iVAC Newsletter

Integrated Visualization and Analytics Community

CCICADA Kick-Off

Command, Control and Interoperability Center for Advanced Data Analysis (CCICADA)

The newest DHS Center of Excellence (COE), the Command, Control, and Interoperability Center for Advanced Data Analysis (CCICADA), celebrated its inauguration with a kick-off event at Rutgers University on December 9th and 10th, a month following the opening of its partner CCI center, Visual Analytics for Command, Control, and Interoperability Environments (VACCINE), led by Purdue. The two CCI partners aim to create enduring technologies capable of analyzing vast amounts of information from disparate sources to detect threats to national security, the nation's infrastructure, and the health of the U.S. population.

On the first day, an overview of CCICADA research was followed by presentations of sample research projects: extracting information from multimedia sources; data warehousing; textual entailment; applying inference to find knowledge gaps; data privacy; trustworthiness of online documents and data sources; sequential inspection methods for container inspection; and virtual worlds. There were also 19 student posters.

A session on VACCINE's research agenda included discussions of joint CCICADA-VACCINE projects on geospatial data and on crime analysis with the Port Authority of NY/NJ. Directors of six DHS COEs talked about their data analysis problems and described joint CCICADA projects with the START Center on analytics for the Global Terrorism Database; with the FAZD Center on biosurveillance; and with the CREATE Center on port resiliency. The day finished with discussions of education programs, technology transfer, and reactions from CCICADA's Advisory Committee.

On Day 2, Rutgers President Richard McCormick referred to CCICADA's role as "a sobering responsibility." Congressman Frank Pallone of NJ, in a letter, referred to the Center's work as "vital" to the "objective of keeping our nation safe from future national security threats." A letter from Sen. Frank Lautenberg of NJ expressed confidence in CCICADA's ability to work effectively with DHS, "not only conducting research, but expanding technologies, and developing methods that confront data analysis problems that threaten homeland security." Representative Elijah Cummings of Maryland wrote that he was "certain" that the Center will "contribute in a significant way to strengthening national security."

The program featured opening remarks by DHS officials followed by a ceremonial ribbon cutting. CCICADA Director Fred Roberts and VACCINE Director David Ebert gave overviews of their centers' programs. A panel featuring COE directors led to ideas for joint projects. A panel of Advisory Committee members featured advice about technology transfer from a venture capitalist and advice about data privacy from a vice president of Yahoo! Practical data analysis problems were presented by speakers from the Port Authority of NY/NJ, Coast Guard, FBI Cybersquad, NJ Department of Health, National Maritime Intelligence Center, CDC, and NJ Office of Homeland Security and Preparedness.

Workshop Defines Future of PIE

Pacific Northwest National Laboratory (PNNL)

A DHS-sponsored workshop held in Seattle on December 14-15, 2009, brought together researchers from industry and academia with DHS stakeholders to define the research challenges involved in creating future work environments for the emergency management community. These so-called Precision Information Environments will provide tailored access to information and decision support capabilities that support the multiple user roles, contexts, and phases of emergency management, planning, and response. A Precision Information Environment will provide analytic and simulation capabilities through novel interactions that transform the way stakeholders engage with each other and with information.

The goal of the workshop was to help the research community gain an initial understanding of challenges faced by the emergency management community, identify major science and technology gaps in addressing these challenges over the next decade, and identify and prioritize research and development approaches to close these gaps. The workshop included participants from DHS Centers of Excellence (including VACCINE, CCICADA, CREATE, PACER, and DIEM), as well as other academic and industry collaborators and practitioners from local and federal end user organizations.

The workshop resulted in an articulation of thirteen research themes required to achieve the PIE vision; working groups then devoted effort to detailing research activities and milestones over the next ten years for the top five of these themes, which included tailoring information feeds based on relevance to users, creating appropriate hardware and software architectures, designing new adaptive interfaces for improved user experience, developing predictive methods for simulation and decision making, and supporting human and organizational work processes.

In the coming months, the results of the workshop will be developed into a publicly distributed research agenda. In addition, a series of interactive conceptual prototypes that demonstrate core PIE concepts are being developed to communicate the impact that new information interaction technologies will have on the DHS stakeholder community.
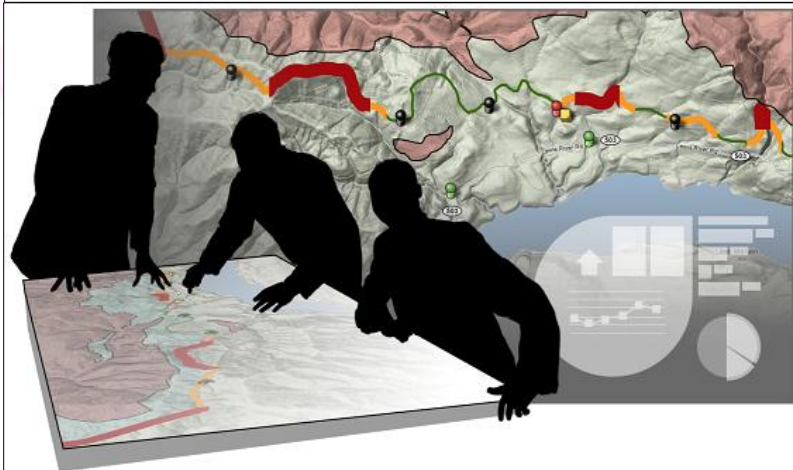
Featured above are the initial **user experience designs** from the PIE conceptual prototype. These early designs are the basis for the interactive elements of that prototype.

European Web Portal on Visual Analytics
University of Konstanz, Germany

Above is a screen shot from the **VisMaster Portal** on activities in Visual Analytics, found at http://www.vismaster.eu/

The VisMaster EU Project has just launched a web portal for up-to-date information about Visual Analytics. Besides the static project websites a number of Twitter and RSS feeds provide access to dynamic content about on-going Visual Analytics activities, such as news, media coverage, EuroVAST, interactive demos, conferences and publications.

Since this web portal is intended to represent a community effort, the EU Visual Analytics community kindly invites the US Visual Analytics community to post information about its own research activities.

For details about the portal or how to post, contact Florian Mansmann (Florian.Mansmann@uni-konstanz.de).

More Information on VisMaster and the EU's activities in Visual Analytics may be found at:

http://www.visual-analytics.eu/

Undergrads Present at Argonne
National Visualization and Analytics Center (NVAC)

For the past two semesters, a team of undergraduate students from Washington State University (WSU) has been working on an agent-based text classification project inspired by the NVAC First Look research effort.

Now, the WSU team's work has been accepted for presentation at the upcoming Annual Argonne Symposium for Undergraduates in Science, Engineering, and Mathematics. First Look project staff helped mentor the team, which focused on the use of autono- mous agents to classify docu- ments in a virtual information space.

The team is also exploring the concept of having agents use a simulated auction approach to "bid" for the user's attention, as a means of elevating groups of documents to the user's awareness.

Ultimately, the student team's research can inform the development of new algorithms in First Look to help bring users quickly up to speed with complex data spaces.
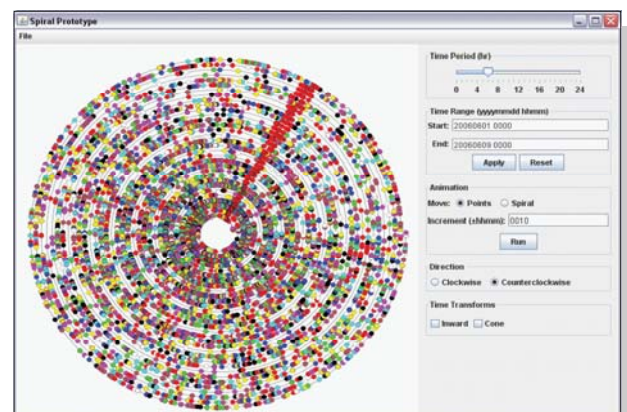
This is a screen shot from a **traffic circle visualization** showcased by the WSU students

COE Education Initiatives
Command, Control and Interoperability Center of Excellence (CCI COE)

To have the greatest impact on the DHS mission, the CCI COE partner centers, VACCINE and CCICADA, work together to identify potential collaborative efforts within the entire education pipeline. They leverage existing expertise within the network of partner schools for program development and dissemination, thereby reducing duplication of effort. Collaborative programs that utilize their Center's ability to obtain speakers and faculty for events, maximize promotional efforts, and share teacher and school contacts are described below.

National Conferences

VACCINE and CCICADA participate in joint program presentations at several national conferences with the goal of expanding visual and data analytics knowledge throughout the DHS and Minority Serving Institution (MSI) networks. Both had a strong presence at the National Association of Mathematicians NAM Mathfest this past November. In March 2010, at the DHS University Network Summit, in Washington DC, VACCINE and CCICADA will present *Effective Strategies for Enhancing Command, Control and Interoperability COE MSI programs.* Then at the ADMI -Association of Computer/Information Sciences and Engineering Departments at Minority Institutions Annual Conference in April 2010, at Jackson State University, another presentation will focus on an overview of VACCINE/CCICADA education efforts and how MSI students can become involved in COE activities and programs.

Training Faculty and Professionals

RECONNECT Conferences are week-long summer workshops that expose university undergraduate faculty to

Educational Photos from **CCICADA**
(http://ccicada.rutgers.edu/).

the mathematical/computer sciences research enterprise and its connections with homeland security. Faculty develop materials to take back to their students in their classes and to guide their undergraduates in research. Two RECONNECT Conferences will be held in Summer 2010. Faculty members from both CCICADA and VACCINE will conduct these workshops, one to be held at USC/ISI on **Information Extraction** and one to be held at Georgia Institute of Technology on **Visual Analytics and Applications**.

<u>Visual Analytics and Applications</u> at Georgia Institute of Technology, with Professors Georges Grinstein, University of Massachusetts Lowell, (grinstein@cs.uml.edu) and John Stasko, Georgia Institute of Technology, (stasko@cc.gatech.edu), *Summer dates will be announced*. Participants will be introduced to basic concepts and components of visual analytics (human, algorithmic, and visualization). They will work together to solve large and complex real-world problems in such areas as homeland security and bioinformatics. Each participant will use a variety of algorithms and visualizations with realistic data sets.

<u>Information Extraction (IE)</u> in Los Angeles CA the second week of June, with Professors Eduard Hovy, USC/ISI, http://www.isi.edu/~hovy/, Zornitsa Kozareva, USC/ISI, http://www.isi.edu/~kozareva/, and Dan Roth, UIUC, http://l2r.cs.uiuc.edu/ . Automatic extraction of desired information from natural language text is increasingly used for medical informatics, business applications, and the intelligence community. In this application, the input is one or more texts in the

domain in question, and the output is a database containing just the desired fields of information, extracted from the source material and formatted appropriately. This week-long course will take students from the early, simpler, methods through the modern ones, and will include theoretical and practical lectures as well as hands-on exercises using software packages. The lecturers are renowned experts in the various aspects of IE and its visualization, and have a long history of teaching informative, engaging, and fun lectures.

Undergraduate Summer Programs

In 2010, VACCINE and CCICADA will share publicity and recruitment opportunities for three hands-on summer research opportunities for undergraduate students.

Rutgers hosts the **Research Experiences for Undergraduates (REU)** http://dimacs.rutgers.edu/REU/ from June 1 – July 23, 2010. CCICADA will select five undergraduates to participate in the program which begins with eight weeks of intensive work during the summer of 2010. Students are strongly encouraged to continue their projects during the academic year 2010-2011.

Purdue University hosts the **Visual Analytics Summer Program (VASP),** a partner with Purdue's longtime Summer Undergrad Research Fellowships Program (SURF) https://engineering.purdue.edu/Engr/Research/SURF, May 24th – August 6th, 2010. The SURF program provides students across all engineering, science and technology disciplines with an intensive research experience, allowing them to work closely with graduate students and professors. This setting provides undergraduate students with an avenue to perform research in visual analytics while exploring future graduate study options.

Educational Photos from **VACCINE** (www.visualanalytics-cci.org).

The University of Illinois at Urbana-Champaign offers the **Data Sciences Summer Institute (DSSI)** http://mias.illinois.edu/dssi/summer_institute, May 24-July 2, 2010. The summer institute weaves together mathematical foundations, applications, and research in a 6 week workshop. Its mission is to encourage computer science college students, particularly from minority serving institutions and EPSCoR states with small research programs, to pursue graduate studies at stronger institutions where they can make a bigger impact on the field, and to expose them to national lab professionals. Limited scholarships are available.

K-12 Curricula, Courses, and Materials

Purdue University will host a series of K-12 teacher workshops during the summer of 2010. These workshops will introduce teachers to visualization and data analytics topics and education modules. Program materials are developed jointly with the goal of rotating these workshops in the future to other interested schools and universities throughout the COE partner network.

VACCINE has developed middle school and high school 'teaser' or 'mini-modules' related to homeland security and visual analytics topics. Each mini-module in the series covers 3-5 class periods. All have already been launched in Indiana with exceptional ratings. These modules will be shared with and expanded into larger curricula and courses by CCICADA. See these modules at http://www.purdue.edu/discoverypark/vaccine/education/k-12.php.

Please, visit the websites to read about these and additional upcoming educational opportunities.

New IN-SPIRE Released

IN-SPIRE™ version 4.6 was finalized in late November 2009 and released to multiple federal agencies and research partners. IN-SPIRE is a powerful visual analytics application that enables users to discover relationships, trends, and themes within large collections of documents. IN-SPIRE is currently undergoing test, evaluation, and certification processes at the ICE/ Office of Intelligence.

The new release includes enhancements to affect and lexical measurement capabilities, expanded analytic export capabilities, support for new and updated dataset types, and miscellaneous changes and enhancements that improve the user experience. This work shows the power of leveraging multiple projects to advance the state of technology and body of understanding for visual analytics.
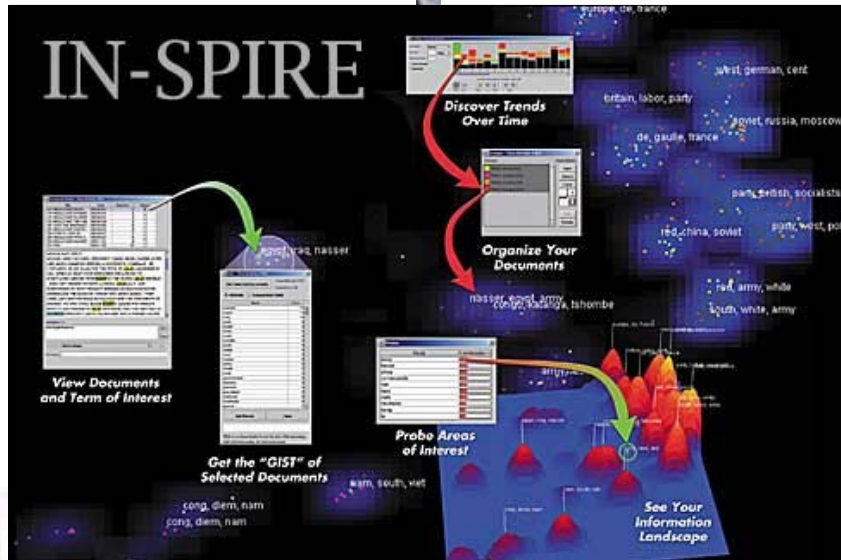
IN-SPIRE™ integrates information visualization with query and other interactive capabilities. The **Galaxy** view (upper right) represents documents with clusters around center points representing central topics or themes. The **ThemeView™** (lower right) provides a faster way to get a visual overview of a collection of data. Users see a **relief map** where the highest peaks represent the most prevalent topics in the collection.

Visual Analytics Highlighted at SC09

Pacific Northwest National Laboratory's visual analytics research and development activities were featured in both a digital kiosk and exhibit talk at the Lab's booth at Supercomputing 2009 in Portland, OR.

Supercomputing is an international conference for high-performance computing, networking, storage, and analysis. Exhibit content on "Visual Analytics for Data Intensive Computing" presented a selection of research activities, supported by PNNL and DHS S&T CCI that resulted in new analysis capabilities for extremely high-volume text, cyber network, graph, and video data.

The conference, held November 14-20, 2009, drew over 11,000 attendees.

VisMaster Industry Day 2010

Fraunhofer Institute, Germany

Today, massive amounts of data are collected and stored in many spheres of human activity, . As the volumes of data available to lawmakers, civil servants, business people and scientists increase, their effective use becomes more challenging.

This workshop, hosted by the Fraunhofer Institute, examines different application areas that increasingly use visual analytics to solve the data challenges of their field.

Renowned experts in these areas present new trends in data analysis and explain the benefits with hands-on business and use cases.

Discussion and presentation topics at this Industry Day will include two sessions in Business Intelligence, with speakers from Fraunhover IGD, SAP Business

About the Event:

Dates:
20-21 January 2010
Registration:
www.analytics-day.de

Objects, Nestle, the University of Stuttgart, IBM France and Magnaview. Other session topics include Safety and Security, with speakers from i2, Plath GmbH and Symantec, and Media Technologies, with speakers from KnowCenter Graz, Bertelsmann-WissenMedia and APA-Defacto.
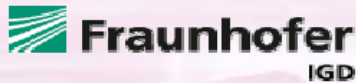
Fraunhofer IGD

VIsMaster
Visual Analytics - Mastering the Information Age

SCIENCE MEETS BUSINESS

TCIP 2010

Command, Control and Interoperability Division

The 11th annual Technologies for Critical Incident Preparedness Conference and Exposition will highlight DOJ, DHS, and DoD's technologies, RDT&E investments, and training tools currently available and under development for the emergency responder community. It also provides a forum for emergency responders to discuss best practices and exchange information.

With 1,500 attendees and 150 exhibits and demonstrations expected, this conference offers a unique opportunity for emergency responders, business and industry, academia, and local, tribal, state, and federal stakeholders to network, exchange ideas, and address common critical incident technology, preparedness, response and recovery needs, protocols, and solutions.

TCIP 2010
February 2–4, 2010

The 2010 TCIP Conference, which will be held at the Philadelphia Marriott Downtown in Philadelphia, PA, is presented and supported by the U.S. Department of Justice (DOJ), Department of Homeland Security (DHS) and Department of Defense (DOD).

Schedule of Key Dates

- **Hawaii International Conference on System Sciences**
Univ. of Hawai'i at Manoa
January 5-8, 2010
- **VisMaster Industry Days**
Darmstadt, Germany
January 20-21, 2010
- **TCIP 2010**
Philadelphia, PA, USA
February 2-4, 2010
- **Submission Deadline for EuroVAST**
February 15, 2010
- **IEEE Pacific Visualization**
Taipei, Taiwan
March 2-5, 2010
- **GeoVA(t) Workshop**
Guimarães, Portugal
May 11, 2010
- **Advanced Visual Interfaces Conference (AVI2010)**
Rome, Italy
May 25-29, 2010
- **EuroVAST 2010**
Bordeaux, France
June 8, 2010
- **EuroVis 2010**
Bordeaux, France
June 9-11, 2010

JANUARY 2010

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FEBRUARY 2010

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MARCH 2010

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