Summary

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GENERIC MULTIMEDIA CONTENT TRANSFORMATION.

PROCESS AUTOMATION IN THE DOMAIN OF INTERACTIVE TV AND E-LEARNING APPLICATIONS

This book treats the problem complex of transformation and data transparency within media information systems from an economic and technical perspective. Based on a survey conducted to illuminate current challenges in media economics, technically available and currently developing concepts and technologies dealing with automatic processing and transformation of semiformal media documents were analyzed.

The classical management concept of industrialization has brought about a high degree of automation and rationalization based on standardization and specialization in the creation of information products. This has been particularly true in the area of processing alphanumerical data that can be formalized. On the other hand, for semiformal document processing, such as the acquisition and usage of information that cannot be strictly formalized (non-data-information), media systems are gaining importance. Trough the increased use of workflow management systems, media logistics, and content management (techniques or processes) the media industry has been able to extend automation concepts to media processing and usage of semiformal documents. These developments could become a model for applications in knowledge management and transfer in the entire information economy.

Digital media disruption was identified as the greatest obstacle in the automation of processes in media production. Under this restriction, process engineering is much more limited than under less complex parameters in classical document management environments. Content reuse and content preparation in the context of knowledge management and transfer – especially for semiformal content – are not implementable without transparent data formats. The rapidly progressing standardization of media data has the intention of allowing increased transmissivity and transparency. However, with the growing scale of currently released standards – for example in common office document formats – and the ever growing complexity of environments in media software development, automated transformation and process streamlining techniques rarely can be created in a manner such that standards are extensively supported.

With the above in mind, this book will link concepts and technologies from media computer science with approaches from information systems research. The goal is to open the doors for an economically driven concept of process integration and automation for the media industry that is widely applicable to generic multimedia data processing such as in content management systems.

The central concept of this work is the method of Generic Content Transformation (GCT), where a generic data description and a matched software architecture were developed. This approach is based mainly on widely accepted media standards but emphasizes on the economically driven 80/20 paradigm. In a design based research approach it is assumed that more then 80% of possible media applications are feasible with less then 20% of format specifications. This method, however, considerably streamlines and accelerates not only software development. Empirically accompanied field tests for the 2D application domains »digital TV« and »e-learning media production« exemplify how transformation processes can be considerably simplified and accelerated. IT-supported process automation based on the GCT method achieved reductions in processing time of 70% or more.

Additionally the GCT approach has remarkable advantages for important parts of the media content lifecycle. Standardized transparent data management on the basis of generalized formats and transformation schemes enables fully automated consolidation of media data in repositories, new synergies in combination with different media retrieval technologies at a uniformly structured media repository, accelerated authoring for interactive applications from various data sources, new quality of transcoding interactive media projects between totally different authoring systems and ultimately new perspectives for long term archiving of multimedia content. Proof of technical feasibility of the method is shown with a modular software architecture. This architecture consists of transformation components according to the Content-HUB concept, an authoring system for interactive media content, a media repository with text and content based retrieval functionality, as well as a media crawler agent for fully automated data migration from authoring systems. In a scenario of flexibly applicable web services, components of this prototyped GCT-Framework are suitable for middleware architectures and for BPEL controlled media syndication. From a technical perspective, GCT architecture offers sound possibilities to restrict complexity of data interfaces and media architectures.

The well-established single-source-publishing concept that originates from enterprise content management is being expanded here to a multi-source-publishing approach, where the results of elaborate creative processes from different specialized authoring systems can be made available to the consolidated and fully automated distribution in content management systems. As a technical driver, GCT supports the management concept of industrialization as applied to media production, enabling a new qualitative as well as quantitative level.