

Multi-Criteria Architecture Style Selection for Precision Farming Software Product Lines Using Fuzzy AHP

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Abstract

Precision Farming (PF) system is an alternative and innovative approach to improve the quality and production of crop yields. However, due to heterogeneity and user demands, PF system complexity has become higher. As such, software complexity has always been an issue in software development, especially for larger systems with innovative functionalities. One solution by which to reduce the problem of software complexity is by incorporating software reuse. Software Product Line (SPL) is a strategic reuse approach, which targets common artefacts for its product line while having a variability management mechanism to cater for variability in individual applications. This research proposes an integrated approach of SPL with architecture style selection and component-based design for the precision farming domain. The focus of this paper is to highlight the process of architecture style selection in the proposed approach, which involves a multi-criteria design decision. The selection process uses a fuzzy analytic hierarchy process (fuzzy AHP) in order to select the best architectural style, which can fulfil most of the sought-after criteria for precision farming product line application.

Keywords: *Precision Farming, Software Product Lines, Software Architecture, Fuzzy AHP.*