

Jörg Cassens

Norwegian University of Science and Technology (NTNU)  
Division of Intelligent Systems (D/I/S)

# A Work Context Perspective on Mixed Initiative Intelligent Systems

Workshop on Mixed-Initiative Intelligent Systems  
Acapulco, Mexico, 2003

# Overview

Context – why care?

Three Perspectives

Walkthrough by Example

- Work Process View
- HCI System View
- HCI Interface View

Wrapping up

Questions

# Why Context?

IT Systems are used

# Why Context?

IT Systems are used

- Often in settings where work was done even before the system was introduced
- For specific purposes/tasks which the system has to support
- By users with specific needs and qualifications

The design of IT systems should take these aspects into account (old news)

# AI systems are different

- Analyzing the conceptual differences between non-AI tools and AI systems
- Integrating an understanding of AI systems into analysis of workplace situations
- Integrating an understanding of workplace situations into design of AI systems

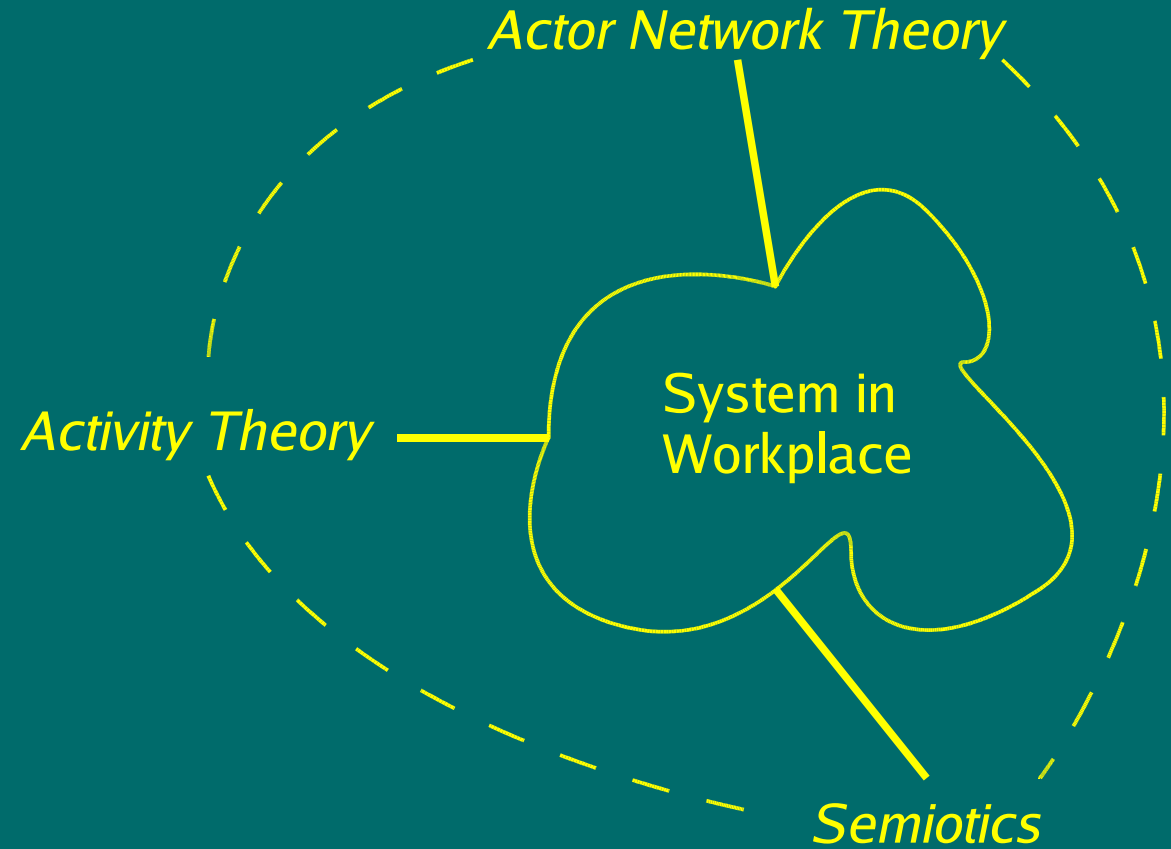
Here: Focus on Mixed-Initiative aspects

# Three Perspectives

Work Process

HCI System

HCI Interface



# Example Application

A diagnostic system for oil drilling

Used to monitor the drilling process in order to identify critical situations (like when the oil drill can get stuck)

Collaborates with human users (Operator, experts at shore and on the rig)

Type: knowledge-intensive Case-Based Reasoning system

# Actor Network Theory

Humans and non-humans linked together,  
driven by actors' interests

- **Translation:** Actors interests translated into technical or social arrangements
- **Inscription:** Result of the translation of one's interest into material form
- **Subscription:** Acceptance of the inscribed interests by other actor



# ANT: Example

Use ANT to describe the organizational standards for dealing with critical conditions and identify situations where the diagnostic system should intervene

**Control issue:** Understanding how the initiative for a task is shared between different human actors gives hints how do it with a technical artifact

# Activity Theory

## Hierarchy of Activities

- **Activity:** topmost level. An example for individual activity is a hotel check-in
- **Actions:** Activities consists of collections of actions; performed consciously
- **Operations:** Actions consist of collections of non-conscious operations

Change in breakdown situations and through automation of actions

# Activity Theory: Example

Some situations might occur quite frequently, the user tends to know them  
Activity Theory captures change over time

**Evolution issue:** shift of modii operandi  
In the beginning, it is important to explain in detail why a particular case was matched  
Same match will be explained in less detail when occurring very frequently

# Semiotics



## Human-Computer Interaction

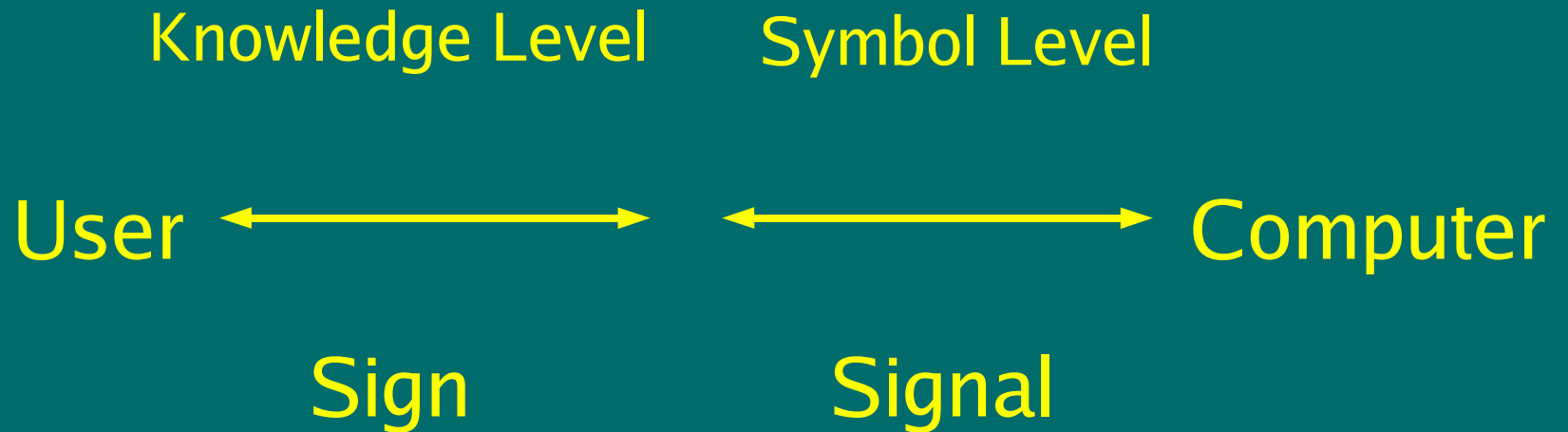
# Semiotics



## Human-Computer Interaction

# Semiotics

AI System acts-if part of sign process



Human-Computer Interaction

# Semiotics: Example

Incorporate new knowledge into the system by enhancing the domain knowledge

System finds new explanations

**Communication issue:** Find a way to suggest probable candidates for new causal explanations to user in a way that strengthens the user's believe in the system's sign-processing capabilities

# Wrap up

Context influences System Design

Three Perspectives on Work Context

Oil Drilling Example

- Work Process View – Actor Network Theory
- HCI System View – Activity Theory
- HCI Interface View – Semiotics

Wrapping up

Questions



Thanks.

Questions?

[jorg.cassens@idi.ntnu.no](mailto:jorg.cassens@idi.ntnu.no)

<http://www.idi.ntnu.no/~cassens/>

