

Gesture Language Workshop

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GISpL: Gestural Interface Specification Language

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Abstract Description of Gestures

[Echtler, Klinker, Butz @ HC 2010]

Regions:

spatial areas defined in reference coordinate system
extension of „traditional“ desktop UI window objects

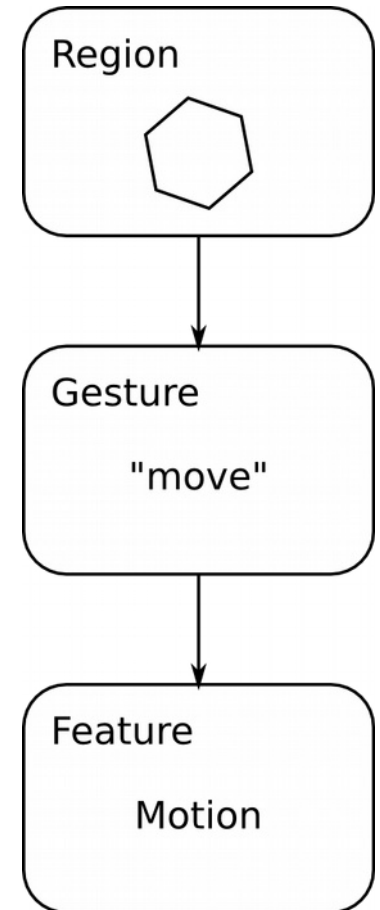
Gestures:

sequences of features, either ...
pre-defined by capability description or ...
customized by application

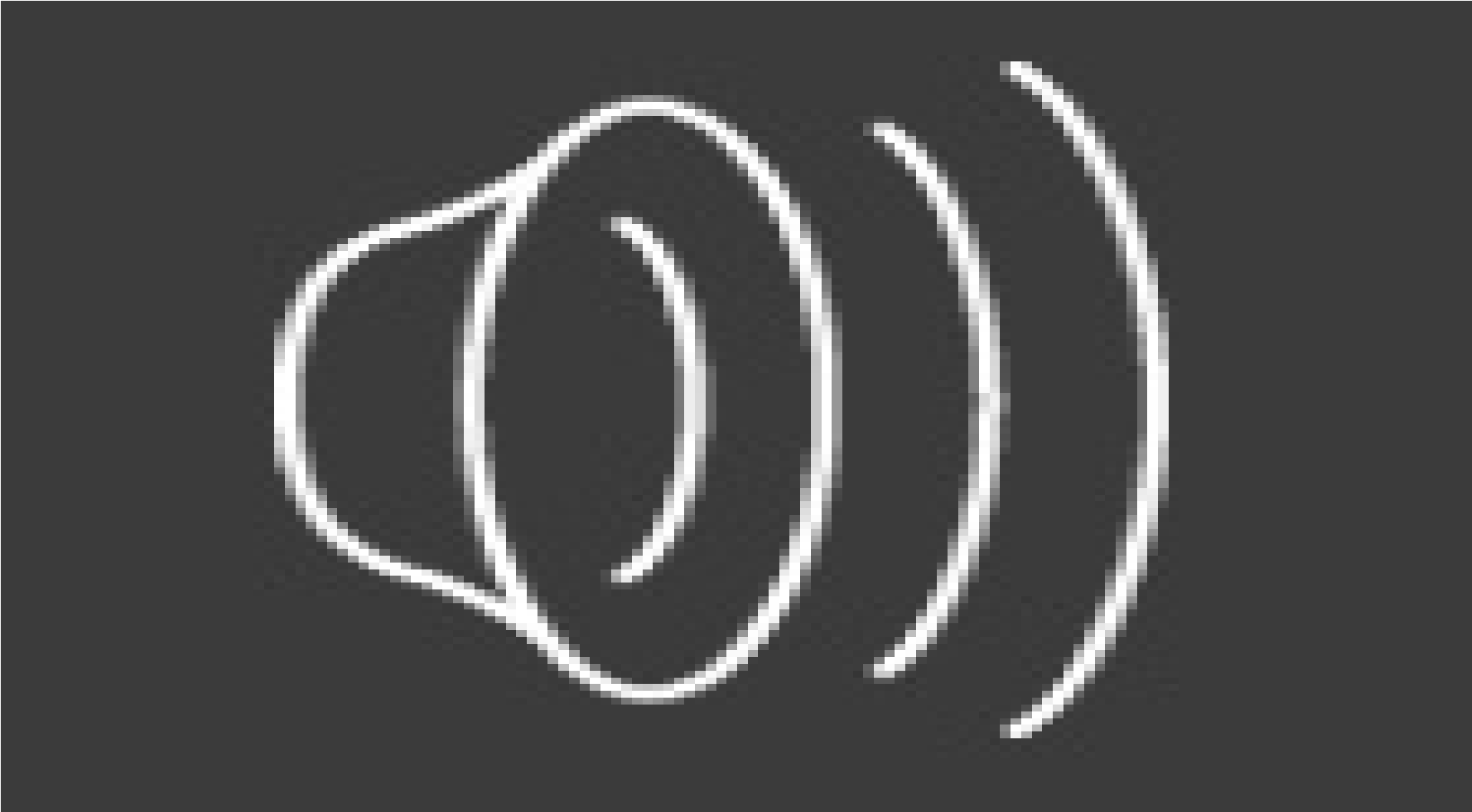
Features:

geometrical/mathematical properties of input data, e.g.:
motion vector
relative rotation
travelled path

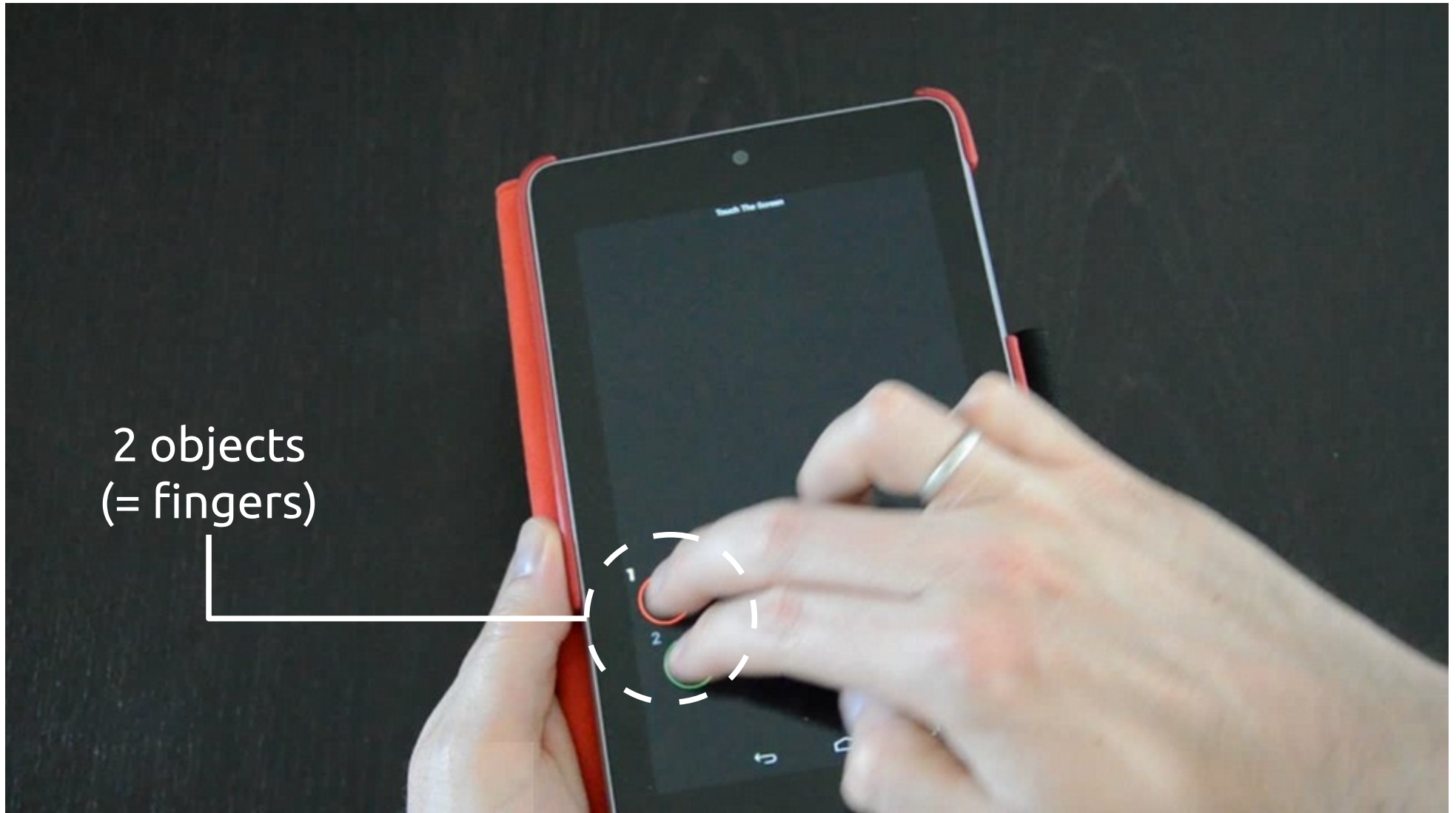
further classification through filters/constraint values



Putting it together

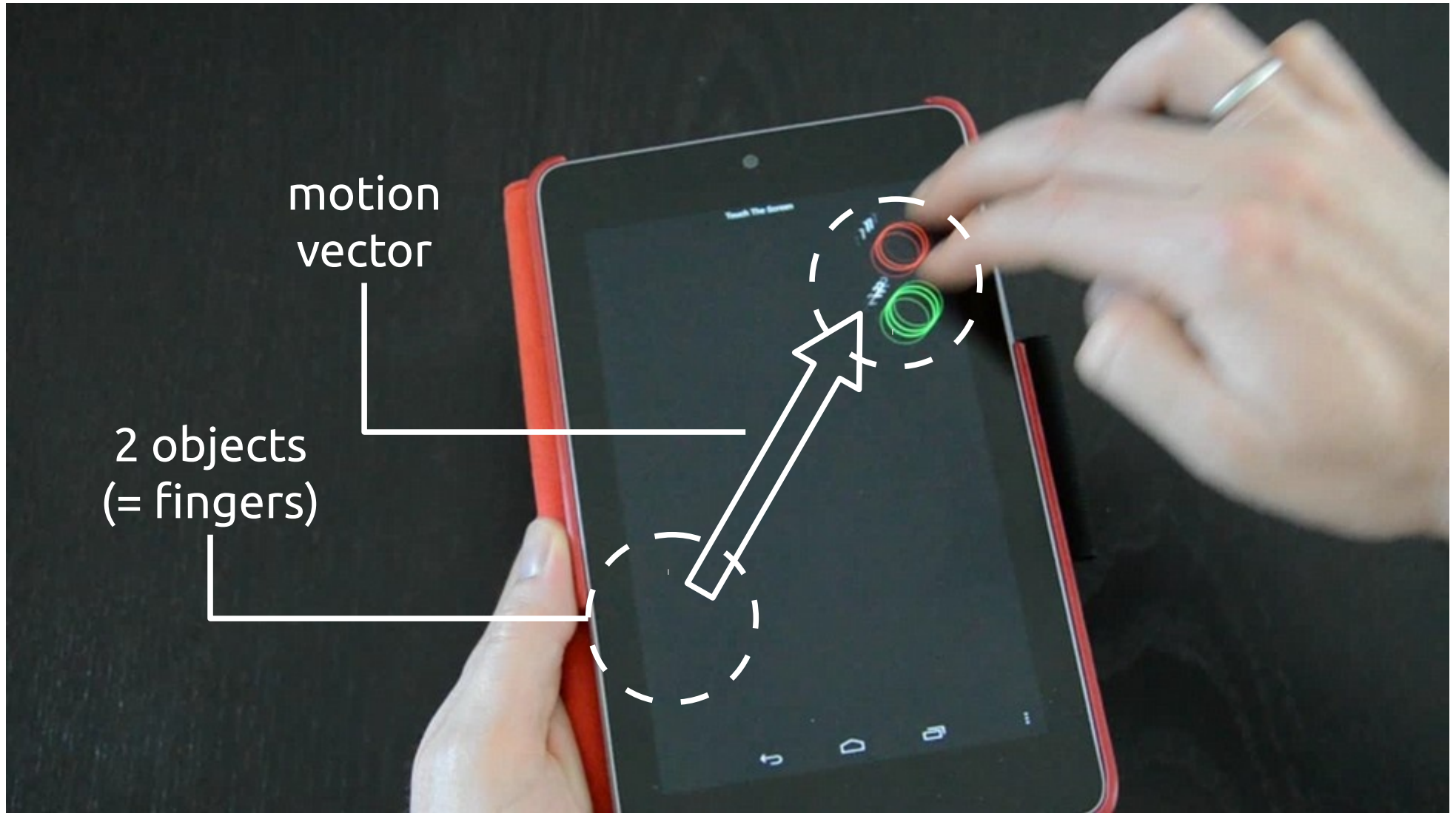


Putting it together



2 objects
(= fingers)

Putting it together



GISpL: Gestural Interface Specification Language

[Echtler, Butz @ TEI 2012]

JSON format – universally readable

```
{
  "name": "2FingerFlickTopRight",
  "flags": "oneshot",
  "filters": 2046,
  "duration": [50],
  "features": [
    {
      "type": "Count",
      "constraints": [2,2]
    }, {
      "type": "Motion",
      "constraints": [
        [0.2,0.2,0.1],
        [0.1,0.1,-0.1]],
    }
  ]
}
```

flags: gesture modifiers
oneshot → triggered only once
default → stored as reusable definition
sticky → „sticks“ to starting region

filters: bitmask for TUIO 2.0 types
2046 = all fingers

duration: how far to look back in history

type: class of feature

constraints: limits for feature values

GISpL: Summary

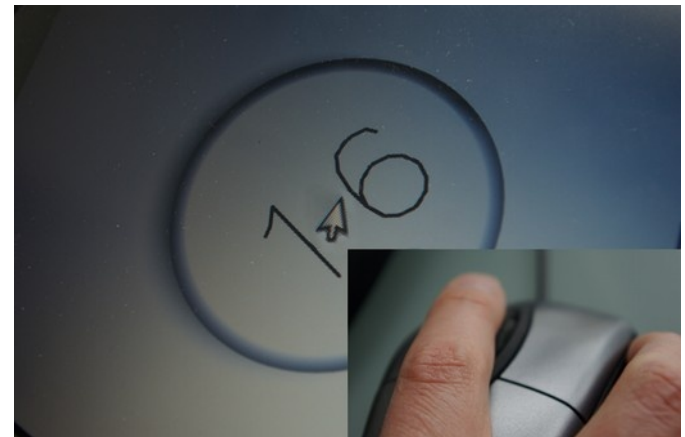
simple example: „*rotate*“ gesture
contains one feature: relative rotation

result value generated through...

- multi-finger rotation *or*
- object rotation *or*
- mouse wheel *or* ...

mapping is hardware-dependent
part of capability description

→ *application developer doesn't have to care*



What is a gesture?

*„A motion of the limbs or body,
especially one made to emphasize speech.“*

[Merriam-Webster 2012]



*„A motion of the limbs or body,
performed to trigger an action.“*

Gestures are *not* only ...

multi-touch *or* shape-/mark-based gestures *or* body-tracking *or* ...

What do they have in common?

Gesture Interpretation

[Echtler, Klinker @ AVI 2008]

What is a gesture?

→ „A motion of the limbs or body...“

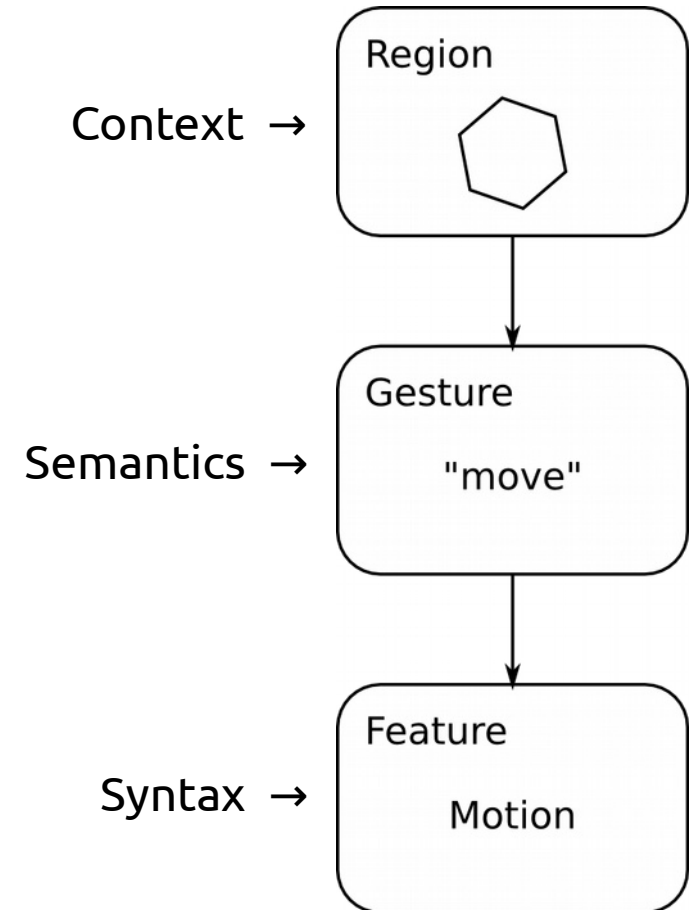
→ *How can these motions be represented?*

Core concepts for unified approach:

Regions: spatial areas containing gesture sets

Gestures: representations for user actions

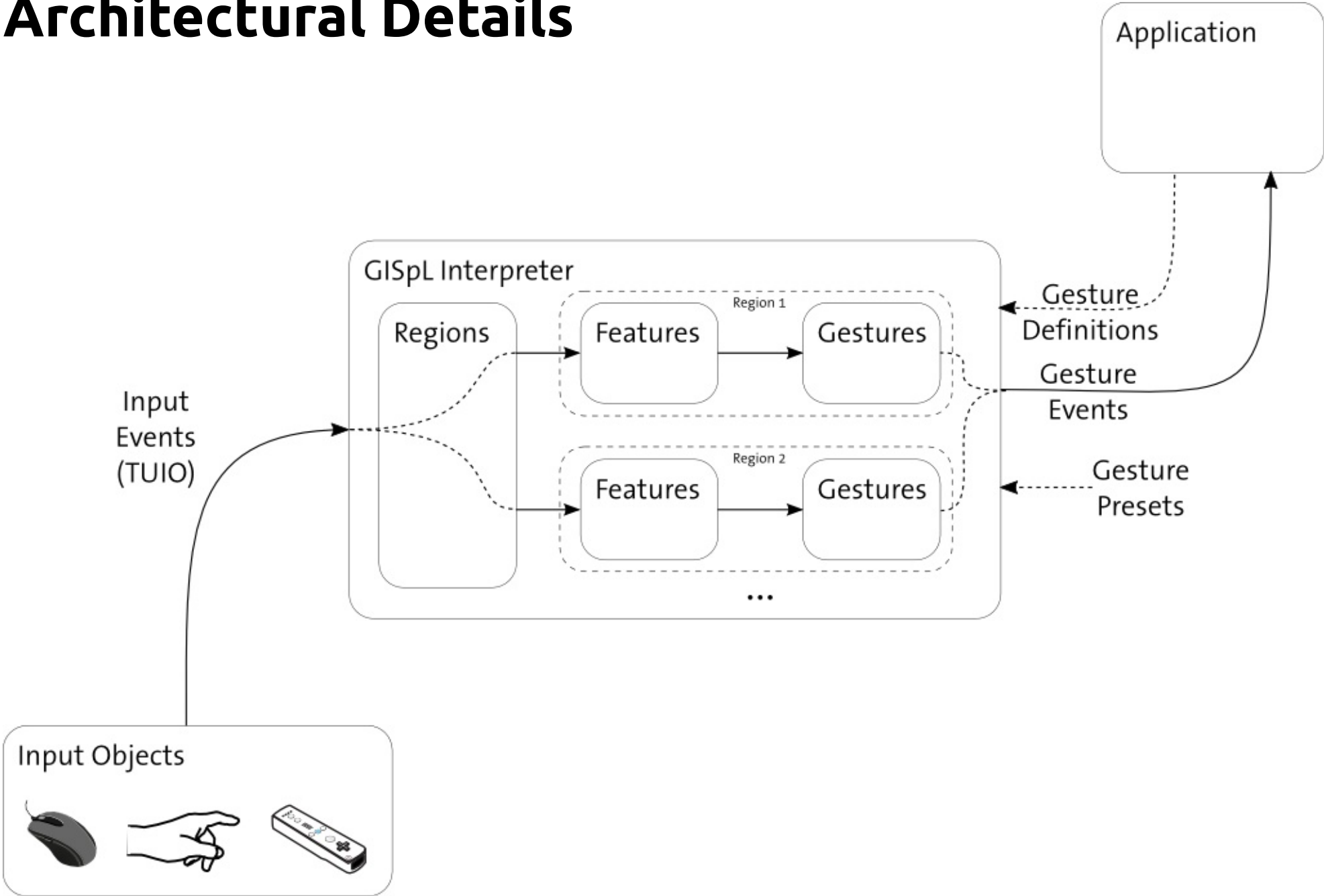
Features: „atomic“ building blocks for gestures



Available Features

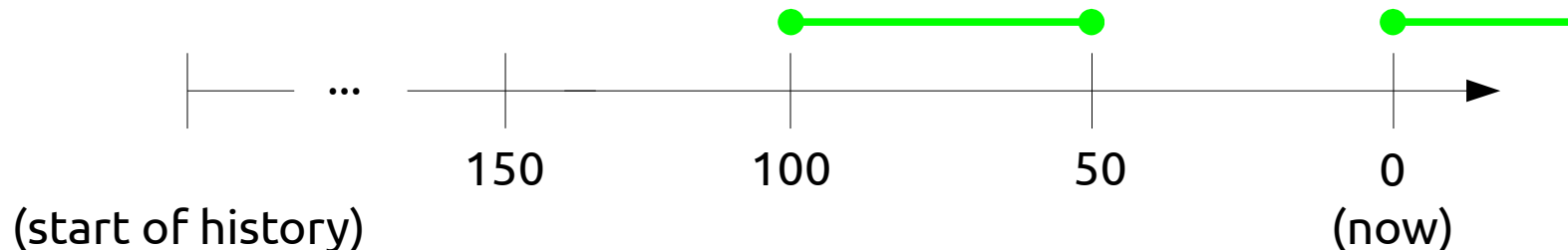
Motion	}	multitouch-inspired
Rotation		
Scale		
Count	}	strokes/shapes
Path		
ID	}	tangibles, whole-body interaction
ParentID		
Group		
Position	}	position & object shape
Dimensions		

Architectural Details



Guess the Gesture

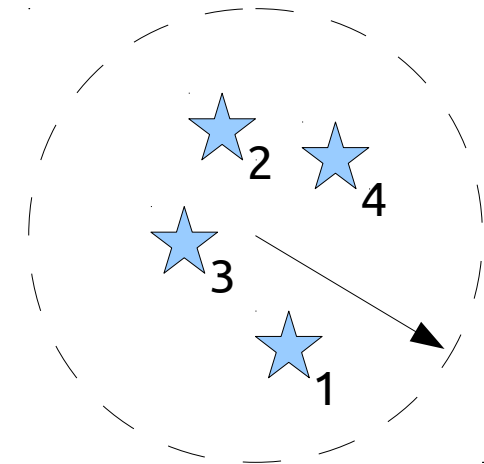
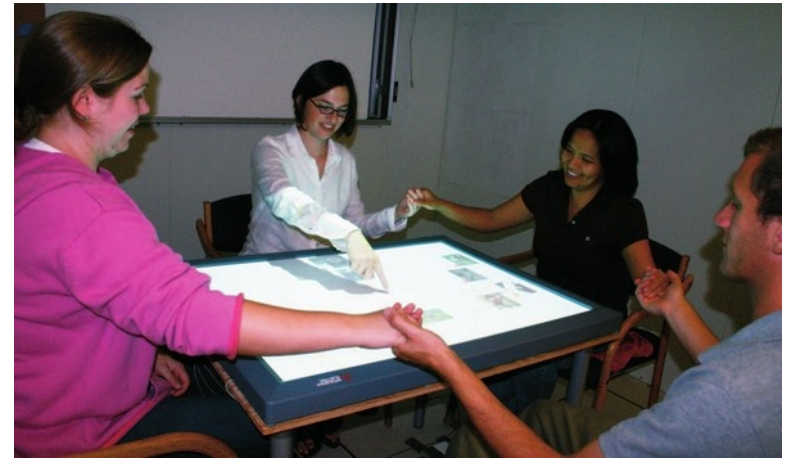
```
{  
  "name": "what_am_i",  
  "flags": "oneshot",  
  "filters": 8192,  
  "features": [  
    { "type": "Count", "constraints": [0,0], "duration": [150,100] },  
    { "type": "Count", "constraints": [1,1], "duration": [100, 50] },  
    { "type": "Count", "constraints": [0,0], "duration": [ 50, 1] },  
    { "type": "Count", "constraints": [1,1], "duration": [ 0, 0] }  
  ]  
}
```



CollabDraw Quit Gesture

[Morris et al. @ IEEE CGA 2006]

```
{  
  "name": "quit_application",  
  "flags": "oneshot",  
  "filters": 2,  
  "features": [  
    { "type": "ID", "constraints": [1,1] },  
    { "type": "ID", "constraints": [2,2] },  
    { "type": "ID", "constraints": [3,3] },  
    { "type": "ID", "constraints": [4,4] },  
    { "type": "Count", "constraints": [4,4] },  
    { "type": "Group", "constraints": [0,0.01] }  
  ]  
}
```



Work-In-Progress: „ubiquitous“ gestures

Problem: gestures...

defined on, e.g., screen background...

but intended for smaller sub-regions

example: strike-through gesture

possible solution: „ubiquitous“ flag

gesture will be delivered to all participating regions

