More information about the standard can be found at this website.

ITL Staff Tutorials on Proficiency Testing

ITL statisticians recently presented two tutorials on proficiency testing at the Combined Regional Measurement Assurance Program (CRMAP) meeting, held in St. Louis, Missouri. The CRMAP meeting is organized and led by the NIST Office of Weights and Measures and brings together metrologists from the state weights and measures laboratories, commercial calibration laboratories, and metrology equipment manufacturers. The first tutorial covered the ISO 13528 standard for proficiency testing, which outlines best practices and recommended statistical methods for proficiency testing. The second tutorial covered frequently asked questions from the analysis of proficiency test data. A new electronic audience response system proved popular, gave instant feedback on the audience's understanding of the material, and spurred further questions and discussion of the concepts being presented.

Wounded Warrior Presentation at NIST

The ITL Diversity Committee and the NIST Civil Rights and Diversity Office recently cosponsored a presentation by retired Staff Sergeant Erick Millette from the Wounded Warrior Project. Wounded in the Iraq War and subsequently discharged from the Army, Millette gave a moving and thought-provoking account of his experiences and the physical, mental, and emotional challenges he has faced since his discharge. The presentation raised awareness at NIST of the ongoing problems of returning veterans and the help that is available through organizations such as the Wounded Warrior Project.

Staff Accomplishments

Simone Gittelson, Statistical Engineering Division, received the Prix de la Banque Cantonale Vaudoise for her 2013 Ph.D. thesis entitled "Evolving from Inferences to Decisions in the Interpretation of Scientific Evidence." She received the prize at the graduation ceremony of the School of Criminal Justice, University of Lausanne, in Lausanne, Switzerland, on November 7, 2014.
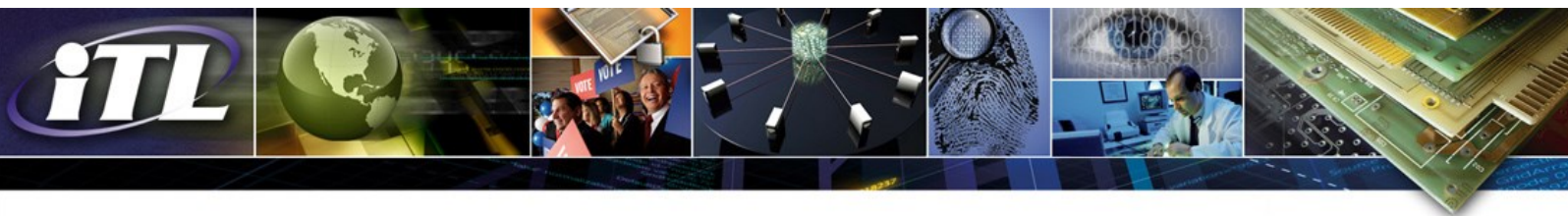
Selected New Publications

US Government Cloud Computing Technology Roadmap Volume I: High-Priority Requirements to Further USG Agency Cloud Computing Adoption and Volume II: Useful Information for Cloud Adopters

By Lee Badger, David Bernstein, Robert Bohn, Frederic de Vaulx, Mike Hogan, Michaela Iorga, Jian Mao, John Messina, Kevin Mills, Eric Simmon, Annie Sokol, Jin Tong, Fred Whiteside, and Dawn Leaf
NIST Special Publication 500-293, Vols. I and II
October 2014

Consistent with its mission, NIST has a technology leadership role in support of United States Government (USG) secure and effective adoption of the Cloud Computing model to reduce costs and improve services. In the technology vision of Federal Cloud Computing Strategy success, USG agencies will be able to easily locate desired IT services in a mature and competitive marketplace, rapidly procure access to these services, and use them to deliver innovative mission solutions.

Assessing Security and Privacy Controls in Federal Information Systems and Organizations: Building Effective Assessment Plans
Joint Task Force Transformation Initiative
NIST Special Publication 800-53A Revision 4
December 2014

This publication provides a set of procedures for conducting assessments of security controls and privacy controls employed within federal information systems and organizations. The assessment procedures, executed at various phases of the system development life cycle, are consistent with the security and privacy controls in NIST Special Publication 800-53, Revision 4. The procedures are customizable and can be easily tailored to provide organizations with the needed flexibility to conduct security control assessments and privacy control assessments.

Media Sanitization
By Richard Kissel, Andrew Regenscheid, Matthew Scholl, and Kevin Stine
NIST Special Publication 800-88 Revision 1
December 2014

Media sanitization refers to a process that renders access to target data on the media infeasible for a given level of effort. This guide will assist organizations and system owners in making practical sanitization decisions based on the categorization of confidentiality of their information.

Guidelines for Derived Personal Identity Verification (PIV) Credentials
By Hildegard Ferraiolo, David Cooper, Salvatore Francomacaro, Andrew Regenscheid, Jason Mohler, Sabari Gupta, and William Burr
NIST Special Publication 800-157
December 2014

This recommendation provides technical guidelines for the implementation of standards-based, secure, reliable, interoperable PKI-based identity credentials that are issued by federal departments and agencies to individuals who possess and prove control over a valid PIV Card.

Screening for factors affecting application performance in profiling measurements
By David W. Flater
NIST Technical Note 1855
October 2014

This report provides an example application of screening techniques in experimental computer science, including validation and selection of metrics and measures, the screening experiment itself, and supporting statistical methods. Together with related references, it is intended to encourage other computer scientists to make more use of established statistical methods in performance evaluations.

Fingerprint Vendor Technology Evaluation
By Craig Watson, Gregory Fiumara, Elham Tabassi, Su Lan Cheng, Patricia Flanagan, and Wayne Salamon
NISTIR 8034
December 2014

FpVTE was conducted primarily to assess the current capabilities of fingerprint matching algorithms using operational datasets containing several million subjects. There were three classes of participation that examined various finger combinations from single finger all the way up to ten fingers. Enrollment sets varied in size from 10,000 subjects up to 5 million subjects. All data used was sequestered operational data that was not shared with any of the participants. The evaluation provided feedback to the participants after the first two of three submissions, allowing participants to evaluate their performance, make adjustments to their algorithms, and resubmit for further testing. The evaluation was conducted at NIST using NIST-owned hardware. Participants submitted software libraries compliant to the testing Application Programming Interface (API), which were linked to a NIST-developed test driver and run by NIST employees. All participant libraries went through validation testing to ensure that results at NIST matched results participants were getting on their hardware. This is the first large scale one-to-many fingerprint evaluation since FpVTE 2003.

Upcoming Technical Conferences

Cybersecurity for Direct Digital Manufacturing Symposium

Date: February 3, 2015
Place: NIST, Gaithersburg, Maryland
Sponsor: NIST
Cost: None

This symposium will explore cybersecurity needed for direct digital manufacturing. Speakers from industry, academia, and government will discuss the state of the industry, cybersecurity risks and solutions, and implications for Information and Communications Technology (ICT) supply chain risk management.
NIST contact: Celia Paulsen

Hands-on Workshop on Assessing and Reporting Measurement Uncertainty

Dates: March 18-20, 2015
Place: Anaheim, California
Sponsor: NIST
Cost: TBD

This short course covers many aspects of the propagation of uncertainty using the methods outlined in the JCGM Guide to the Expression of Uncertainty in Measurement. Exercises and hands-on applications will use functions for uncertainty analysis from the free software package, metRology, written for the open-source R statistical computing environment.
NIST contact: Will Guthrie

FISSEA Annual Conference

Dates: March 24-25, 2015
Place: NIST, Gaithersburg, Maryland
Sponsors: NIST and FISSEA
Cost: $195 (includes coffee breaks/lunch)
$101 (no coffee breaks/lunch)

The theme of this year's Federal Information Systems Security Educators' Association (FISSEA) conference is Changes, Challenges, and Collaborations: Effective Cybersecurity Training. Attendees will gain a better understanding of current cybersecurity projects, emerging trends and initiatives, and awareness and training ideas.
NIST contact: Peggy Himes

Workshop on Cybersecurity in a Post-Quantum World

Dates: April 2-3, 2015
Place: NIST, Gaithersburg, Maryland
Sponsor: NIST
Cost: $95 (includes coffee breaks/refreshments) $60 (no coffee breaks/refreshments)

The advent of practical quantum computing will break all commonly used public key cryptographic algorithms. In response, NIST is researching cryptographic algorithms for public key-based key agreement and digital signatures that are not susceptible to cryptanalysis by quantum algorithms. NIST is holding this workshop to discuss issues related to post-quantum cryptography and its potential future standardization.
NIST contact: Dustin Moody

The Information Technology Laboratory (ITL) is a major research component of the National Institute of Standards and Technology (NIST). As a world-class measurement and testing laboratory encompassing a wide range of areas of computer science, mathematics, statistics, and systems engineering, our research program supports NIST's mission to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life. ITL cybersecurity experts collaborate to develop cybersecurity standards, guidelines, and associated methods and techniques for federal agencies and industry. Our mathematicians and statisticians collaborate with measurement scientists across NIST to help ensure that NIST maintains and delivers the world's leading measurement capability. ITL computer scientists and other research staff provide technical expertise and development that underpins national priorities such as cloud computing, the Smart Grid, homeland security, information technology for improved healthcare, and electronic voting. We invite you to learn more about how ITL is enabling the future of the nation's measurement and standards infrastructure for information technology by visiting our website at http://www.itl.nist.gov.

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Credit: NIST