HyCom: A Domain Specific Language for Hypermedia Application Development

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Abstract

This paper presents HyCom, a DSL for hypermedia authoring embedded in the language Haskell. HyCom provides a declarative framework for describing hypermedia designs and also automatic application generation. We propose HyCom as the bridge between engineering models and implementation environments.

HyCom is based on the principle of programming by combination. A hypermedia application is constructed by the combination and transformation of components, promoting the reuse of existing assets and the abstraction of common patterns. The resulting framework is flexible and practical – yet rigorous and formal – enabling the effective representation of existing engineering methods primitives without loss of expressiveness.

We present a real situation in which HyCom is used in the definition of an application developed following systematic steps. By means of an example, we show the general principles underlying its use for the mapping of design concepts to implementation environments.

1 Introduction

Applications taking advantage of hypermedia technology have become the target of an ever-growing interest in recent years [19]. Being the underlying technology in WWW and *e-commerce* applications, the market for this technology is growing at a fast pace. Several design approaches were proposed by the academic and professional communities [22, 14, 6, 11] to handle the increasing complexity of the hypermedia development task. But there is still a wide gap between these software-engineering solutions and commercially available implementation tools [1, 2, 5]. Engineering methods emphasize a systematic approach to design, and commercial toolkits are oriented to quick-and-dirty – rather than solid – development. While the latter are good for the general public, we think that professional applications should take care of engineering solutions to avoid potentially becoming the legacy systems of a near future.

This paper presents HyCom [17, 18, 21], a domain specific language for hypermedia authoring embedded in the *HOT* (*H*igher-*O*rder and *T*yped) language Haskell [20]. HyCom provides a declarative framework for describing designs developed with engineering methods, and also automatic application generation from those descriptions. HyCom can capture the rigorous and systematic approach to design of engineering methods, without loss of expressiveness, and keeping the rapid generation of prototypes of commercial products.

HyCom is based on the widely-accepted principle of *programming by combination* [9]. A hypermedia application is constructed by the combination and transformation of components, promoting the reuse of existing assets and the abstraction of frequently used patterns. The resulting framework is flexible and practical – yet rigorous and formal – enabling the effective representation of existing engineering methods primitives without loss of expressiveness.

Additional advantages of HyCom come from the usage of the purely functional Haskell as the underlying host language. Not only does Haskell have very efficient, industrial-strenght implementations [4], but also it has shown to be a very-powerful platform for the implementation of domain specific *embedded* languages (DSELs) [13, 10, 23, 16]. HyCom benefits from

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