I. Energy-SmartOps

Project aims:
Integrated approach, optimize operation and optimize workflows and intelligent decision making.

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)

Visualization Concepts
Brainstorming + Literature review

Mimic Diagrams
Interactive modeling of processes
Interactable user interface

Powerful Visualizations
Multi-layer linking
Interactive graphs
Signed directed graphs
Dependency explorer

Quantitative Analytics
Causal maps
Plant-wide oscillation detection

V. Results

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.

IV. Methodology

User Centered Design (UCD)

Visualization Concepts
Brainstorming + Literature review

Mimic Diagrams
Interactive modeling of processes
Interactable user interface

Powerful Visualizations
Multi-layer linking
Interactive graphs
Signed directed graphs
Dependency explorer

Quantitative Analytics
Causal maps
Plant-wide oscillation detection

V. Results

Mimic Diagrams
Interactive modeling of processes
Interactable user interface

Powerful Visualizations
Multi-layer linking
Interactive graphs
Signed directed graphs
Dependency explorer

Quantitative Analytics
Causal maps
Plant-wide oscillation detection

VI. Future work

Visualization Concepts
Brainstorming + Literature review

User studies
Mapping out users + Understand workflows