

Tangible User Interfaces - Classification -

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- Introduction
- Terminology
- Key Characteristics
- Classification
- Application Domains
- Conclusion

- 2000: Ullmer and Ishii presented a framework to classify TUI's

<http://tangible.media.mit.edu/content/papers/pdf/ullmer-isj00-tui-framework-pub.pdf>

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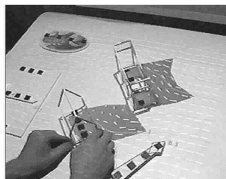
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- Urp - Urban planning simulation:



<http://tangible.media.mit.edu/content/papers/pdf/jper.pdf>

- mediaBlocks:



<http://alumni.media.mit.edu/~ullmer/projects/mediablocks>

Iconic Share representational properties with the object they refer.

Symbolic Don't share representational properties with the object they refer.

Token Physical object which can be manipulated and used.

Reference frame The physical interaction space.

Container Symbolic token to which media can be assigned.

Tool Token which represent digital operations or functions.

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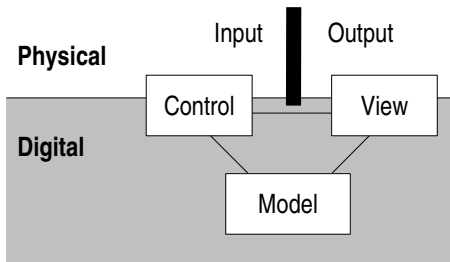
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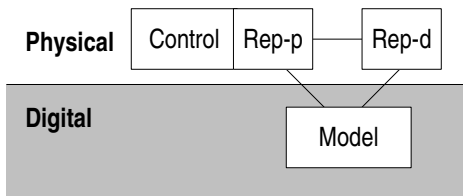
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The traditional interaction model:
Model-View-Control (MVC)

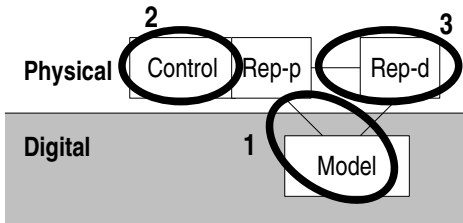


The interaction model for TUIs:
Model-Control-Representation (physical and digital) (MCRpd)



Key Characteristics

Relationships between the physical representation and the other components.



rep-p – model Coupling between the physical representation and the underlying digital information.

rep-p – control How is the physical representation controlled?

rep-p – rep-d The representation might have a digital part beside the physical part.

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Spatial Systems which interpret the position and orientation of tokens in a reference frame.

Constructive Systems with a constructive approach (similar to LEGO).

Relational Systems where relations between different tokens are created.

Associative Systems where tokens associate digital information.

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Examples of TUI instances:

Spatial	Constructive	Relational	Associative
Bricks metaDESK BuildIt Urp InterSim InfoBinder Twin Objects Illuminating Light	Blocks BBS IModeling	Marble Ans Lego Wall mediaBlocks musicBottles	Voice Boxes POEMs WebSticks Passage
	AlgoBlock SAGE Programming Blocks Triangles		

The model extended by Hoven and Eggen:

Digital associations	Fixed (1)		Flexible (n)	
	Symbolic (tool)	Iconic (tool)	Symbolic (token)	Iconic (token)
No existing mental model, mostly multiple users ⇒ Generic object	Bricks metaDesk Urp musicBottles Triangles	BuildIt Light Illuminating Urp	MediaBlocks WebStickers InfoSticks	
With existing mental model, mostly single user ⇒ Personal object			Passage	POEMs Phenom Living Memory Box

Categorisation based on application domains: "What kind of tasks are tangible interfaces good for?"

- Information storage, retrieval and manipulation
- Information visualization
- Modelling and simulation
- Systems management, configuration and control
- Education, entertainment and programming systems

Conclusion and Questions