Sustainable Software Engineering: A Move Towards Future

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ABSTRACT

Current software engineering practices have significant effects on the environment. Examples include e-waste from computers made discarded due to software upgrades, and changes in the power demands of new versions of software. Sustainable software engineering aims to create reliable, long-lasting software that satisfy the needs of users while reducing environmental impacts. Sustainability is becoming a significant emerging area in Information Technology (IT)—as contribution of IT to safeguard our future, and as evolving market segment. IT’s high productivity in combination with short life cycles and, on the other hand, growing resource problems of our planet, lead to a essence that software engineers take their share of responsibility for sustainability. Therefore, we need to include the concept of sustainability into the university curriculum of computer science, software engineering and information systems.

According to the World Commission on Environment and Development Sustainability, sustainability is defined as “meeting the needs of the present without compromising the ability of future generations to meet their own needs”. The goal with sustainable software engineering is to create better software so future generations’ opportunities should not be compromised. According to the SMART 2020 report, in 2007 the ICT sector was responsible for 2% of global carbon emissions. Additionally, the report estimates that the combined carbon footprint of PCs and monitors is expected to triple by 2020. While there is growing interest among software engineers regarding environmental sustainability, the relationship between software and sustainability is still a relatively minor concern, if it is thought of at all, for most users and developers. Our goal with this research is to raise awareness that similar software systems can have quite different levels of energy consumption, and therefore different environmental footprints, and that these and other environmental impacts are an important part of the software engineering field.

Sustainability, software engineering and green computing study in computing is not only critical and imminent for the long-term benefit of human beings, but also has the potential to attract more students to this area due to its indispensable significance for future. Over the past few years, sustainable software engineering and green computing has received an increasing amount of attention since it is considered as one of the critical factors for protecting the environment. The challenge is to motivate and interest students and faculty members for sustainability, to identify spheres of activity for software engineers, to build up competence fields for solutions, and to incorporate the topic into the curriculum.