Probing Questions, Participatory Democracy, Quality Assurance, and Customer Data

Jeffrey C. Carver, Maria Paasivaara, and Birgit Penzenstadler

THIS MONTH’S COLUMN reports on papers from the 38th International Conference on Software Engineering and the 17th International Conference on Agile Software Development (XP 2016). Feedback or suggestions are welcome. In addition, if you try or adopt any of the practices mentioned in the column, please send Jeffrey Carver and the paper authors a note about your experiences.

Asking the Right Questions
“Probing for Requirements Knowledge to Stimulate Architectural Thinking,” by Preethu Anish and her colleagues, describes an inexpensive, down-to-earth requirements elicitation technique to ensure that software requirement specifications (SRSs) contain architecturally relevant information.1 This research aims to equip business analysts with the appropriate probing questions (PQs) software architects typically ask. This will enable the analysts to elicit and specify architecturally relevant information themselves. Using this approach, they can produce richer specifications containing the details software architects need to make decisions.

This research is necessary because SRSs often lack architecturally relevant details. Consequently, architects often either make assumptions, which can lead to incorrect decisions, or conduct additional stakeholder interviews, potentially delaying a project. Anish and her colleagues’ approach can reduce the necessary communication between architectures and customers. According to one architect who used it, “[In the absence of such an approach] the effort [to unearth architectural details] would be quite high, and more than that, user acceptance testing will raise questions as to why things were not clarified earlier in the requirements phase.”

Through interviews with 40 experienced architects, Anish and her colleagues identified reusable PQs for five areas of functionality and organized them into structured flows. They trained a machine-learning algorithm to classify architecturally significant functional requirements. On the basis of this classification, they could determine whether a PQ is appropriate for a project. The authors evaluated their approach on more than 8,000 requirements from 114 industrial requirements specifications and validated its usefulness. This research also produced a repository of PQs business analysts can reuse in other projects.
to enhance SRS quality and completeness. You can access this paper at http://goo.gl/4UNvJu.

**Promoting Participatory Democracy**

“Engineering Software Assemblies for Participatory Democracy: The Participatory Budgeting Use Case,” by James Holston and his colleagues, describes AppCivist-PB, a service-oriented software platform that promotes participatory democracy. AppCivist-PB focuses on participatory budgeting (PB), in which a municipality’s residents develop projects to which the municipality designates part of its annual budget.

One lesson learned from evaluating AppCivist-PB is the tension between building a usable system (by constraining the number of options provided) and allowing citizens to learn about participatory democracy (by providing a more complex, unconstrained system).

Support of participatory democracy is an emerging application domain that could provide business opportunities. Although there are Web-based systems that support participatory democracy, none of them include all the essential functions for composing participatory workflows for citizens. So, Holston and his colleagues advocate the development of a service-oriented platform to improve civic participation. You can access this paper at http://goo.gl/tnOaMo.

**Extending Scrum for Quality Assurance**

“Quality Assurance in Scrum Applied to Safety Critical Software,” by Geir Hanssen and his colleagues, presents SafeScrum, a variant of Scrum that employs Extreme Programming techniques to develop safety-critical software. On the basis of an analysis of the IEC 61508 functional-safety standard, discussions with an independent assessor, and working with a development team from Autronica Fire and Security developing fire detection systems, Hanssen and his colleagues identified a set of Scrum extensions to support safety-critical software.

The primary extension is the addition of a rotating quality assurance (QA) role to the Scrum team. This role checks:

- code metrics for new or changed code;
- documentation coverage;
- test coverage; and
- the traceability of requirements, tasks, and code.

These tasks are defined to be simple and inexpensive and to be supported by efficient tool use. The researchers and practitioners are continuously refining and extending SafeScrum. You can access this paper at http://goo.gl/kmSTAk.

**Sharing Customer Data**

“The Lack of Sharing of Customer Data in Large Software Organizations: Challenges and Implications,” by Aleksander Fabijan and his colleagues, reports that the main challenge related to customer data in large, agile software organizations is not data collection but sharing data between development phases. The results from case studies in three companies using large-scale agile software development indicate the critical handover points at which data is easily lost.

When a project moves from pre-development to development, qualitative data regarding the product context, expected product use, and user groups is often lost. Specifically, information about personas, user journeys, and customer wishes is lost, possibly requiring developers to collect that information again. When a project moves from development to postdeployment, information regarding the rationale for system configurations might get lost, resulting in solution choices that are known to be unacceptable to users. At the same time, teams might lose information about prototype acceptance and bottlenecks. Finally, teams might not share operational and performance data gathered after development with those responsible for development, which might lead to the selection of inappropriate architectures.

The interviewees reported that the main reason for losing data is the difficulty of gaining access to qualitative data that someone else gathered in a different project phase. This difficulty arises from the multiplicity of data collection roles and the lack of systematic methods for storing and sharing such data. One product
The IEEE Computer Society is the world’s largest association of computing professionals and is the leading provider of technical information in the field.

MEMBERSHIP: Members receive the monthly magazine Computer, discounts, and opportunities to serve (all activities are led by volunteer members). Membership is open to all IEEE members, affiliate society members, and others interested in the computer field.

OMBUDSMAN: Email ombudsman@computer.org.

COMPUTER SOCIETY WEBSITE: www.computer.org

Next Board Meeting: 13–14 November 2016, New Brunswick, NJ, USA

EXECUTIVE COMMITTEE

President: Roger U. Fujii
President-Elect: Jean-Luc Gaudiot; Past President: Thomas M. Conte; Secretary: Gregory T. Byrd; Treasurer: Forrest Shull; VP Member & Geographic Activities: Nita K. Patel; VP, Publications: David S. Ebert; VP, Professional & Educational Activities: Andy T. Chen; VP, Standards Activities: Mark Paulik; VP, Technical & Conference Activities: Hausi A. Müller; 2016 IEEE Director & Delegate Division VIII: John W. Walz; 2016 IEEE Director & Delegate Division V: Harold Javid; 2017 IEEE Director-Elect & Delegate Division V: Dejan S. Milojčić

BOARD OF GOVERNORS

Term Expiring 2016: David A. Bader, Pierre Bourque, Dennis J. Frailey, Jill I. Costin, Atsushi Goto, Rob Reilly, Christina M. Schobert
Term Expiring 2017: David Lomet, Ming C. Lin, Gregory T. Byrd, Alfredo Benso, Forrest Shull, Fabrizio Lombardi, Hausi A. Müller
Term Expiring 2018: Ann DeMarle, Fred Douglass, Vladimir Getov, Bruce M. McMillan, Cecilia Metra, Kunio Uchiyama, Stefano Zanero

EXECUTIVE STAFF

Executive Director: Angela R. Burgess; Director, Governance & Associate Executive Director: Anne Marie Kelly; Director, Finance & Accounting: Sunny Hwang; Director, Information Technology & Services: Sumit Kacker; Director, Membership Development: Eric Beckwitz; Director, Products & Services: Eman M. Butterfield; Director, Sales & Marketing: Chris Jensen

COMPUTER SOCIETY OFFICES

Phone: +1 202 371 0100 • Fax: +1 202 728 9614 • Email: hq.ofc@computer.org
Los Alamitos: 10662 Los Vaqueros Circle, Los Alamitos, CA 90720
Phone: +1 714 821 8380 • Email: help@computer.org
Membership & Publication Orders
Phone: +1 800 272 6657 • Fax: +1 714 821 4641 • Email: help@computer.org
Asia/Pacific: Watanabe Building, 1-4-2 Minami-Aoyama, Minato-ku, Tokyo 107-0062, Japan • Phone: +81 3 3408 3118 • Fax: +81 3 3408 3553 • Email: tokyo.ofc@computer.org

IEEE BOARD OF DIRECTORS

President & CEO: Barry L. Shoop; President-Elect: Karen Bartleson; Past President: Howard E. Michel; Secretary: Parviz Famouri; Treasurer: Jerry L. Hudgings; Director & President, IEEE-USA: Peter Alan Eckstein; Director & President, Standards Association: Bruce P. Kraemer; Director & VP, Educational Activities: S.K. Ramesh; Director & VP, Membership and Geographic Activities: Wai-Chong (Lawrence) Wong; Director & VP, Publication Services and Products: Sheila Hemami; Director & VP, Technical Activities: Jose M.F. Moura; Director & Delegate Division V: Harold Javid; Director & Delegate Division VIII: John W. Walz

revised 10 June 2016

References


JEFFREY C. CARVER is an associate professor in the University of Alabama’s Department of Computer Science. Contact him at carver@cs.ua.edu.

MARIA PAASIVAARA is a research fellow in Aalto University’s Department of Computer Science. Contact her at maria.paasivaara@aalto.fi.

BIRGIT PENZENSTADLER is an assistant professor of software engineering at California State University, Long Beach. Contact her at birgit.penzenstadler@csulb.edu.