Influencing Factors in the Quality of Software Development

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Abstract

This dissertation aims to develop an approach to find factors that influence the software development process in either negative or positive ways.
Creating Software requires cognitive skills such as logical thinking, creativity or problem solving but also teamwork and good communication. However, the focus of this work lies on the influences in the cognitive performance of the developers.

Most people notice inconsistency in the quality of their work. There is always a risk that a developer is producing bad code which could lead to bugs and/or delays.
Many developers don't really know about the exact quality of their code, neither in a general perspective nor in their temporary performance. Even if they do, reasons for negative or positive changes in their code quality may not be obvious.

Software metrics have been around for decades with the purpose of evaluating the quality and the performance of the programmer but they are used primarily for project management rather than for providing feedback to the developers.

In two experiments, mobile devices are being used to collect the contextual data of the environment and the work patterns of the developers. An installed application on the device of participants gathers information from sensors and collects data which is provided by the operating system. It accesses the light sensor, the noise level, the step counter, a 3axis-accelerometer and the location of the device. This information is then clustered and linked to a context.

Two experiments were executed to demonstrate the functionality of the developed approach.
Overall, the data gathering app generates valuable information about the environment and context. The application leads to findings that give evidence for factors that influence the brain performance for an individual participant and for patterns which could be influences in general.