Context-Aware user interfaces in automation

Automation is deployed in a great range of different domains such as the chemical industry, the production of consumer goods, the production of energy (both in terms of power plants and in the petrochemical industry), transportation and several others. Through several decades the complexity of automation systems and the level of automation have been rising. This has caused problems regarding the operator's ability to comprehend the overall situation and state of the automation system, in particular in abnormal situations. The amount of data available to the operator results in information overload. Because the notion of what information is relevant continually changes, the suggestion is to develop context-aware systems that can assist the operator. In order to create a context-aware system we must first examine what context is, and what kinds of data we should consider constituting the context. Since context-aware applications have been developed in other research areas it seems natural to analyze the findings of this research and examine how this can be applied to the domain of automation systems. By evaluating existing architectures for the development of context-aware applications we find that some important differences exist between the notion of context in these systems and in the automation domain. We find important differences in the needs for information between the control room operators and field operators in complex automation systems, and the need for the field operator to be present at various locations in the facility suggests the use of wireless mobile devices. We present a number of applications where a wireless mobile device can provide the field operator with great benefits, both in terms of information and interaction. The use of mobile devices presents a number of limitations in terms of input and output capabilities, which make the use or context-aware computing even more relevant in this case. Different types of mobile devices are discussed. The use of a positioning system for locating the field operator and inferring his tasks and intentions from the location is proposed. In combination with other types of context information this allows the system to present a usable interface on the mobile device. An architecture for processing context information in the automation domain is presented and two cases are used to support the applicability of the architecture. The use of context-awareness in automation is found to provide several benefits, in particular in applications for field operators.

General information
State: Published
Organisations: Department of Electrical Engineering, Automation and Control, Image Analysis and Computer Graphics, Department of Informatics and Mathematical Modeling
Authors: Olsen, M. H. (Intern), Lind, M. (Intern), Ravn, O. (Intern), Rose, M. (Intern)
Number of pages: 139
Navigating Distributed Services

This thesis explores the impact of three current trends which, when taken together, are fundamentally changing the way in which the task of navigating virtual environments is accomplished. The first concerns the changeover from a situation in which all data and functionality reside locally to the user, to a situation where they are distributed across the Internet. The second trend is the shift from a virtual environment that solely consists of distributed documents to a virtual environment that consists of both distributed documents and distributed services. The third and final trend is the increasing diversity of devices used to access information on the Internet. The focal point of the thesis is an initial exploration of the effects of the trends on users as they navigate the virtual environment of distributed documents and services. To begin the thesis uses
scenarios as a heuristic device to identify and analyse themain effects of the trends. This is followed by an exploration of theory of navigation Information Spaces, which is in turn followed by an overview of theories, and the state of the art in navigating distributed services. These explorations of both theory and practice resulted in a large number of topics for further investigation. The thesis focuses upon three sub-topics. The first deals with the general differences between navigating distributed documents and navigating distributed services. These second deals with the applicability of a geographical metaphor for collections of distributed services. The third and final sub-topic tries to answer the question of the different metadata requirements distributed services have when compared to distributed documents. A study is devised to test the validity of three hypotheses, but also to provide specific details about the differences in how users search for documents vs. services, and to give a detailed overview of the required metadata for services. The study includes the building of prototypes that are evaluated by experts and tested by users. Together, the scenario design, the literature review, the building of the prototype, and expert and user evaluations test the validity of the hypotheses, the results of which can be used to improve the user experience of navigation distributed services. Furthermore, the results include both a fully functional platform for browsing services and a large number of services. Both can be used for further studies.

**General information**
State: Published
Organisations: Department of Photonics Engineering, Center for Information and Communication Technologies
Authors: Beute, B. (Intern), Rose, M. (Intern)
Number of pages: 280
Publication date: 2002

**Publication information**
ISBN (Print): 87-90-28815-7
Original language: English

Series: CTI Ph.D. Series
Number: 3
Main Research Area: Technical/natural sciences
Electronic versions:
berco_beute-phd.pdf
Source: orbit
Source-ID: 192146
Publication: Research › Ph.D. thesis – Annual report year: 2002

**Music in the Home: Interfaces for Music Appliances**

**General information**
State: Published
Organisations: Department of Telecommunication
Authors: Rose, M. (Intern)
Pages: 45-53
Publication date: 2000
Main Research Area: Technical/natural sciences

**Publication information**
Journal: Personal Technologies
Volume: 4
ISSN (Print): 0949-2054
Ratings:
BFI (2008): BFI-level 1
Original language: English
Source: orbit
Source-ID: 177627
Publication: Research - peer-review › Journal article – Annual report year: 2000

**Interactive TV Market: Interactive services and telecommerce**

**General information**
State: Published
Organisations: Department of Telecommunication
Authors: Dormann, C. (Intern), Beute, B. (Intern), Olesen, H. (Intern), Rose, M. (Intern)
Publication date: 1999

**Publication Information**
Original language: English
White paper on Interactive TV

**General information**
State: Published
Organisations: Department of Telecommunication, Technical University of Denmark, Aalborg University
Authors: Rose, M. (Intern), Dormann, C. (Intern), Olesen, H. (Intern), Beute, B. (Ekstern), Jensen, J. F. (Ekstern)
Number of pages: 97
Publication date: 1999

**Publication information**
Original language: English
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 174006
Publication: Research - peer-review › Report – Annual report year: 1999

**Projects:**

**Interactive Topology Optimization**
Department of Applied Mathematics and Computer Science
Period: 01/04/2012 → 21/09/2015
Number of participants: 7
Phd Student:
Nobel-Jørgensen, Morten (Intern)
Supervisor:
Aage, Niels (Intern)
Sigmund, Ole (Intern)
Main Supervisor:
Bærentzen, Jakob Andreas (Intern)
Examiner:
Rose, Michael (Intern)
Singh, Karan Sher (Ekstern)
von Keulen, Alfred (Ekstern)

**Financing sources**
Source: Internal funding (public)
Name of research programme: Institut stipendie (DTU) Samf.
Project: PhD

**Menneske-maskine samarbejde i distribuerede automatiseringssystemer**
Department of Electrical Engineering
Period: 01/07/2003 → 30/03/2007
Number of participants: 7
Phd Student:
Olsen, Mikkel Holm (Intern)
Supervisor:
Ravn, Ole (Intern)
Rose, Michael (Intern)
Main Supervisor:
Lind, Morten (Intern)
Examiner:
Blanke, Mogens (Intern)
Andersen, Peter Bøgh (Intern)
Johnsen, Terje (Ekstern)

**Financing sources**
- Source: Internal funding (public)
- Name of research programme: DTU, Samfinansiering
- Project: PhD

**Webmining: Finding Meaning in Distributed Signals on the Internet**
- Department of Informatics and Mathematical Modeling
- Period: 01/04/2003 → 30/06/2006
- Number of participants: 7
- Phd Student:
  - Meng, Anders (Intern)
- Supervisor:
  - Hansen, Lars Kai (Intern)
- Rose, Michael (Intern)
- Main Supervisor:
  - Larsen, Jan (Intern)
- Examiner:
  - Winther, Ole (Intern)
- Casey, Michael A. (Ekstern)
- Riis, Søren Kamaric (Intern)

**Financing sources**
- Source: Internal funding (public)
- Name of research programme: DTU, Samfinansiering
- Project: PhD

**Framework for deployment of advanced telecommunication services in current and future converged networks**
- Department of Photonics Engineering
- Period: 01/04/2002 → 23/03/2006
- Number of participants: 6
- Phd Student:
  - Soler, José (Intern)
- Supervisor:
  - Fosgerau, Anders (Intern)
- Main Supervisor:
  - Dittmann, Lars (Intern)
- Examiner:
  - Rose, Michael (Intern)
- Færgemand, Ove (Ekstern)
- Gurbani, Vijay K. (Ekstern)

**Financing sources**
- Source: Internal funding (public)
- Name of research programme: Anden EU-finansiering
- Project: PhD

**Teknisk udredning : Andersen Management International**
- Department of Photonics Engineering
- Period: 01/12/2001 → 31/12/2001
- Number of participants: 1
- Project ID: 70014
- Project Manager, organisational:
  - Rose, Michael (Intern)

**Financing sources**
- Source: Sam.arb.aftaler, Private danske - Andre virksomheder
Name of research programme: Sam.arb.aftaler, Private danske - Andre virksomheder  
Amount: 20,000.00 Danish Kroner  
Project

**Spation**

Department of Photonics Engineering

Philips Electronics Nederland B.V.

Tomorrow Internet AG

Università Degli Studi di Brescia

Institut Eurecom

**Period:** 01/10/2001 → 31/01/2004

**Number of participants:** 1

**Project ID:** 70164

**Project participant:**

Rose, Michael (Intern)

**Financing sources**

Source: Forsk. EU - Rammeprogram

Name of research programme: Forsk. EU - Rammeprogram

Amount: 2,167,598.00 Danish Kroner

**Project**

**Design and implementation of personal networked information appliance interfaces**

Department of Photonics Engineering

**Period:** 01/11/1999 → 22/04/2005

**Number of participants:** 5

Phd Student:

Larsen, Jakob Eg (Intern)

Main Supervisor:

Rose, Michael (Intern)

Examiner:

Frekjær, Erik (Ekstern)

Hansen, John Paulin (Intern)

Havn, Erling C. (Intern)

**Financing sources**

Source: Internal funding (public)

Name of research programme: DTU-lønnet stipendie

**Project**

**Multimedia in the Home**

Multimedia in the Home, a research consortium sponsored by Danish National Centre for IT Research, is investigating issues related to networked information appliances in the home. The emphasis is on user interface design, but the project also extends into the technical issues of information structure and programming in a distributed environment as well as the social issues of the interplay between user interface design and home organization and culture. The Multimedia in the Home web site (see below) provides information and results from the research projects carried out by the consortium. It also serves as a general resource for news and information related to media and homes in the future.

Department of Photonics Engineering

**Period:** 01/11/1999 → 31/12/2002

**Number of participants:** 1

**Project ID:** 70016

**Project Manager, organisational:**

Rose, Michael (Intern)

**Financing sources**

Source: Sam.arb.aftaler - Statslige danske

Name of research programme: Sam.arb.aftaler - Statslige danske

Amount: 1,540,000.00 Danish Kroner
Multimedia in the Home

Multimedia in the Home, a research consortium sponsored by Danish National Centre for IT Research, is investigating issues related to networked information appliances in the home. The emphasis is on user interface design, but the project also extends into the technical issues of information structure and programming in a distributed environment as well as the social issues of the interplay between user interface design and home organization and culture. The Multimedia in the Home web site (see below) provides information and results from the research projects carried out by the consortium. It also serves as a general resource for news and information related to media and homes in the future.

Department of Telecommunication
Period: 01/11/1999 → 31/12/2002
Number of participants: 4
Project participant:
- Olesen, Henning (Intern)
- Dormann, Claire (Intern)
- Beute, Berco (Intern)
Project Manager, organisational:
- Rose, Michael (Intern)

Multimedier i hjemmene: Center for IT-forskning

Department of Photonics Engineering
Period: 01/11/1999 → 31/12/2002
Number of participants: 1
Project ID: 70016
Project participant:
- Rose, Michael (Intern)

Financing sources
Source: Sam.arb.aftaler - Statslige danske
Name of research programme: Sam.arb.aftaler - Statslige danske
Amount: 1,540,000.00 Danish Kroner

Starting small: Distributed multimedia on networked information appliances within the home

Department of Photonics Engineering
Period: 01/07/1999 → 13/03/2003
Number of participants: 5
PhD Student:
- Beute, Berco (Intern)
Main Supervisor:
- Rose, Michael (Intern)
Examiner:
- Olesen, Henning (Intern)
- Frøkjær, Erik (Ekstern)
- Schmidt, Kjeld (Intern)

Financing sources
Source: Internal funding (public)
Name of research programme: Offentlig finansiering
Project: PhD

Multimedia in the Home

CIT funded project with Bang & Olufsen, Visionik and Univ. of Aalborg as partners. The project is investigating the role of networked information appliances and converged media in the future home environment.

Department of Telecommunication
Bang & Olufsen A/S
Visionik A/S
Aalborg University

Period: 01/08/1998 → 31/12/1999
Number of participants: 4
Project participant:
Beute, Berco (Intern)
Dormann, Claire (Intern)
Olesen, Henning (Intern)

Project Manager, organisational:
Rose, Michael (Intern)

Financing sources
Source: Unknown
Name of research programme: Ukendt
Amount: 2,700,000.00 Danish Kroner

Teleteknologierne konvergens - distribuerede multimedier

Department of Photonics Engineering
Period: 01/02/1998 → 19/11/2003
Number of participants: 5
Phd Student:
Øst, Alexander G. (Intern)

Main Supervisor:
Skouby, Knud Erik (Intern)

Examiner:
Rose, Michael (Intern)
Binder, Thomas (Intern)
Grønbæk, Kaj Georg (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: DTU-lønnet stipendie
Project: PhD