
Exploring the Application of Smart Objects in the Workplace

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Abstract

Enabling objects to be aware of the work processes in which they are involved, and current position within them, opens up a variety of new and novel possibilities. In this demo we show how a smart work object, which supports user interaction via a mobile device, can foster awareness of processes in which it is involved and provide workers with context aware guidance. We also show how a smart work object that records high-level memories of the activities that compose a process simplifies retrospective analysis of the actions of workers. In order to assist a non-technical domain expert to represent a process in which a work object is involved a workflow notation is used. A technical expert then annotates the workflow with context conditions involving sensing and user interaction to constrain the execution of the flow appropriately (enabling detection of activities). The workflow description is then compiled to a format that can then be embedded onto a smart work object and is executed by the embedded workflow engine. The demo shows how this process greatly simplifies the generation, deployment and refinement/redeployment of smart object applications.

Keywords

Smart Objects, Workplace, User Interaction, Workflows

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ACM Classification Keywords

C.3 SPECIAL-PURPOSE AND APPLICATION-BASED SYSTEMS

Introduction

In domains such as construction and manufacturing work objects are involved in range of prescribed processes on levels from business and organization to physical usage. However, it is challenging to determine whether workers follow these work processes correctly. Conversely, it is challenging for a worker to check what the current 'next step' in a process actually is. This demo shows a framework utilizing workflows in order to represent and embed these processes into smart work object prototype. The prototype tracks its current position within a workflow (work process) and records a persistent history. The prototype supports user interaction and enables a worker with a mobile device to determine what has happened to the object in the past and what should happen in the future.

Background

This work is motivated by observations made at a large UK construction company that carries out road maintenance. Figure 2 shows three main processes in which work objects are involved: equipment leasing (all equipment is leased by the construction company), equipment management (movement of equipment within the construction company) and physical usage (execution of construction tasks).

Smart Work Objects

This demo shows how a workflow describing a work process can be represented using XML then embedded into a smart object prototype. An example workflow is shown in figure 2 (left). A non-technical domain expert

is able to design a workflow that is then annotated (by a technical expert) with context conditions involving sensing and user interaction to constrain the execution of the flow through detection of worker activities. The workflow is then compiled into a form that can then be executed by a workflow engine running on the prototype (shown in figure 2 right). The demo shows how a worker is able to connect to the smart drill using a mobile phone to receive context aware guidance on work processes (based on the object's embedded workflow) and view the object's history.



figure 1. Construction Domain Processes.

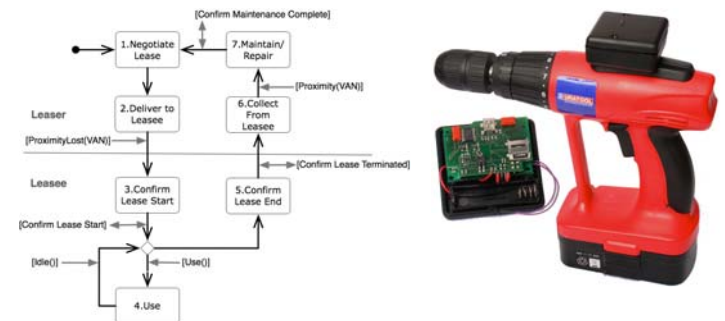


figure 2. Workflow Example (left) and Smart Drill Prototype (right)