Tangible Musical Interfaces

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professional background ...

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http://www.reactable.com/
Reactable Systems, Barcelona, Spain
musical instruments 35,000 years ago...
... until the 19th century
pioneers of electronic music
from analog sound synthesis
to digital sound synthesis
an office tool as musical instrument?
but how can we control all these parameters?
the need for extended musical interfaces
various types of musical controllers
decoupling control & sound generation

Diagram showing MIDI connectors (MIDI IN, MIDI OUT, MIDI THRU) and a keyboard with keys labeled c, d, e, f, g, a, h.
musical remote control
a musical instrument ...

... unifies control and feedback
Graphical User Interfaces

separate control from representation
Tangible User Interfaces

... unify control & representation within tangible physical artifacts
Embodiment

physical objects are containers for digital information and processes
Tangible Surface Instruments

Spatial Systems
Object Oriented Sequencers

Relational Systems
Token based Sequencers

Token-Constraint Systems
Building Block Sequencers

Constructive Assemblies
Tangible Musical Artefacts

Physical Containers
++ reactable - tangible modular synthesizer
++ fundamental inspirations
++ Björk tour, BBC 2007
++ first experiments, Medialab Europe 2003
++ first public prototype, NIME 2004
++ first public concert, ARS Linz 2005
++ Reactable Experience
++ Reactable Live!
++ Reactable Mobile
++ shape: generic object classes

+ sound generators: squares, cubes
  oscillators, sound fonts, samples, phys. models

+ sound effects: rounded squares
  filter and effects (band pass, delay, distortion ...)

+ control generators: round disks
  LFOs, melody generator, random

+ step sequencer: round polygons

+ global objects: star shape
  tempo, tonality, volume
++ dynamic patching paradigm
++ visual feedback
++ collaborative instrument
++ reacTIVision
community projects

ReacTIVision

182 videos / 138 subscribers

This channel is a showcase for tangible interface projects made with the reacTIVision toolkit.
reactivision.sourceforge.net/

Another list of tangible musical interfaces made with reacTIVision:
modin.yuri.at/tangibles/?list=7

Facebook page: facebook.com/reacTIVision

Ribosound - Concept
by Victor

Stadtpianung
by Fabian Gronbach

Interfaces for Encoura
by JAG

Demo Reactable Ketap
by Dario Freddi

Tuio Kontrol+++multit
by Vision Nocturne

Learn about the RGB :
by YUFANGISED

Learn about the RGB :
by Harsha Vardhan

Block Environment
by Ameec

Martin Kaltenbrunner - Creator
Created October 2009
4 videos / 292 likes / 197 contacts

Shout Box

Thanx for adding the vid to your channel... And thx for your great reacTIVision framework of course!!!
Posted by Fabian Gronbach 2 days ago

Martín, gracias por incluir nuestro video!
Posted by derooted creative agency 6 months ago
++ student project – Interface Cultures
++ object abstraction
++ amoeba symbols
++ fiducial breeding – genetic algorithm
++ region adjacency graph

Some simple topologies and their corresponding region adjacency graphs.

(a) a reacTIVision fiducial (b) black and white leaves and their average centroid (c) black leaves and their average centroid, and (d) the vector used to compute the orientation of the fiducial.
++ marker, finger & object tracking
++ token, pointer & geometry abstraction
TUIO framework architecture
++ TUION components

+ original TUIO 1.0

Objects: /tuio/2Dobj

describes arbitrary physical objects, which are usually tracked with the help of visual symbols (fiducial markers), RFID tags or similar methods. tokens are not defined by their physical appearance but by their ID. encodes position and rotation angle.

Cursors: /tuio/2Dcur

describes surface pointers such as finger touches or dedicated devices. multiple pointers are only distinguished by their position.

+ extended TUIO 1.1

Blobs: /tuio/2Dblb

describes the bounds of untagged physical objects. encodes position, and oriented bounding box (angle, width, height) can be used to additionally describe the approximate object geometry.
TUIO 2.0 - tangible abstraction framework

+ revised component definition

Tokens (objects), Pointers (cursors), Geometries (blobs)

+ additional components

Symbols: allow the encoding of extended symbol content
Controls: for the association of additional control dimensions
Associations: allows description of physical connections & relations
Geometries: Contour, Skeleton, Area ... (incremental detail)

+ extended attributes

e.g. pointers include dedicated pointer/user ID, pressure attribute, ...
tokens allow the use of different symbol types

+ timing infrastructure

for improved gesture recognition capabilities