



Energy-SmartOps

Integrated Control and Operation of Process, Rotating Machinery and Electrical Equipment

VISUALIZATION OF PLANT DEPENDENCIES

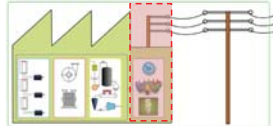
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I. Energy-SmartOps

Project aims:

Integrated approach, optimize operation and optimize workflows and intelligent decision making.



PITN ENERGY SMARTOPS WORKSHOP 'ADVANCED DIAGNOSIS OF ELECTRO-MECHANICAL SYSTEMS', Krakow, 15-16 Nov 2012

How will it contribute?

- Improve the ways information is presented to process experts → **integrated approach**

- Support cooperation** in fault management, specially during fault detection and diagnosis, event correlation, and postmortem analysis

II. Motivation



What is the current problem?

Large-scale facilities are becoming super-complex systems. Because of recycle flows and utility grids, hundreds or even thousand variables are interconnected, turning plant-wide analysis into a really hard process.

How would connectivity information help?

Connectivity information can create qualitative models. These models can be used to support different stages during fault management process.

How is this different from other methods?

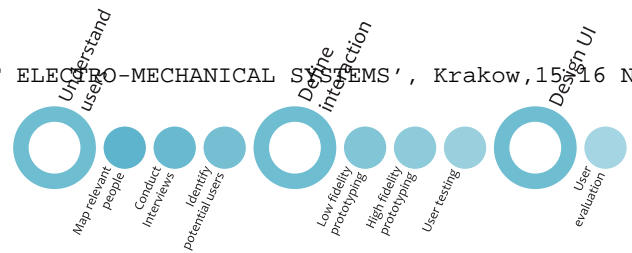
Topology analysis is a fairly recent field of research. Most of the work done so far have only be focused on extracting and analysing the data, but have lacked on good visualization techniques. In this project we will take a more end-user centered approach and incorporate techniques from the visual analytics.

III. Objectives

- 1 Development of new **interactive visualization** prototypes
- 2 Use methods for **extraction** and **manipulation** of connectivity information from process schematics
- 3 Proposal of new concepts for representing and highlighting **causality information**
- 4 Design of **user interface** (UI) for the users to explore plant connectivity by means of data mining

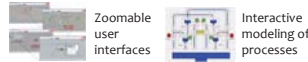
IV. Methodology

User Centered Design (UCD)



V. Results

Mimic Diagrams



Powerful Visualizations



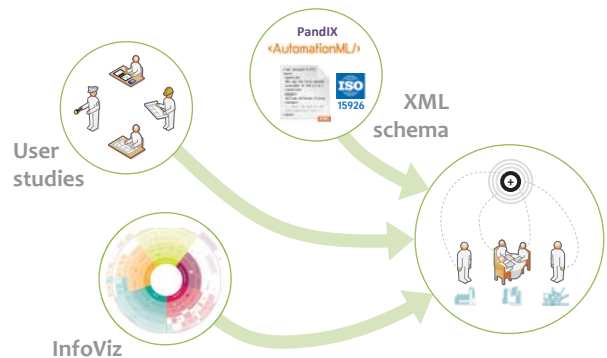
Quantitative Analytics



- Visualization Concepts → Brainstorming + Literature review

- User studies → Mapping out users + Understand workflows

VI. Future work



The research leading to these results has received funding from the People Programme (Marie Curie Actions) of the European Union's Seventh Framework Programme PITN-GA-2010-26940

