Task Modeling for Collaborative Environments

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Introduction

Existing Approaches

CTML
- ❖Preconditions & Effects
- ❖Task Life Cycle
- ❖Simulation

Tool Support

Conclusion & Future Work

Outline

- Introduction
- Existing Approaches
- The Collaborative Task Modeling Language
  - Rationale
  - Task Life Cycle
  - Preconditions & Effects
- Tool Support
- Conclusion & Future Work

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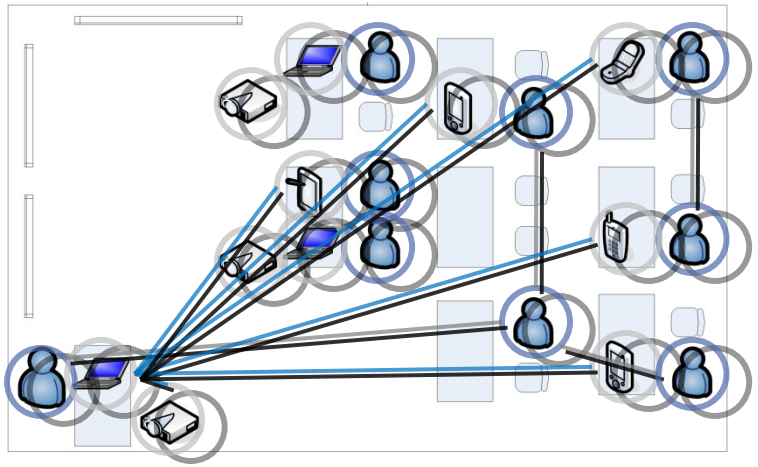
Collaborative Environments

- Actors
  - Fulfilling roles
  - Performing tasks
- Devices
  - Personal
  - Stationary
- Cooperation
- Dependencies
  - Actors & devices



Enormous Complexity

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UIs for Collaborative Environments

- Hand-crafted vs. model-based
- Model-based UI development

- Task as building block
  - Understanding collaboration
  - Combining individual with collaborative task performance
  - Starting point for MB-UI development

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Existing Task Modeling Languages

- No current notation fulfills our requirements
- But..
- Cooperation
  - Cooperative CTT
- Effect of task execution
  - TaoSpec
- Life cycle of tasks
  - State Chart as Life Cycle
    - Executable Task Model
    - WebTask Model

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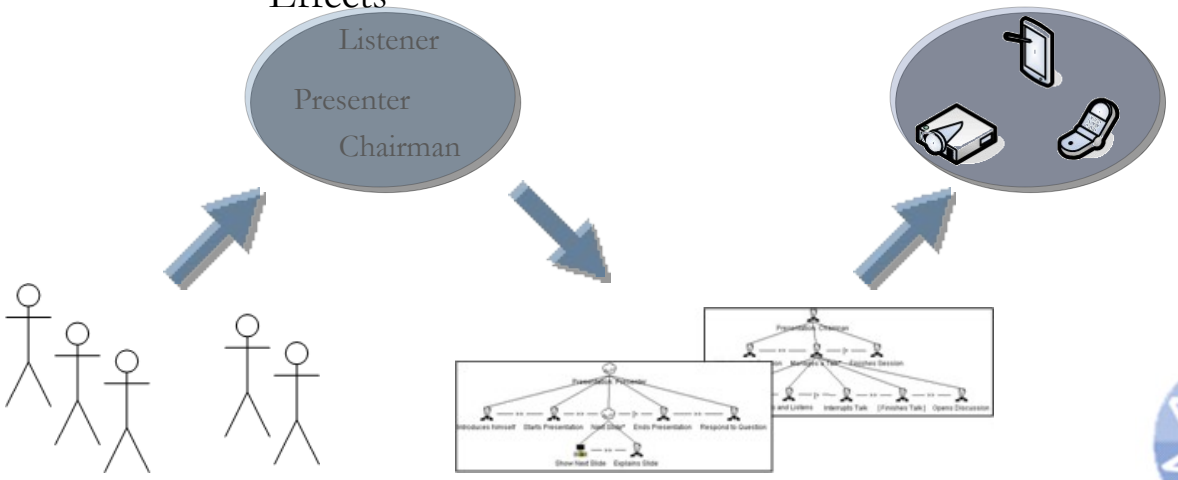
The Collaborative Task Modeling Language (CTML)

- Actors, Roles, Tasks, Environment
  - Actors fulfilling roles
  - Roles are associated with task models
  - Task execution changes system state
- Task enriched with
  - Preconditions
  - Effects



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CTML – Preconditions & Effects

- Preconditions & effects are used to model cooperation and the relation of tasks to the system state
- Precondition
  - State of system required for starting a task
- Effect
  - State change after performing a task

When to evaluate preconditions?

When to apply effects?

Need for a precise life cycle of tasks

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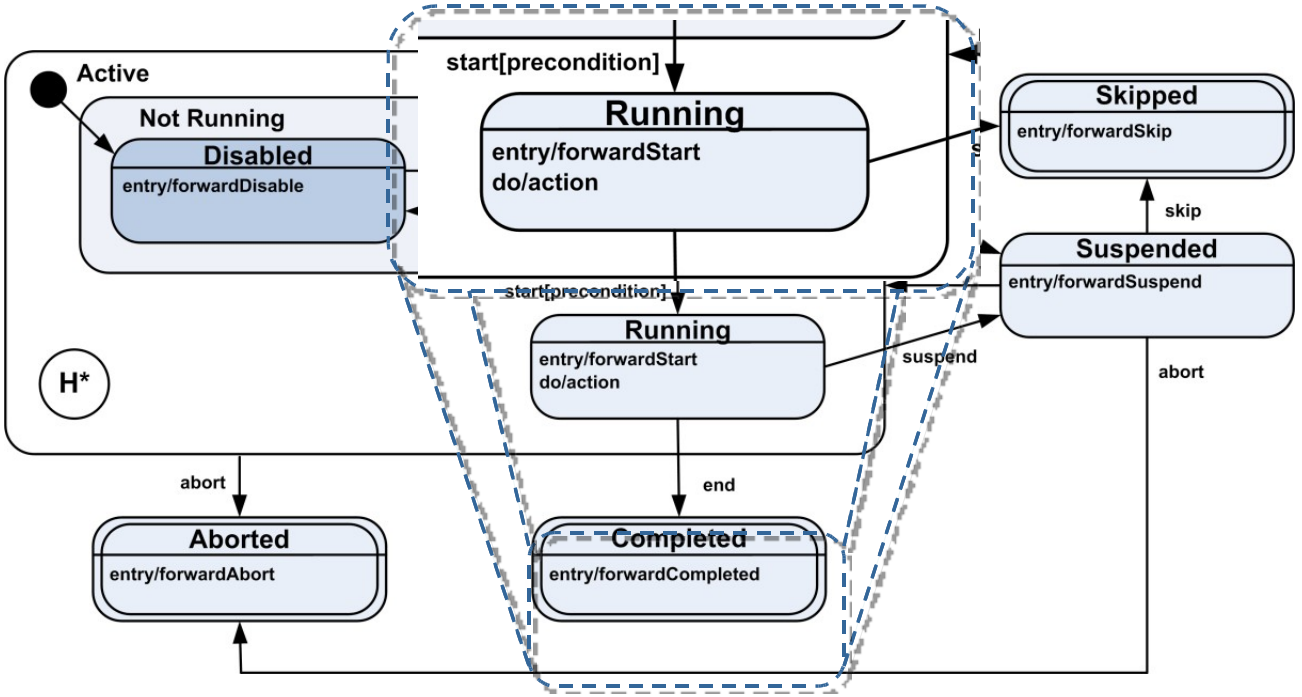
Task Life Cycle



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Precondition

#	Role	Task	Precondition
(1.)	*Presenter*	*StartsPresentation*	*Chairman.oneInstance.AnnouncesTalk.completed*
(2.)	*Listener*	*AsksQuestion*	*Chairman.oneInstance.OpensDiscussion.completed*
(3.)	*Chairman*	*Wraps-UpSession*	*Presenter.allInstances.EndsPresentation.completed*

Effects

#	Role	Task	Effect
(1.)	*Presenter*	*EndsPresentation*	*this.presented = true*
(2.)	*Presenter*	*StartsPresentation*	*@RoomsProjector.connectedWith = this.notebook*

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CTML Simulation

- Each actor uses its task model according to the role
  - An "instance" of the task model is created
- Each instance task model is represented by a set of communicating task state charts
- Concurrent task simulation of all actors
  - Synchronization between actors is defined in terms of precondition & effects

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Development Life Cycle for CTML

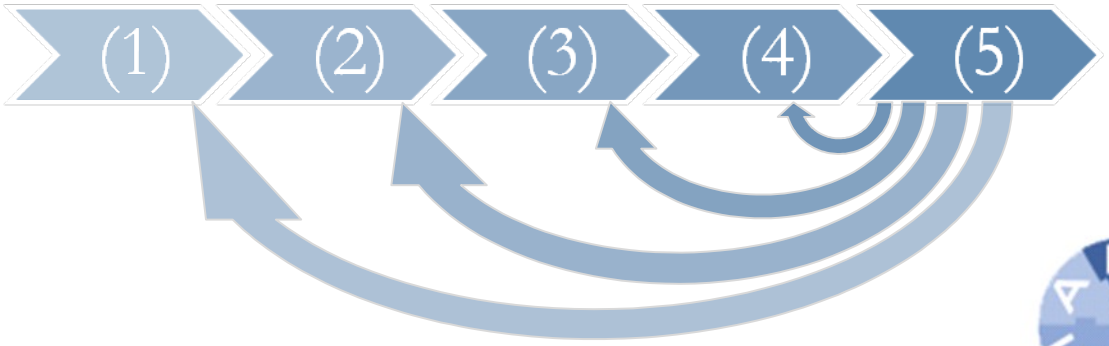
(1) Definition of roles and corresponding task models

(2) Animation and validation of these sub-specifications

(3) Specification of actors, environment & devices

(4) Annotation of tasks with preconditions and effects

(5) Animation and validation of these entire specifications



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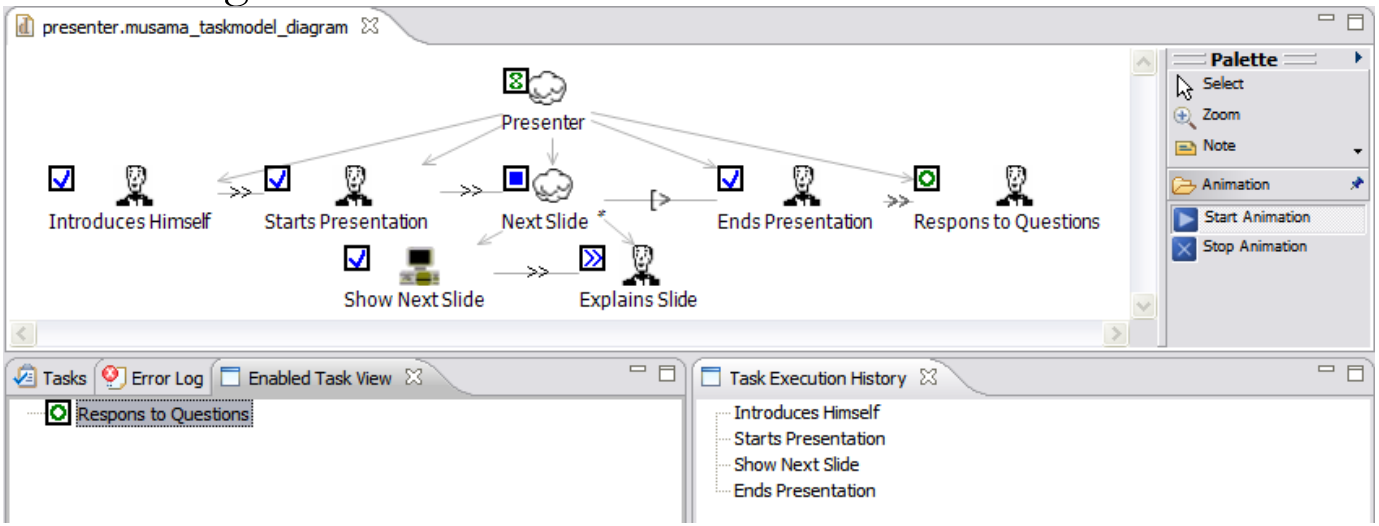
Tool Support

- Single Model Simulation



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- CTML Editor

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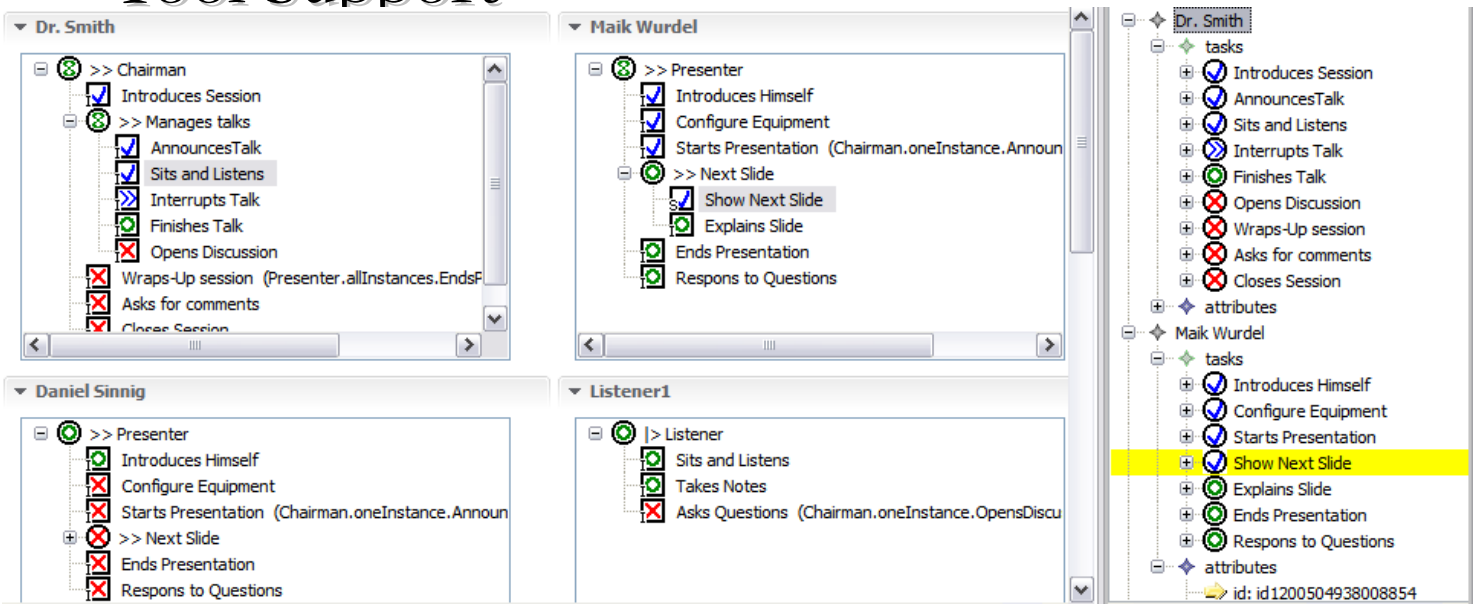

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Conclusion

- **Main Motivation:** Vast complexity of collaborative environments in terms of involved actors, tasks, and devices.
- Need for a holistic task-based specification language
- **Solution:** Collaborative Task Modeling Language
  - Formal syntax and semantics
  - Superior expressiveness
- Tool Support: The CTML Editor and Simulator

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Future Work

- Definition of a refinement relation:
  - Already introduced for single task models
- Domain modeling
- Physical context of task execution

Ultimate Goal:

- Definition of Development Methodology for UIs for Collaborative Environments

Thank You for Your Attention, Discussion and Feedback.

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