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# Abstract Interactor Model Multimodal Interactor Mapping Model Specifications

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# Basic Question

How to **model** Interactions that span **Modes** and **Media** for the Web?



# Why modeling?

- One (visual) language that
  - is declarative and precise to discuss & execute multimodal (web) interfaces
  - Is located between Tool and Code
  - Supports different forms of interaction and flexible multimodal prototyping
  - Paradigm design
  - Post-WIMP Interfaces

# What is **Out of scope** ?

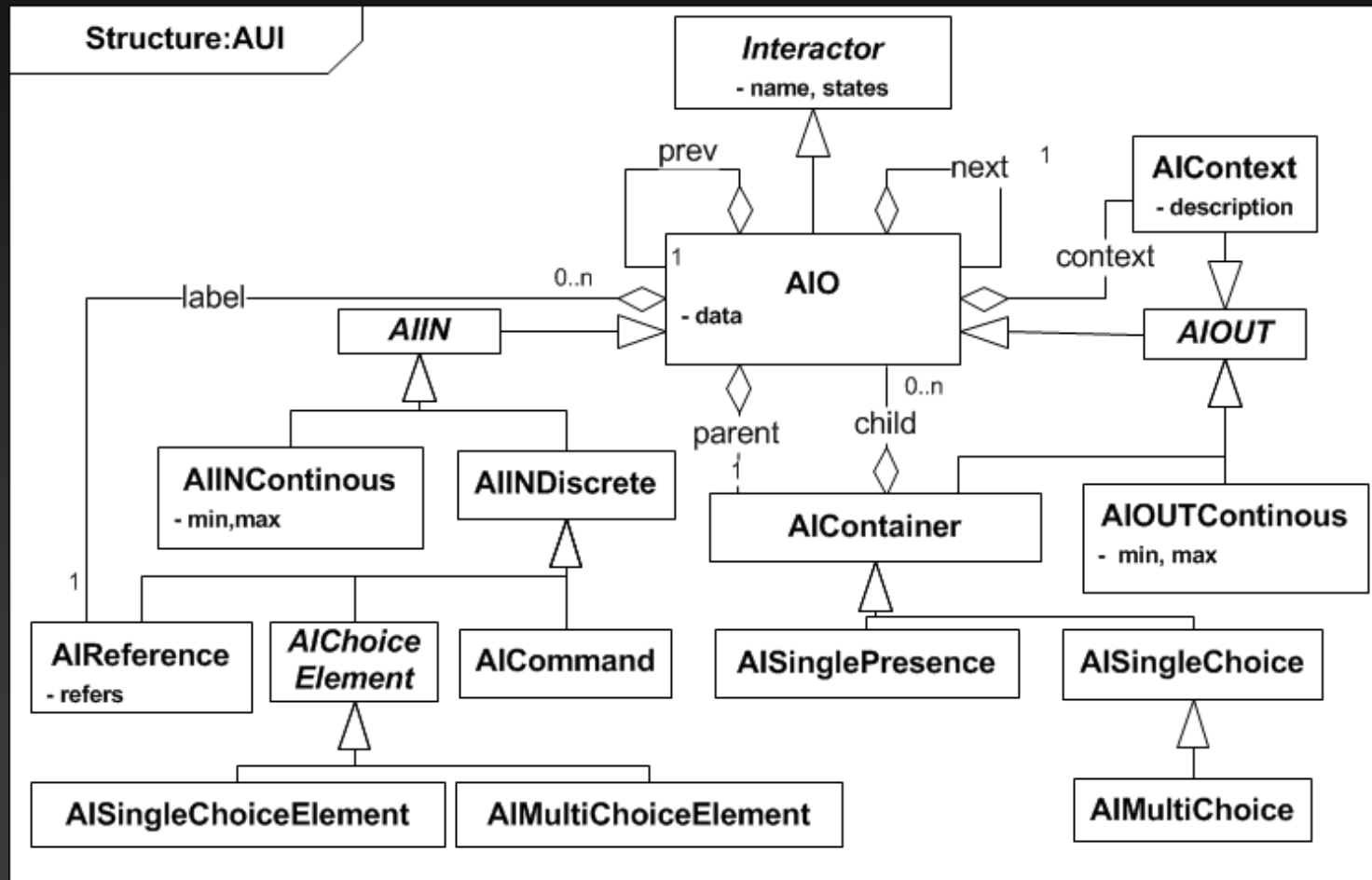
- No transformations, no process
  - Instead:
    - Interactor design (Multimodal \ Post WIMP)
    - Interactor assembly like GUI building with Mappings
  - System Design vs. Application Design
- Tools
  - Visual language -> Tool support



# How to **model**?

- Models
  - Interactors (Abstract & Concrete Media, Mode)
    - Static: class diagram, Behavior: state-chart
  - Mappings Mode-To-Media Synchronization
    - Custom Notation

# Abstract Model

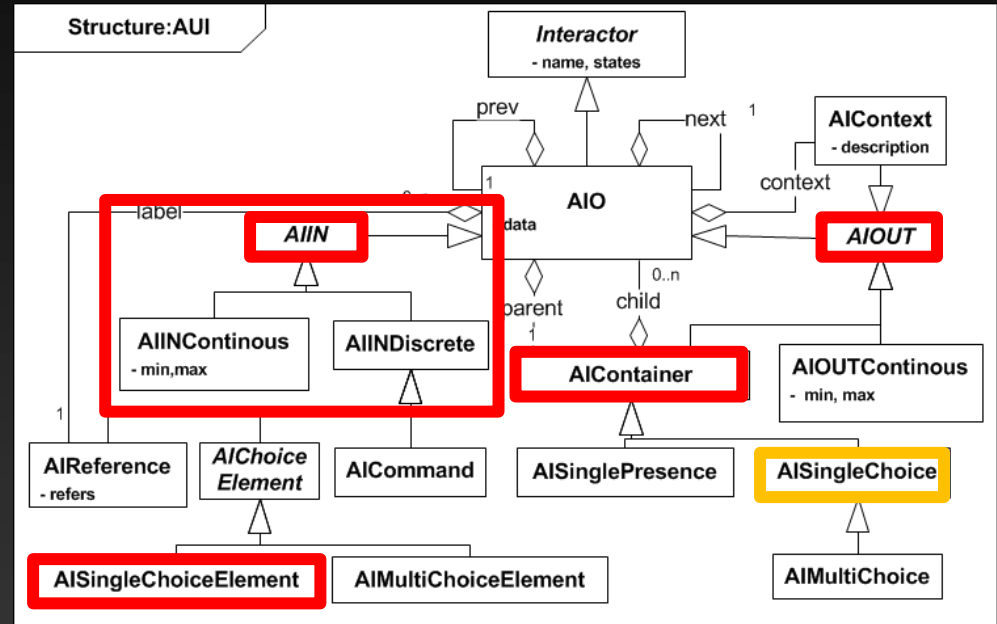


# Abstract Media Model



## Single Choice

Aggregates a set of Entities from that only one can be chosen at a time



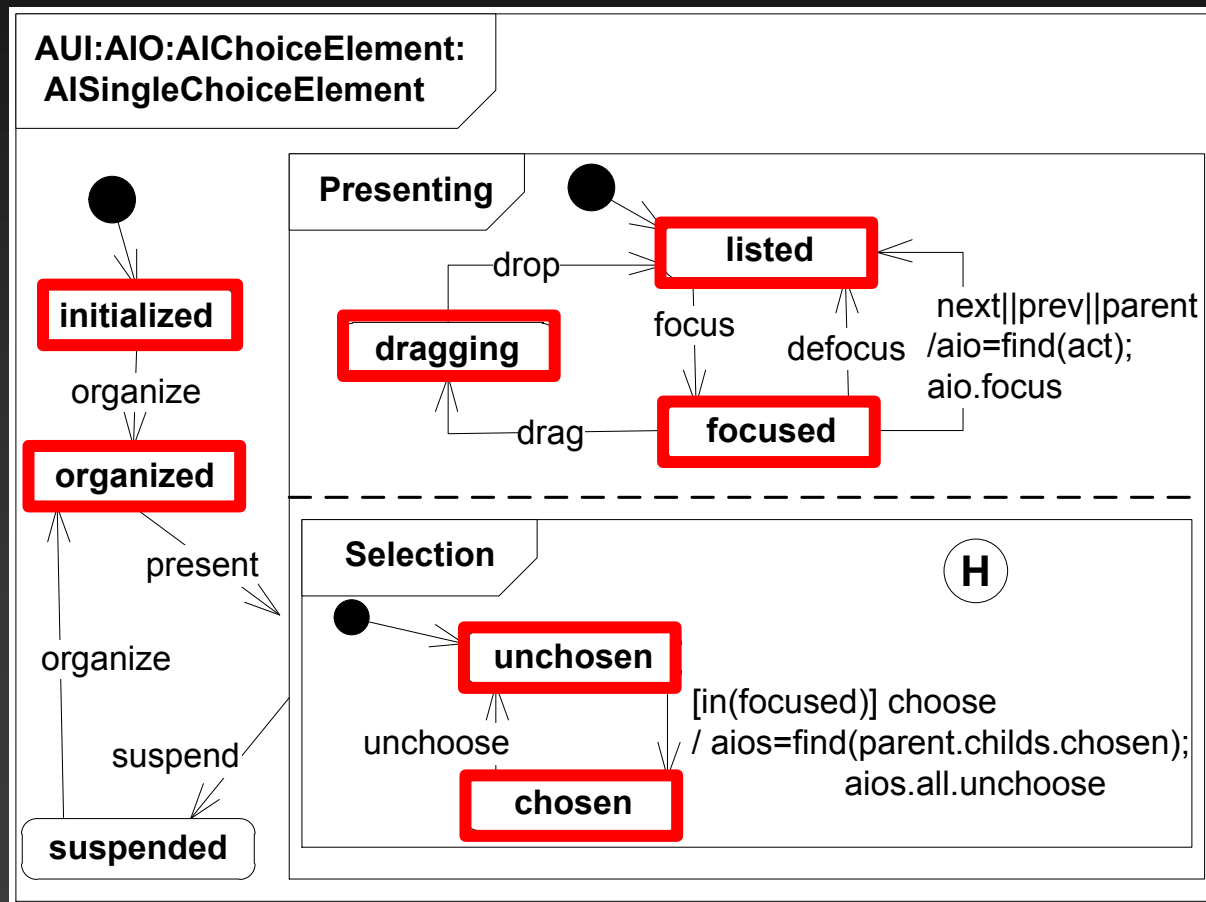
Examples: Direction (left or right)

Further Properties:

Container -> Aggregation, Discrete, Output to the User

Contains Single Choice Elements that are Inputs

# Abstract Behavior Model

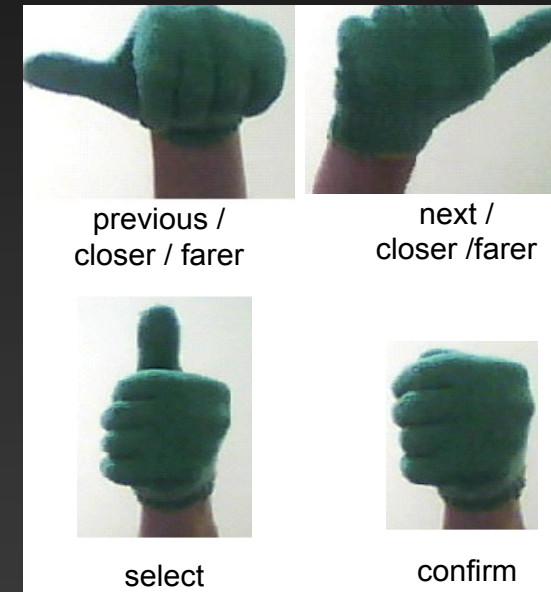
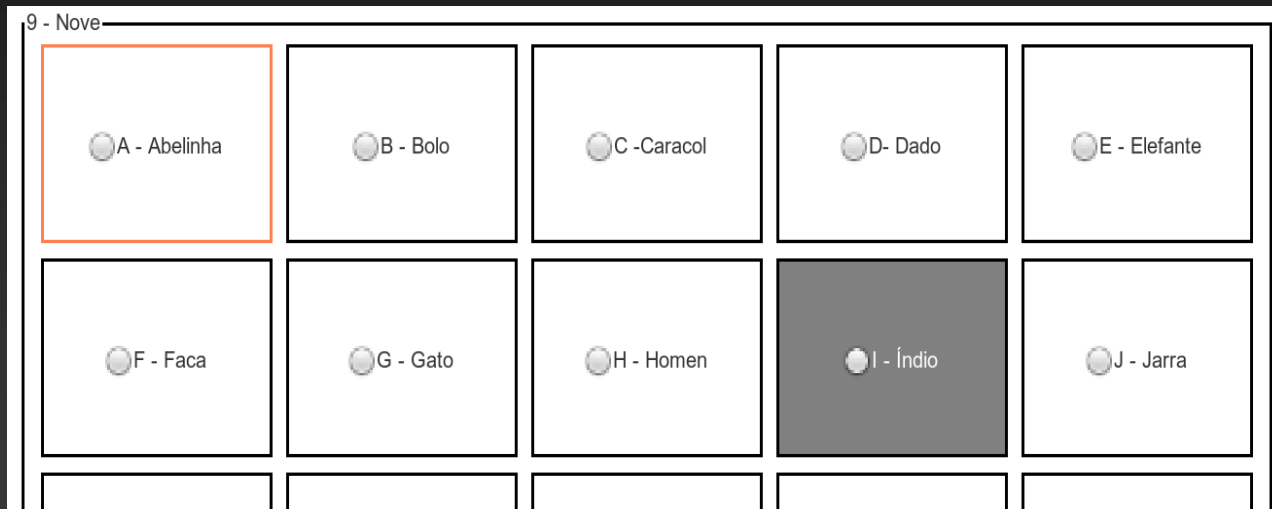




# Gesture-based Interface Navigation



# Gesture-based Interface Navigation



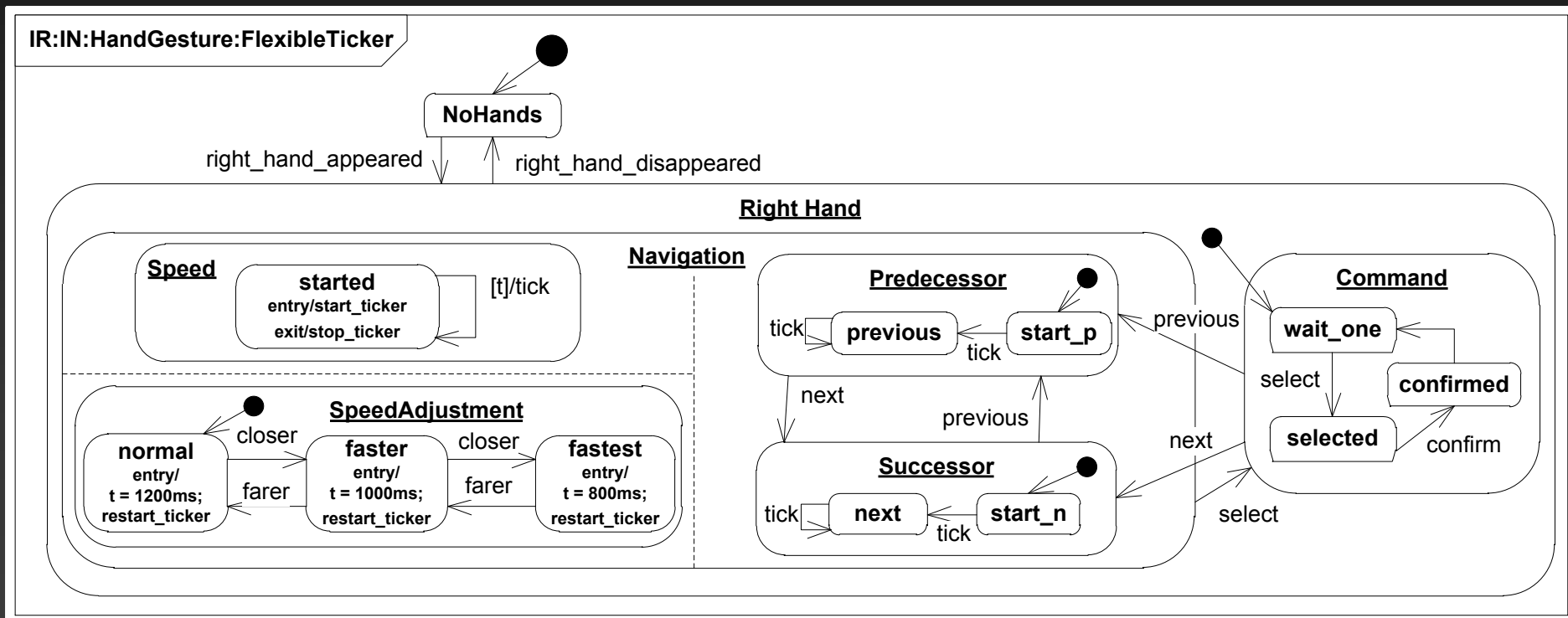
- Rapid model-based Design and Comparison of three variants

Published: HCII 2011, MoBe 2011, I-Com Journal



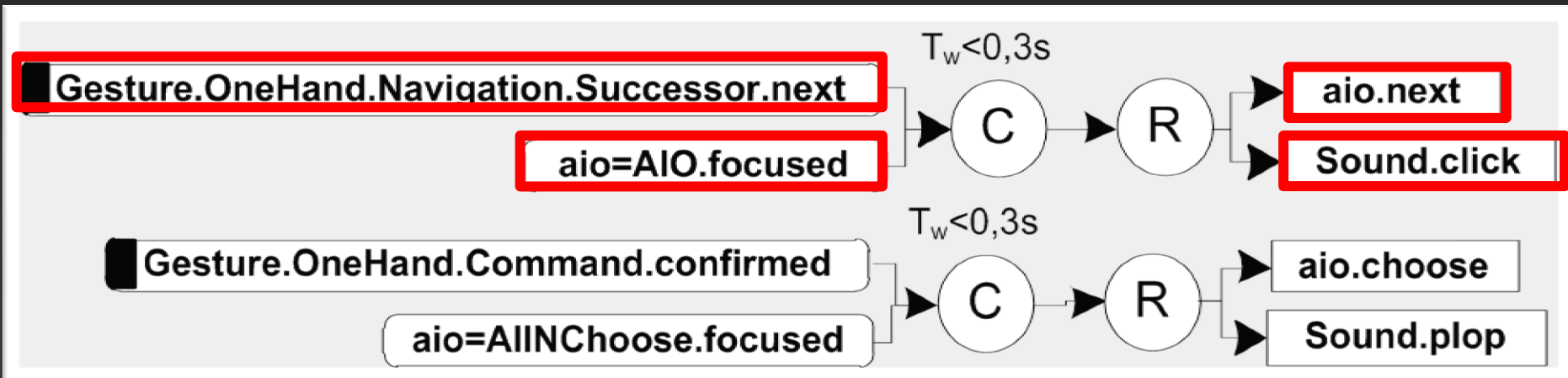
# Mode Model

## (Example: Gesture Interactor)



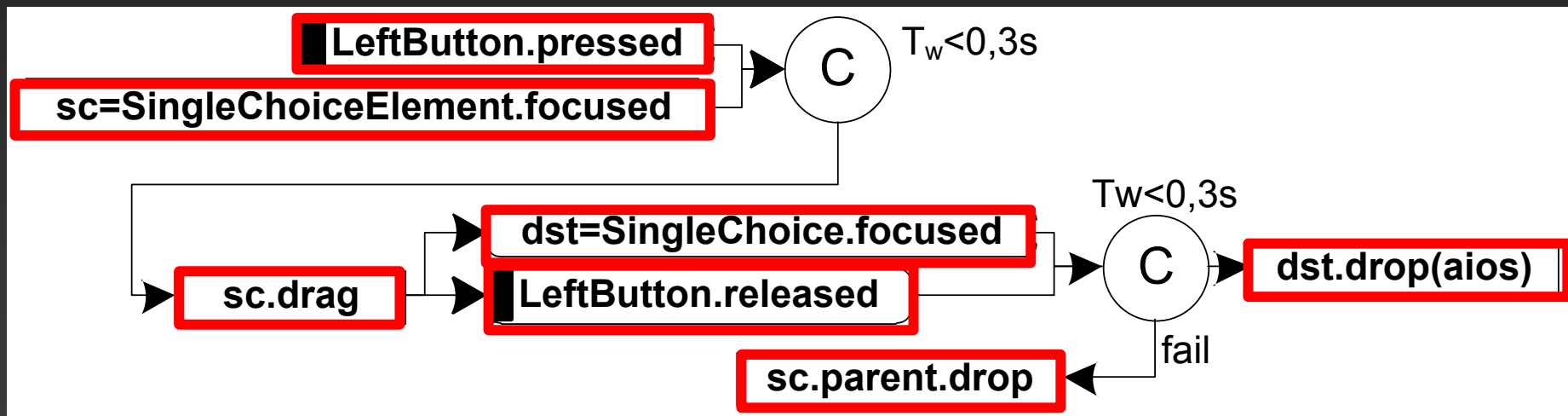
# Multimodal Mapping

(Combining Mode with concrete Media)



# Multimodal Mapping

## The Drag-and-Drop (abstract)

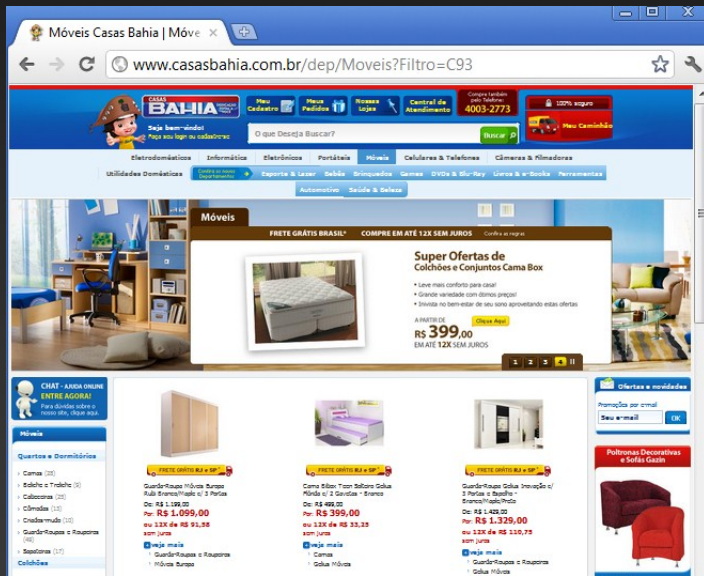




# Further Use Cases



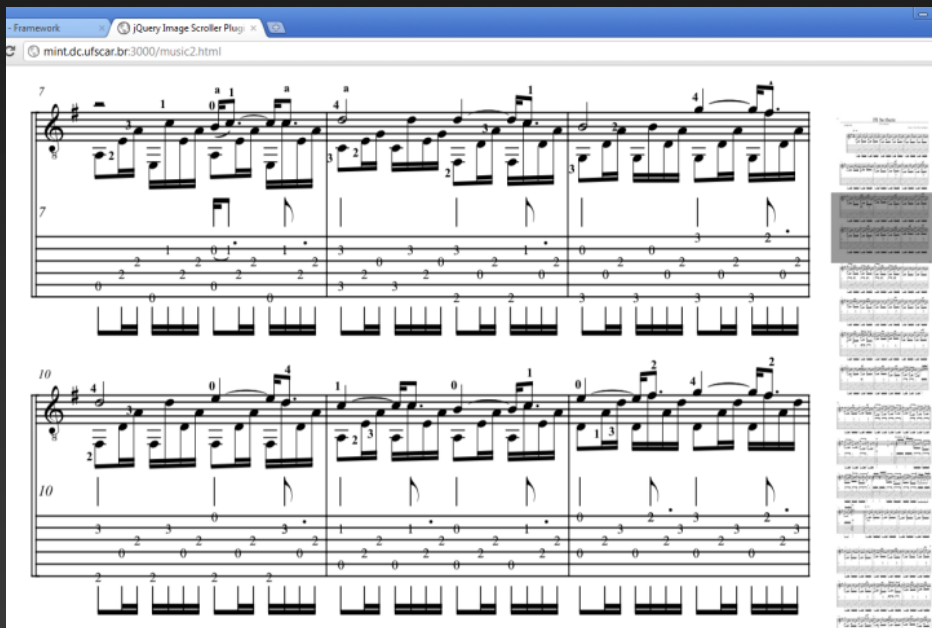
# Augmented Drag and Drop



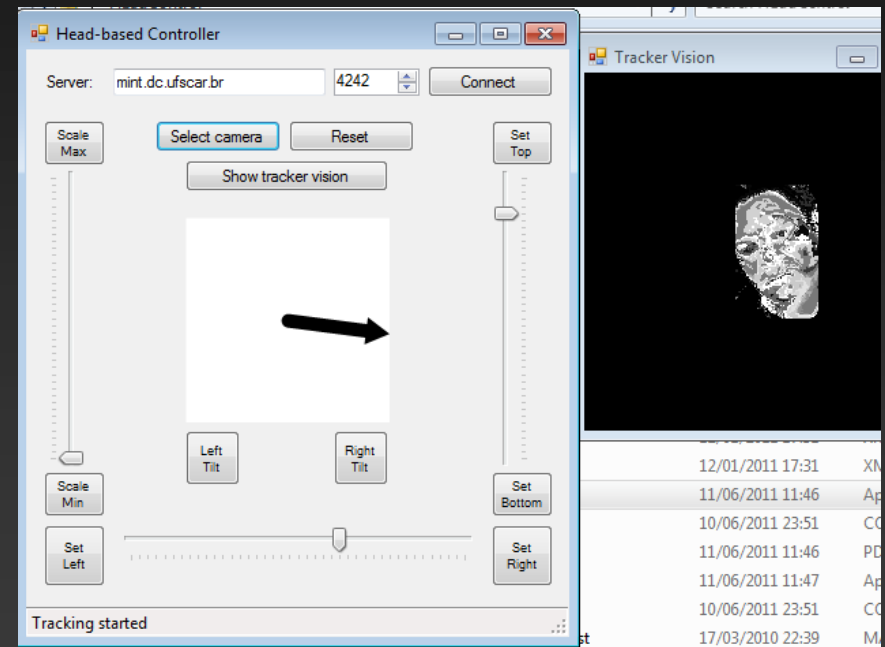
- Furniture Drag and Drop

Published: SVR 2011

# Head-based Interface Control



The screenshot shows a web browser window displaying a music sheet. The top part of the sheet features musical notation on a treble clef staff, including notes, rests, and dynamic markings. Below the staff is a guitar tablature with numbers 0-3 indicating fret positions. The sheet is divided into measures, with some measures containing multiple notes and rests. The browser's address bar shows the URL 'mint.dc.ufscar.br:3000/music2.html'.



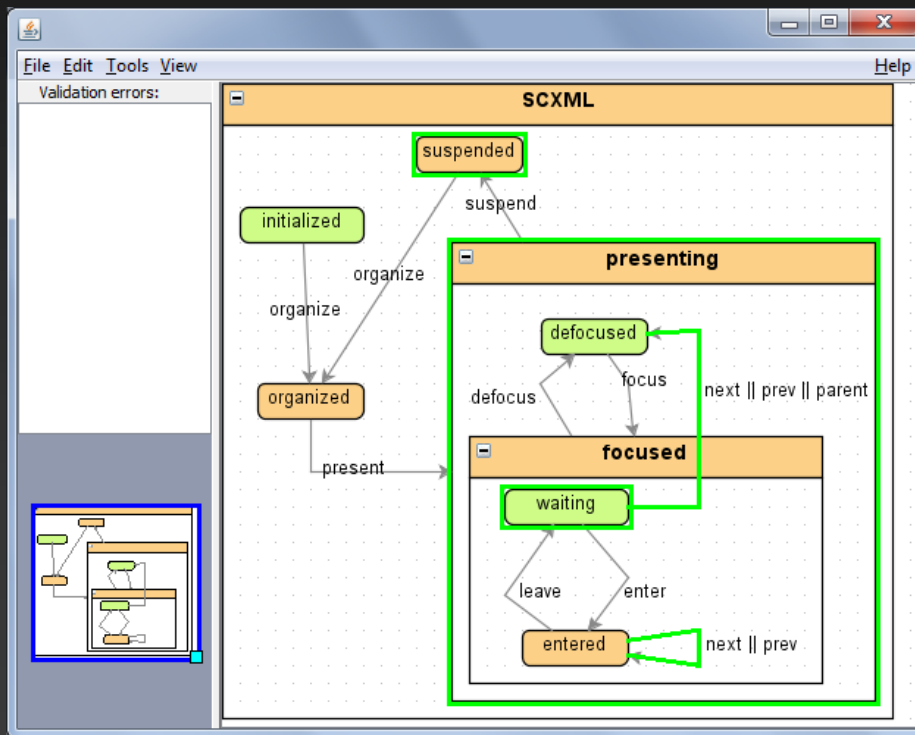
The screenshot shows two windows from a head-based interface. The 'Head-based Controller' window has a server address 'mint.dc.ufscar.br' and port '4242'. It includes buttons for 'Connect', 'Select camera', 'Reset', 'Show tracker vision', 'Scale Max', 'Scale Min', 'Set Left', 'Set Right', 'Left Tilt', 'Right Tilt', 'Set Top', and 'Set Bottom'. A central white box contains a black arrow pointing right. The 'Tracker Vision' window shows a grayscale image of a person's face. Below the image is a table of logs:

Date	Time	Event
12/01/2011	17:31	XM
11/06/2011	11:46	Ap
10/06/2011	23:51	CO
11/06/2011	11:46	PD
11/06/2011	11:47	Ap
10/06/2011	23:51	CO
17/03/2010	22:39	M

- Evaluation of controlling a music sheet by using head movements



# SCXML-based Interactor Design



Two concepts

- Interactors
- Mappings

3 steps

- 1) Widget Design
- 2) Interacton Design
- 3) Mapping



# What's there?

- Detailed Modeling of Multimodal Interactions (Media, Mode) including behavior
- Support for Paradigm Design via Mappings
- SCXML-based design and execution = No gap between Design- and Runtime
- Tools and Execution environment
  - (WebSockets, HTML 5 / CSS 3, Rails, NodeJS, Redis/TupleSpace, MMI-Arch)
- Machine-readable Specifications



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- MINT Framework

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 Multimodal Interaction  
Smart Environments