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Datavetenskap

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Visualization Techniques & Tools for Monitoring and Improving SW Development

Problem statement

Visualization is a powerful tool for conveying and analysing large amounts of data and can be used to monitor and improve on software development practice. Project teams can be supported in improving on their work by measuring and visualizing various aspects of the development progress and the process used. Team practices have been improved by visualising team characteristics [1] (e.g. shared leadership, autonomy), distances between individuals [2] (e.g. cognitive and psychological distance), source code changes relative test status [3] and by using a visualised project history for retrospectives [4]. These studies show that visualisation is useful for improving work practices. However more work remains to explore strengths and weaknesses of various visualisation techniques for this purpose, and tools for supporting this.

Master thesis content

- Survey existing research on the use of metrics and visualisation of these for improving various aspects of software development, including communication and collaboration.
- Investigate and design suitable visualisation techniques for software development including tools for these. This may involve implementing and evaluating a visualisation tool.
- Apply a number of visualisation techniques and empirically evaluate how they support team reflection, learning and improvement. The evaluation can be performed as a case study or as an experiment, ideally in collaboration with one of our industry partners.

Prerequisites

Familiarity with the basic development process and software engineering concepts. Programming skills and will to identify a technical tool solution, either an existing one or implementing a new or extended one.

Contact

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References

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3. Feldt, Robert, et al. (2013) "Supporting software decision meetings: Heatmaps for visualising test and code measurements." 39th Euromicro Conf on *Softw Engineering and Adv Appl (SEAA)*.
4. Bjarnason, E, Hess, A, Berntsson Svensson, R, Regnell, B, Doerr, J. "Reflecting on Evidence-Based Timelines", IEEE Software, June/July 2014.