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Special section on Visual Analytics in Software Engineering



In the recent years there has been a tremendous development in handling large quantities of data in different aspects of software product development. One of the areas is the ability to understand customers and collect the data from the product usage in-field; another area is the ability to use large quantities of product development data to optimize software development flows.

As a community we have also made great progress in providing more data from software development systems such as source code management systems (e.g. Git), defect management systems (e.g. Jira) and many more. We can see, that visual analytics in software engineering is gaining importance. The ability to quickly, and accurately, understand the software, and its context, is important for software engineers, business analysts, software product managers, and other roles involved in software development.

Visual analytics is a new area within software engineering and software engineering management. The goal of the visual analytics is to provide new insights about software engineering products and activities to its stakeholders. The stakeholders are all roles – from software developers through product and quality managers, to line managers in software development organizations.

The area of visual analytics combines the competence, knowledge and experiences from such areas as visualization techniques, mining software repositories, software comprehension, business analytics, and software measurement. This combination creates a unique opportunity to build software engineering decision support founded in solid theories, support state-of-the-art instrumentation and supported by actionable visualizations.

This special section consists of two articles, which illustrate the need and potential of visual analytics. The special section is designed to provide an introduction and inspiration for researchers and practitioners, to further develop the portfolio of methods, tools and processes of visual analytics in the context of software engineering.

The first paper is authored by Alison Fernandez Blanco and Alexandre Bergel and titled “A Domain-Specific Language to Visualize Software Evolution”. The paper presents a new way of understanding program evolution using a domain-specific language. The language utilizes a powerful metaphor of heat-maps for code comprehension, and it combines it with stacked visualizations to compress multiple dimensions into two-dimensional graphical visualization. The paper helps software designers and software quality managers to understand, monitor and manage code evolutions of small and large code bases.

The second paper is authored by Mujtaba Alshakhouri, Jim Buchan and Stephen MacDonell, and titled “Synchronised Visualisation of Software Process and Product Artefacts: Concept, Design and Prototype Implementation”. The paper presents a novel approach to combining software artefacts’ parameters’ visualization with the visualization of the process adopted to develop these artifacts. This novel combination utilizes a standard metaphor of code-cities; a combination that eases the adoption of the presented method. The authors evaluate this adoption in an illustrative case study indicating the usefulness of the method in practice.

These two selected papers show the potential of visual analytics, which goes beyond visualization or software engineering. Both papers illustrate how to use software development data to increase insight into software product and process design and evolution.

We believe that this special section will help you, the reader, to get engaged into this area of research and will help you to improve your software engineering practices, apply visualization techniques in new areas, and utilize your development data more effectively.

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