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Reuse for Mass Personalisation Through Feature Models and Similarities

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ABSTRACT

This tutorial explores the impact of the socio-economic trends of customization and personalization on software reuse and describes a product similarity evaluation process to support the management of a product line.

CCS CONCEPTS

• **Software and its Engineering** → **Software Creation and Management** → **Software Development Techniques** → **Reusability** → Software Product Lines.

KEYWORDS

Software Reuse, Mass Personalization, Product Lines

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1 Introduction

The range of products in a product line and the features in each product evolve for many reasons including supplier sales and profit motives, changing customer demand, customer confusion [1], personnel changes, market competition, brand positioning [2], mergers and takeovers, or changing legislation. Some suppliers are responding by offering supplier-led software design choices (“mass customization”). Some are also offering customer-led software product design choices (“mass personalization”). We will introduce these concepts and explore the implications for software reuse through software product line engineering.

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We will discuss two different approaches. One is grounded in feature modelling, the other in case-based reasoning. Both support the identification and selection of similar products. However, they place different emphases on these activities, use different product descriptions and deploy different product derivation methods. Hence they each have different properties, benefits and limitations.

2 Evaluating Product Similarity

A common approach to software product line engineering is to construct feature models that represent the variability of the products [3]. New but similar products are derived through configuring the feature model by making selections at points of variability. One management task is understanding which configured products in the product line are similar to each other and the extent e.g. [4, 5, 6]. We describe a specific product similarity evaluation process [7] in which a product configured from a product line feature model is represented as a weighted binary string, the overall similarity between products is compared using a binary string metric, and the significance of individual feature combinations for product similarity can be explored by modifying the weights. Binary strings map easily to feature selection processes, are low on storage requirements and enable fast comparison computations with existing similarity metrics and measuring tools. We will illustrate our ideas with mobile phone worked examples, and discuss the benefits and limitations of this approach.

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