

Information supply for business processes: coupling workflow with document analysis and information retrieval

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Abstract

Explicit modeling of business processes and their enactment in workflow systems have proved to be valuable in increasing the efficiency of work in organizations. We argue that enacted business processes — i.e. workflow management systems — form a solid basis for adequate information support in complex and knowledge-intensive business processes. To support this claim we demonstrate results from two different projects.

The VirtualOffice approach employs workflow-context information to support high-precision document analysis and understanding in standard office settings; the combination of workflow context and document analysis allows for the automatic handling of incoming paper mail with respect to the appropriate workflows.

The KnowMore approach focuses on the support of people who work on knowledge-intensive tasks by automatic delivery of relevant and goal-specific information. To this end, workflow context, an extended process model, and a detailed modeling of information sources are combined. © 2000 Elsevier Science B.V. All rights reserved.

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1. Introduction

Workflow Management is a widespread technology for automating structured business processes, which can coordinate complex processes where many activities must be scheduled and dispatched among many agents. Further support comes from an integrated handling of application programs used in the process chain and a streamlined passing of application data and electronic documents flowing between different process steps.

As complex business processes rely on intensive information exchange with the company's environment, they are document-driven by nature: employees deal with and react to information and knowledge transferred by and embedded in all kinds of documents, including forms, letters, books, manuals, records, either electronic or paper-based. Consequently, one would like the workflow management system (WfMS) to automatically offer access to relevant knowledge sources, or to even directly 'pump' information items extracted from incoming documents to the appropriate

places in the data models of the actual workflow instance. This vision requires an extensive exchange of information items between *and suitable semantic annotations* of workflow, application, and information spaces. To realize this, the WfMS should possess interfaces for exchanging knowledge items with the surrounding support environment and be able to bridge between different conceptualizations and data models.

Such considerations are not subject of today's standard WfMS approaches [12,3]. In order to overcome this limitation, this paper will present two different solutions, which describe how a true knowledge transfer between business processes and their surrounding information space can be established. Both approaches focus on process-embedded information delivery from documents and fit into a common description frame which is sketched in Fig. 1.

The WfMS represents running business processes by workflow instances and executes them by means of a workflow engine. It is complemented by a mediator system which we call *information provider*. The information provider gets an information request and some additional context information from the WfMS. It accesses the documents by some kind of document index which may consist of an inverted index file as required for information retrieval tasks, but might be more sophisticated. The retrieved information is

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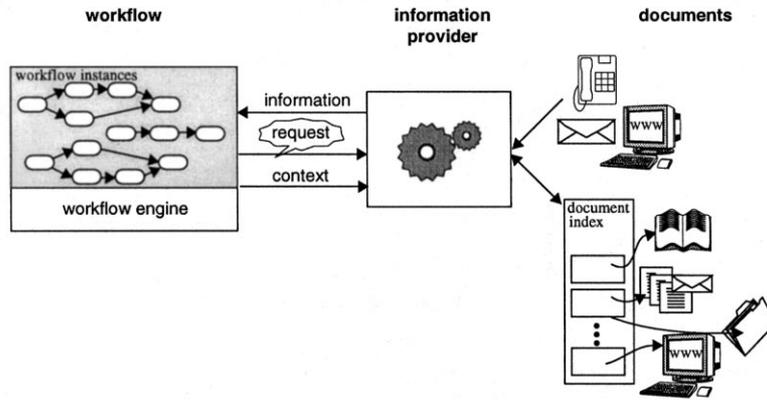


Fig. 1. Information support for workflows: a common description frame.

handed over to the WfMS. So, the interface between the WfMS and the information provider comprises three different kinds of information: the information request, supporting context information, and the retrieved information results supplied to the WfMS.

Central to our considerations is the notion of *context* which allows the information provider to perform its tasks proactively and more precisely. What context information can be provided by the WfMS and which context information is required to support the information provider’s job highly depends on the actual request to be fulfilled by the information provider. So, the general description frame of Fig. 1 does not help to refine the notion of context in the given scenario. Hence, we consider two concrete instantiations of the general description frame.

The *VirtualOffice* project [18] presented in Section 2 integrates paper-based information into arbitrary workflow activities, while the *KnowMore* project [1], described in Section 3, supports so-called knowledge-intensive tasks (KITs) by proactive document delivery. After presenting these two projects, we review some related work and conclude with a unifying view which shows commonalities and differences of the two approaches. This unified view leads to suggestions for the design of future WfMS.

2. VirtualOffice: information support by paper documents

Although the paperless office has been a buzzword for many years now, it still has not come into reach. On the contrary, the enactment of business processes by administrative workflows has even complicated the integration of paper documents since such workflows require electronic representations of all documents involved. Looking a little bit closer, such workflows are characterized by manifold documents which belong to one common process and arrive in a chronological order. Typical examples can be found in insurance companies where initial applications for contracts, changes in the policies, annual invoices, and damage claims, etc. are dealt with. In this paper we will use the purchasing process in a company as the basis for our examples.

The *VirtualOffice* project, conducted at DFKI Kaiserslautern, integrates paper-based information into workflows using a document analysis and understanding (DAU) system [4] as a workflow application. The DAU system in turn benefits from this integration since context information from the workflow system can improve the analysis of business letters [5].

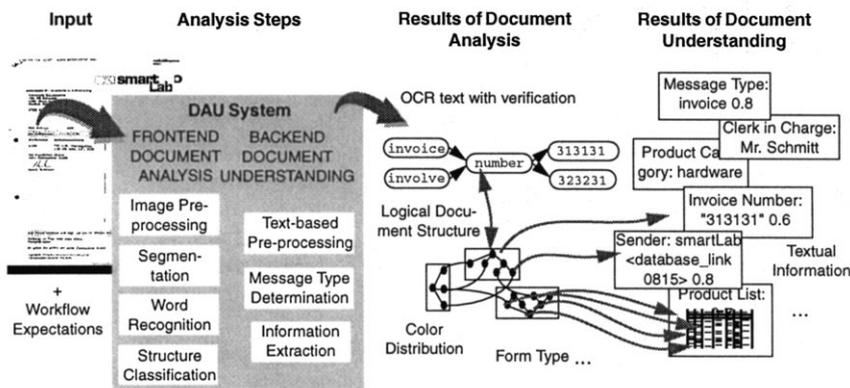


Fig. 2. Document analysis and understanding: steps and results.

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