

## HOT RESEARCH

### From the Silk Road to the Silicon Highway: Collaboration in a Global World

On November 26, 2010, ISR Professor **Gloria Mark** presented the keynote talk at the Seventh National CCSCW (China Computer-Supported Cooperative Work) Conference, held in Nanjing, China. The talk was entitled "From the Silk Road to the Silicon Highway: Collaboration in a Global World." With Chinese academics and industry researchers in attendance, Mark spoke on social and technical issues that need to be addressed to support distributed collaboration on a global level.

Mark's talk focused on the challenges that researchers in the interdisciplinary field of CSCW face. She began the talk by pointing out that China was a central figure in early global collaboration with the development of The Silk Road, over 2,000 years

ago. The Silk Road was actually a collection of routes between the Chinese Imperial capital, Xi'an, and those westwards to the Middle East, Venice, Antioch and Tyre. China of today is very

involved in fostering intercultural communication and cooperation with other countries, particularly in academics and commerce. Yet though technical innovations proceed at a rapid pace to connect people globally, there is still a relative lack of understanding in the social aspects of intercultural technology use. As a researcher in the field of human-computer interaction, Mark is interested in understanding how collaborative systems and group behavior interact.

In her talk, Mark raised the question: What issues do designers and practitioners of computing systems need to take

## RESEARCH BRIEFS

Prof. **Paul Dourish** and ICS Prof. Melissa Mazmanian have been awarded \$400,000 by the National Science Foundation for a three year study on "Innovating Across Cultures in Virtual Organizations." They are looking at how design and creative work is managed in cross-cultural settings. In particular, they are looking at how collaboration technologies and material practices shape the design process, and how cultural processes shape the production and interpretation of these practices.

Prof. **Walt Scacchi** has been awarded \$140,000 by the San Francisco Symphony for developing an informal music learning game environment. The project targets 8-13 year old learners, but the audience for the SFSKids.com website will include parents, teachers, adults, and children of all ages. The goal is to harness cutting edge thinking and technologies in game design to enable kids, families and teachers to learn about classical symphonic music in a fun and engaging way.

Prof. **Alfred Kobsa** received a \$25,000 gift from Disney Company to support his research on location-sharing applications on mobile devices. Kobsa and his Ph.D. student **Xinru Page** will investigate novel interface designs for applications that accommodate users' privacy and impression management desires. Special emphasis will be put on practical usage for car pooling purposes. More on Kobsa on page 4.

*More Research Briefs on page 6.*

seriously to support successful global collaboration? She explained how distance involves not only a geographical separation among collaborating partners but also cultural, time zone, language, organizational, and contextual differences. These are problems that technology alone cannot solve. She presented projects that she has worked on over the last eight years that illustrate different ways these differences can be bridged, by using a sociotechnical approach. These projects included supporting scientific team-to-team distributed collaboration, a global conference room with wall-size HDTV video-conferencing, managing multiple distributed collaborations, global telemedicine collaboration, and the use of ubiquitous and mobile technologies in disrupted areas.

For example, Mark has been studying how, in areas that have been disrupted by conflict or disaster, people use mobile and Internet technologies to continue their

work and social lives. In this project she is collaborating with ISR Project Scientist **Ban Al-Ani** and Ph.D. student **Bryan Semaan**. Though people may not be able to travel in the disrupted environment, people have invented new ways to

use technology to travel safely, to continue to work (virtually), and to connect with others globally. "The

value of connecting to others globally cannot be understated. It is a means for citizens to be journalists as well as a means for people to create a network of global support," says Mark.

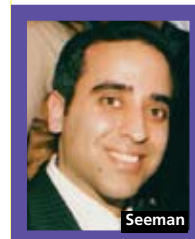
In another project, Mark is collaborating with ISR post-doctoral researcher **Daniel Massaguer** on the VirTel Med project, a



Mark



Al-Ani



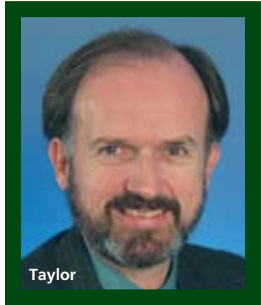
Semaan

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## MESSAGE FROM THE DIRECTOR

In November 2010 a “Workshop on the Future of Software Engineering Research” (FoSER) was held in Santa Fe to provide an “opportunity for the international software engineering research community to develop, discuss and disseminate consequential new ideas about the future of our field.” I took the occasion to lay out not what I see as consequential new ideas for the field, but rather what I feel is hindering the field. My remarks below are a summary of my presentation<sup>1</sup>. I think an internal, critical look, and revision is necessary. Largely my focus is on what’s wrong with academic research; I’ll save my thoughts about what’s wrong with industry for a future letter ☺



Software Engineering must choose whether it wants its future to be one in which innovative development techniques, innovative architectures, innovative interfaces, and such are enabled and encouraged to emerge from its research community, or if research will be confined to observation, analysis, formalization, and assessment of the innovations that emerge from other quarters, notably industrial practice. If the choice is to enable innovation in the research community, then the “meta-practices” of the community must change.

**Introduction.** Many seasoned attendees at conferences such as ICSE and FSE attend few of the paper sessions. When asked to explain, many will reply that they find most papers boring. Indeed, it is easy to find many veterans of software engineering research lamenting the state of field, wherein such laments focus either on the narrowness of research papers or the lack of consequence of the results.

The characterization of papers as “boring” is often understood to mean that the size of any presented innovation or other advancement is small relative to prior work, or that the topic of the study bears only distant relation to perceived problems of the industry, or perhaps that the experiment conducted – if any – is unconvincing for being distant from “reality”. Whether “boring” is a legitimate complaint or not, few would disagree that major innovations in software technology seldom first appear in today’s research conferences. A substantial part of the community now sees the interesting technologies and approaches emerging only from “the practice” – either from single companies or from open-source communities. In my opinion, the net effect is that progress is much slower and the degree of innovation much less, since “the practice” necessarily focuses on near-term results.

**Roots of the Dilemma.** In many respects our problem – if indeed one agrees that it is a problem – is the result of our own success. Faced in the past with products trying to masquerade as research, “results” based on poor investigational practices, and other actual or perceived problems, the community actively sought to raise the bar. Program committees for conference such as FSE and ICSE are now held to a high standard: committee members must personally review submissions, must attend the program committee meeting in person, and must be prepared to defend their positions. Correspondingly, the quality of papers has become more uniform and, arguably, much better. “Better” as defined by being clear in definition, comprehensive in comparison to related work, and providing evidence of evaluation. Yet the net effect seems to have been to move all research to “under the lamppost.” Since in order to be published a paper must have clarity, precision, formality, and above all, a solid evaluation section, authors have focused their work on those problems that are amenable to those criteria. That is, they have (necessarily) focused on problems for which it is possible to have a tidy, fully defensible evaluation section, nice formalisms, and a whole package that can be presented in 10 pages, ACM format. We wanted rigor, repeatability, and precision, and we got it.

**Necessarily?** One question is, have we narrowed our investigative focus *necessarily*? Here the answer comes in part not from the essence of software, but rather from the social world in which the research community operates. Many of us are professional academics: subject to the rules and norms of the academy. Our personnel cases are evaluated by our peers in software engineering, but (at least in my university) also by a powerful campus-wide committee composed of scientists, humanists, artists, philosophers – academics of all stripes. We have to “look good” to get our infrequent raises, and yes, to get tenure.

We also have to “look good” when seeking funding for our investigations. When a major funding agency, such as the NSF, has to decide whether to fund a software engineering program or (say) a chemical engineering program, part of the argument will be based upon the relative or perceived “quality of work in the fields,” the rigor of the techniques, the solidness of the results, the predictability of the outcome. Naturally that pushes software engineering to be formal, rigorous, and so on.

“Looking good” also has implications for productivity, which usually translates to quantity of publications. We are motivated to produce more papers, rather than (e.g.) deeper results. This tension is supposed to be attenuated by external peer review of personnel cases, but the visible presence of many publications in one dossier, as opposed to fewer but possibly deeper pubs in another case, is hard to ignore – especially when viewed by someone outside the field.

I do not mean to imply that such pressures are ill-intentioned, or parochial in their fundamental nature. I believe that much of what we see in practice is due to the entirely appropriate need for quality, accountability, and integrity.

## MESSAGE FROM THE DIRECTOR CONTINUED

**Quality, Accountability, and Integrity.** My view of why software engineering has come to be so baked-in to its current conservative position is that it is in reaction to a period many years past when several publications and postures were of arguably very low quality, when claims could be made for which there was no ultimate accountability, and indeed cases when the very integrity of a presentation was in question. The need for excellence is undeniable. The quandary then, is how to encourage risk, innovation, excitement, and new technology development within the research community, while still maintaining high standards. Even more, how to encourage such work that targets large-scale problems, creates new industrial markets, builds intellectual property, and even creates new positive economic forces.

**Some Suggestions.** I do not claim novelty for my suggestions. Some of them echo recommendations from earlier studies. Others echo comments often heard in the ICSE and FSE hallways.

1. New conference publication forums are needed. Much as I would prefer to “fix” ICSE or FSE, I do not see any realistic potential for the required radical transformation of the process. The current ICSE/FSE criteria and processes *do* serve a part of the community and the industry well, and that should continue. Hence I believe SIGSOFT should step up to the challenge of creating a new forum (occasionally mooted as “HotSE”) to be the venue for highly innovative (and risky) design-based contributions.
2. Funding officers should be enabled to exercise greater personal judgment and discretion in making funding decisions. The extensive external constraints that some funding officers work under possibly will preclude this from happening, but it has worked exceedingly well in the (remote) past at DARPA. Concomitantly, reviewers should be encouraged to apply criteria prioritizing novelty, impact, innovation, and significance over slavish adherence to formality or safe but largely meaningless experiments.
3. The new freedom implied by item 2 to fund more interesting, but riskier projects should be accompanied by a new focus on public accountability. Public demonstrations of new technologies, head-to-head competitions, “bake-offs” and prize-based competitions should be used as a matter of course, not as rare exceptions.

*Above all, innovation should be moved to the forefront of software engineering research’s priorities.*

ISR Director **Richard N. Taylor** can be reached at [taylor@uci.edu](mailto:taylor@uci.edu).

<sup>1</sup>The full paper is available as: *Richard N. Taylor. 2010. Enabling innovation: a choice for software engineering. In Proceedings of the FSE/SDP workshop on Future of software engineering research (FoSER '10). ACM, New York, NY, USA, 375-378. DOI=10.1145/1882362.1882438 <http://doi.acm.org/10.1145/1882362.1882438>.*

telemedicine project designed to deliver health care to people in remote regions both domestically and in developing regions. The VirTel Med system leverages the high penetration of mobile phones, whereby using a novel visual mobile phone interface, people can communicate their symptoms to a web-based environment. Health care workers, in turn, from anywhere in the world, can then collaborate and communicate with the patient through this environment.



Currently, Mark is also working on a project with ISR sponsor Northrop Grumman. The goal of this project is to design a technical system to support people who engage in high levels of multitasking as they deal

with large amounts of information on the computer. As a first step, Mark produced a primer on theories that relate to human processing of information, ranging from types of memory stores, automatic and controlled processing, divided and selective attention, and priming, to theories that take the environment and social interaction into account such as activity theory, situated action, and distributed cognition. The next phase of the project will be to develop a prototype that is based on one or more of these theories.

Mark has been studying multitasking in the workplace for the last several years. With ICS post-doctoral researcher Stephen Voida, she is currently collaborating on a large-scale field study to examine the role of email in multitasking. Information workers have been suspending their use of email so that the researchers can examine

how it affects different aspects of work, ranging from productivity, stress levels, to reconfigurations in people’s social networks.

Mark’s research focuses on studying collaborative technology use and adoption. She has done extensive work in understanding requirements analysis for collaborative technologies and in evaluating technologies in practice. In her past projects, she has participated in system development for novel technologies, and studied distributed collaborations in diverse organizations using a variety of technologies, including a German government ministry, The Boeing Co., NASA, Intel and local software companies.

For more on Mark’s research, see:  
<http://www.isr.uci.edu/~gmark>

She can be reached at: [gmark@ics.uci.edu](mailto:gmark@ics.uci.edu).



## ISR STUDENT NEWSBRIEFS

**Xinru Page** (A. Kobsa advisor) will present the paper “With A Little



Help From My Friends: Can Social Navigation Inform Interpersonal Privacy Preferences?” at the ACM Conference on Computer Supported

Cooperative Work in China in March. The paper was authored by alumnus **Sameer Patil**, Page, and their advisor Prof. **Alfred Kobsa**.

**Yong Ming Kow** and his advisor Prof.



**Bonnie Nardi** were awarded \$1500 from the kynamatrix Research Network, one of only four national awards, for the project “Building a Creative

Ecology with Software Users.”

**Nilmax Moura** (A. van der Hoek, advisor) spent his summer intern-



ing at VMWare, Inc., where he developed a highly interactive visual log browser tool (Eclipse plug-in) that facilitates the visualization of, and navigation through, log files. This

tool aims to support activities such as proactive system maintenance, intrusion detection, failure analysis, and usage assessment.

For more information on students:  
<http://www.isr.uci.edu/people.html>



## FOCUS ON FACULTY Meet the Conciliator Alfred Kobsa

Ever since his early days in graduate school in Austria, ISR Professor **Alfred Kobsa** has had an interest in personalized systems, and in privacy. When joining UCI, he started to work on reconciling the two.

“Consumer studies demonstrate that online users value personalized content,” Kobsa points out. “Likewise, providing personalization on websites is quite profitable for web vendors, despite its higher costs. This win-win situation is however marred by privacy concerns since personalization requires gathering considerable amounts of personal data, which many users are hesitant to disclose.”

Today, around fifty countries worldwide have enacted privacy laws. Many of these laws mandate that certain forms of personalization require users’ consent. Quite a few of these national laws also apply beyond a country’s boundaries when its citizens provide personal data to servers abroad, such as to websites in the U.S. Kobsa therefore developed an architecture that allows “privacy-enhanced” personalized websites to comply both with users’ individual privacy preferences and with the privacy law of the country in which the user resides. “Our approach is technically feasible with comparatively modest additional resources, even for web sites with the highest traffic today” says Kobsa about

this research which was supported by the NSF and Google.

Simulation experiments with a pretend online bookstore demonstrate that users value individualized privacy controls as suggested in Kobsa’s research. Study participants who could use the proposed privacy controls [shown in Figure 1] disclosed significantly more data about themselves and decided to buy a book 60% more often than those to whom these controls were not made available. “In order to buy a book, our study participants had to disclose their real name, address and payment data” explains Kobsa. “Giving users control is known to increase trust in a system, which in turn is known to increase people’s willingness for data disclosure. Web retailers can profit from this effect by giving their online customers easily understandable and usable privacy choices.” Awareness of the activities and whereabouts of others has also been a long-term research interest of Kobsa. Both can again be useful, but at the same time also

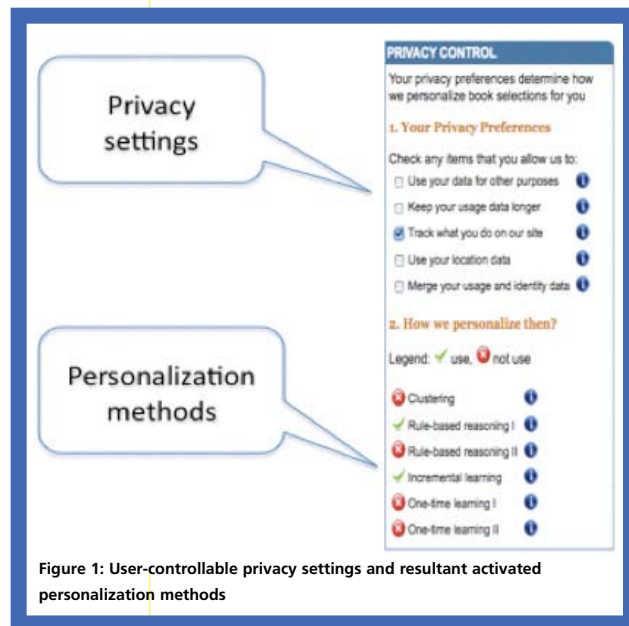


Figure 1: User-controllable privacy settings and resultant activated personalization methods

privacy-sensitive. Kobsa studies these tensions in two application areas, namely in distributed collaborative work (with support from the NSF and Avaya Research) and in location-sharing on mobile devices (with support from the NSF and Disney Research).

In distributed collaborative work, awareness of others’ activities and progress can aid team members in continuously coordinating their activities in an informal manner. Interviews with Orange

County IT professionals and a field study at three U.S. and one Indian site of Avaya revealed, however, that many do not want all their activities to be visible to others. Kobsa explains this: "Other research of mine among IM users shows that people do not entertain such privacy desires gratuitously but rather for at least one motive, namely their desire for impression management. Withholding information is a safe strategy if one is not sure how others will interpret it." Kobsa would like to explore this issue in more depth in the future.

In the area of location sharing, many applications have recently been made available that allow groups of people to easily find out each other's current location, often down to the building level and often in a stealth manner. Interviews with early adopters and abandoners of one such application, Google Latitude, revealed however that some people are unfazed by its potential privacy implications and social pressures, whereas others are quite concerned. Together with his team, Kobsa currently is designing a location-sharing application for the "pessimists" that offers a number of privacy-preserving and face-saving features. For

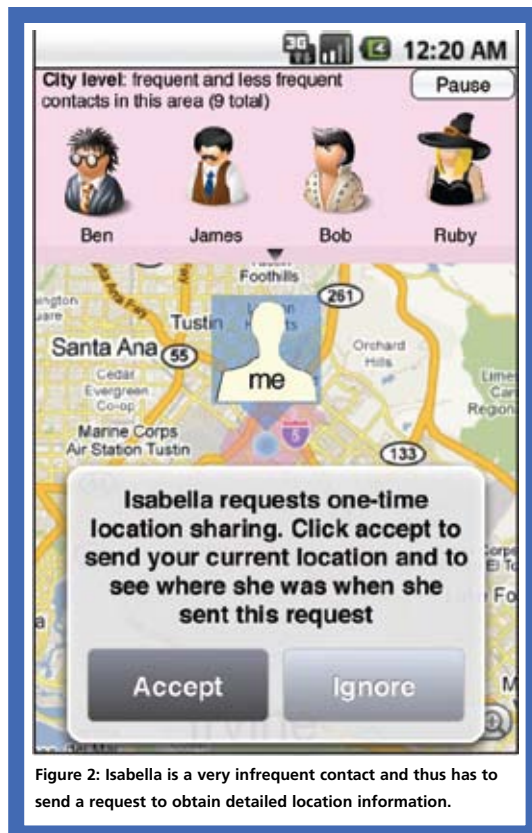


Figure 2: Isabella is a very infrequent contact and thus has to send a request to obtain detailed location information.

instance, contacts with whom one interacts infrequently can only see one's location at

## ISR Technical Reports Available Online

ISR technical reports present information resulting from student and faculty research carried out under the auspices of the Institute. They showcase early results not available in print elsewhere. ISR technical reports are available in PDF on the ISR website. Recent reports include:

### "Initial Successes and Failures Prototyping Socio-technical Visualizations Using a Collaboration Infrastructure"

Erik Trainer, David Redmiles  
UCI-ISR-10-5, November 2010

### "Disjoint Reachability Analysis"

James C. Jenista, Yong Hun Eom, Brian Demsky  
UCI-ISR-10-4, June 2010

### "The Infrastructure of a Computational Web"

Michael M. Gorlick, Justin R. Erenkrantz, Richard N. Taylor  
UCI-ISR-10-3, May 2010

### "Gaze Awareness for Distributed Work Environments"

Benjamin Koehne  
UCI-ISR-10-2, May 2010

All ISR technical reports are available at:

<http://www.isr.uci.edu/tech-reports.html>

## ISR STUDENT NEWSBRIEFS

**Nicolas Lopez**, (A. van der Hoek, advisor) spent his summer as an intern at IBM T.J. Watson Research Center as part of a development co-op



working to improve adoption of Jazz - Rational Team Concert by academia and open source projects. Lopez also presented his paper, "An Agenda for Concern-

Oriented Software Engineering," at the Workshop on the Future of Software Engineering Research at FSE in November. The paper was co-authored by his advisor Prof. **André van der Hoek**. Additionally, Lopez has been awarded the Miguel Velez Fellowship for Winter 2011. This fellowship is given to students who demonstrate outstanding past academic achievement as well as future promise.

**Nick Mangano** (A. van der Hoek advisor) received an ARCS Scholar Award for the 2010-2011 academic year. The Achievement Rewards



for College Scientist (ARCS) Foundation award recognizes and rewards UC Irvine's most academically superior doctoral students exhibiting outstanding

promise as scientists, researchers and public leaders. Mangano interned last summer at IBM T.J. Watson Research Center where he collaborated with the Flexible Modeling Group to develop new features for BITKIT, an office-like product that combines the freedom and flexibility of regular office tools with the benefits of more formal modeling tools.



## ISR STUDENT NEWSBRIEFS

Lily Irani (P. Dourish, advisor) is spending a year doing ethnographic field-

work studying designers at a design firm in India. This work is supported by a Fullbright Scholarship as well as an NSF grant. Additionally, Irani's paper, "Shopping

for Sharpies in Seattle: Mundane Infrastructures of Transnational Design," received the Best Paper award at the ACM Intl. Conf. on Intercultural Collaboration in Copenhagen. The paper was co-authored by her advisor, **Paul Dourish**, and ICS Prof. Melissa Mazmanian.

Leyna Cotran (R. Taylor, advisor)

will co-chair a working group at the 2011 Ground System Architectures Workshop (GSAW) on the topic of "Beyond Shall Statements: Modernizing Requirements Engineering."

ISR Alumnus **Eric Dashofy** of The Aerospace Corporation will co-chair the working group with Cotran.

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Affiliate—Grad Student	\$60,000	Graduate student fellowship.
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the city or state level and need to send a request if they want more precise location information [Figure 2, page 5].

Last but not least, Kobsa also supervises student projects on user interface design and evaluation, with companies like Magellan, Southern California Edison and ExpensAble, and UCI units like the Libraries, Extension and Donald Bren School of ICS. "This is a welcome opportunity for students to get in touch with real-life demands, and for companies to have access to unbiased expertise and potential future employees" he says.

For more on Kobsa's research, see:

<http://www.isr.uci.edu/~kobsa>

Contact Kobsa at: kobsa@uci.edu.

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## RESEARCH BRIEFS

Prof. **Alfred Kobsa** gave an invited keynote talk titled "Privacy-Enhanced Personalization" at the 22ème Conférence Francophone sur l'Interaction Homme-Machine in September in Luxembourg.

Prof. **Richard N. Taylor** is serving as General Chair for ICSE 2011, the 33rd Int'l Conference on Software Engineering, to be held in May in Hawaii. ISR faculty associate and alumnus **Nenad Medvidovic** is serving as Program Co-Chair. ISR Technical Relations Director **Debra Brodbeck** is serving as Conference Director.

Prof. **Bonnie Nardi** is co-authoring a book entitled "Ethnography and Virtual Worlds: A Handbook of Methods" with Prof. Tom Boellstorff of UCI, Prof. Celia Pearce of Georgia Tech and Prof. T.L. Taylor of the IT University of Copenhagen. Look for her book in late 2011.

## Contextualized Coding – No More Coding in the Dark

ISR Professor **André van der Hoek** and his graduate students are taking a fresh look at software development environments, particularly seeking to make them increasingly smarter in providing developers with just



the right information at just the right time so they can perform their work effectively and efficiently.

This research is based on the observation that current development environments simply

provide the current state of a system to be modified, and then leave it up to the developer to make the changes desired. While the task may be clear, to fix a bug or enhance the system in some way, the context in which this task takes place remains absent. Has the code recently undergone changes? Is there a high level of code churn? Has it been authored by a single developer or by many? Will the changes possibly overlap with changes that others are working on? How will the changes influence the underlying design of the system? All of these questions are important, and the answers can critically shape a developer's approach to their work. As van der Hoek points out, "While one must be careful changing any code, to some code one should pay even more attention than usual, say when the particular block of code has been involved in numerous bugs, does not have much test coverage, and has

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IBM T. J. Watson Research Center

*"Smart Flexible Office Modeling Tools"*

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**ISR Distinguished Speaker: Wendy Kellogg**

IBM T. J. Watson Research Center

*"Social Intelligence for a Smarter Planet"*

For more information: <http://www.isr.uci.edu/events.html>

changed a significant amount in a short time."

This kind of information, however, is not readily available in current development environments. van der Hoek is experimenting with a number of different tools to rectify this situation. The Code Orb [shown in Figure 3] is one. It provides a developer with continuous feedback

regarding the volatility of the code, on a line-by-line basis. As the developer navigates through a particular file, each slice in the Orb changes color from green to red depending on a different indicator (e.g., code churn for this line, past bugginess of this line). The more red the Orb, the more this line of code should be paid attention to should it need to be changed.

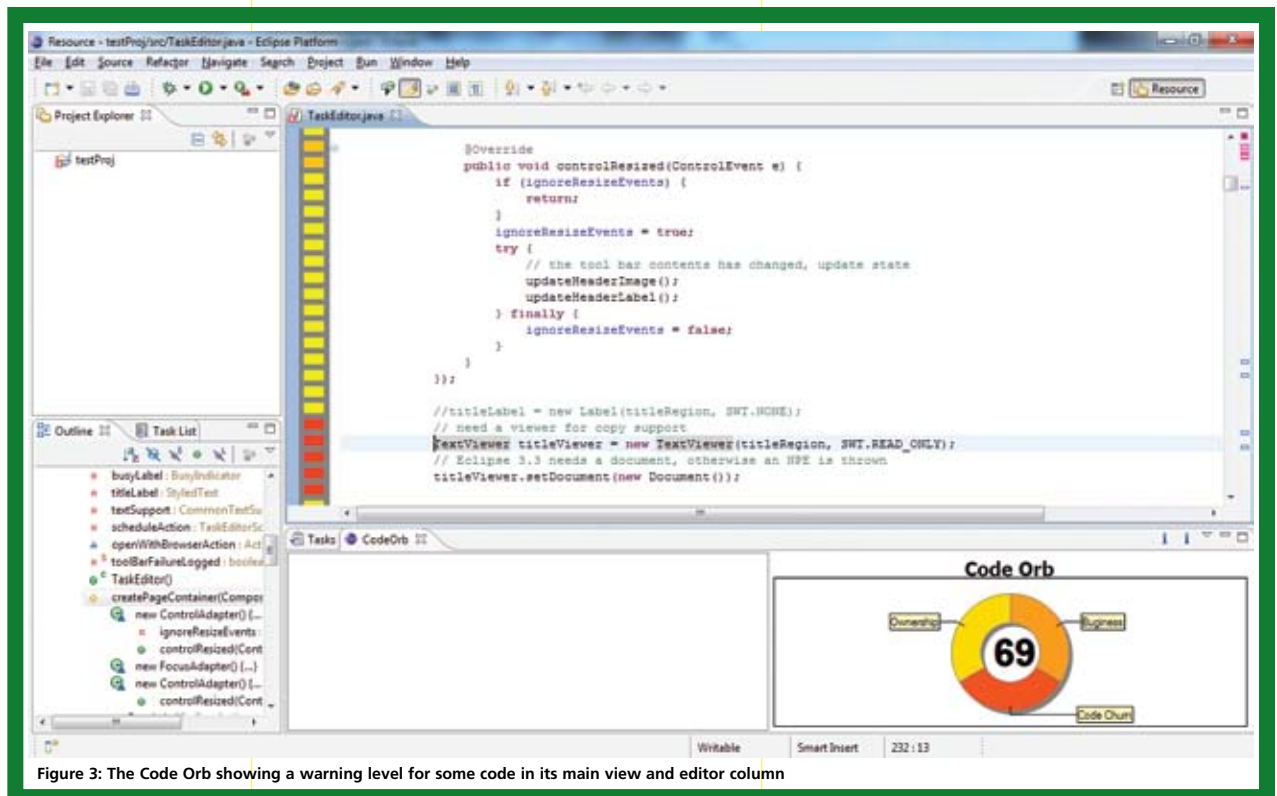


Figure 3: The Code Orb showing a warning level for some code in its main view and editor column



Lighthouse [Figure 4] provides a second example of van der Hoek's work. The idea here is that context is not just historical, but also consists of the present – particularly the ongoing work of others. Parallel changes by all developers determine how the software will look in the future. The better the parallel changes “fit”, the better the quality of the software and the less rework needs to be done. Lighthouse distinguishes itself with its emerging design view – the design as it exists in the code and evolves with every change that developers make in their workspaces. The emerging design view, then, provides an instant, live development view that provides developers the opportunity to avoid potential conflicts, self-coordinate their work, and jointly oversee the quality of the design.

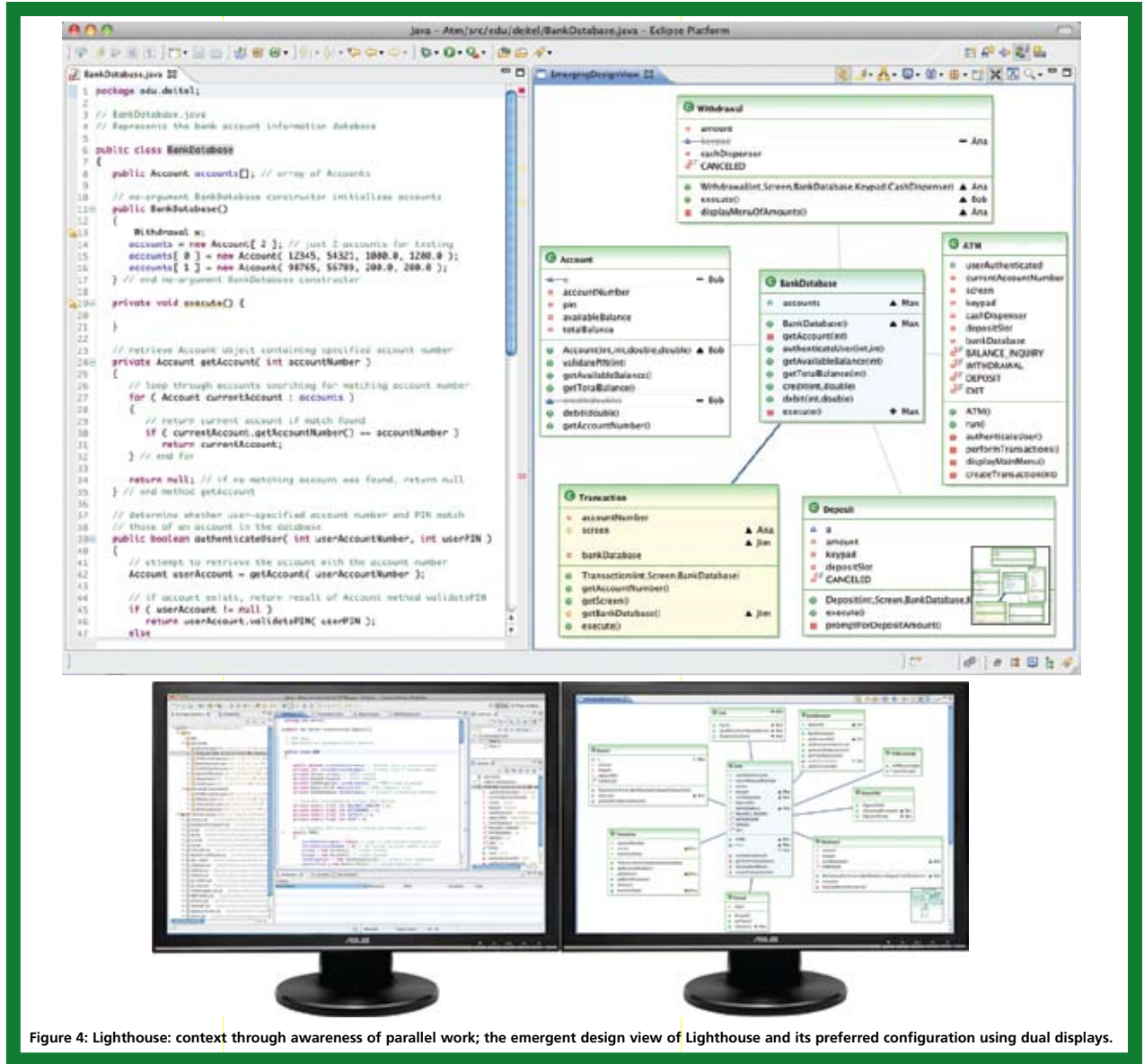


Figure 4: Lighthouse: context through awareness of parallel work; the emergent design view of Lighthouse and its preferred configuration using dual displays.

Says van der Hoek: “Both the Code Orb and Lighthouse provide developers with the opportunity to more intelligently work. Developers are smart; modern development environments should leverage their smartness, especially when it comes to recognizing and addressing troublesome situations. No automated tool is going to be able to do that to the fullest extent.”

van der Hoek's work regularly involves industry, with actual development efforts serving as inspiration, tests of viability of the approach, and exploratory tech transfer. His work has been sponsored by IBM, Hitachi, HP, and Accenture.

van der Hoek can be reached at: andre@ics.uciedu.

For more information, see: <http://www.isr.uci.edu/~andre>

Information on Lighthouse is available at: <http://awareness.ics.uci.edu/lighthouse/>

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