

CHI 2000

Mihai Nadin

COMPUTATIONAL DESIGN

ONE CANNOT NOT INTERACT

Semiotic Approaches to  
User Interface Design

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# 1. Semiotics – the "mathematics" of CHI

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Ferdinand de Saussure (1857–1913)



synchronic perspective / structure

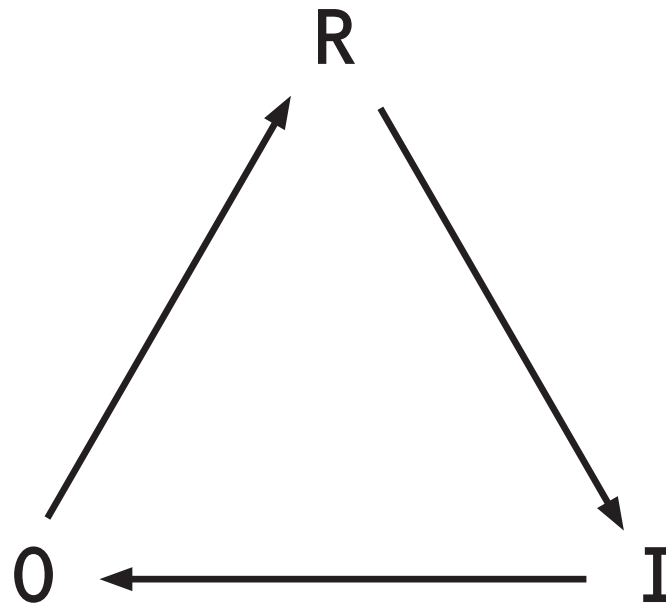
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# 1. Semiotics – the “mathematics” of CHI

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Charles Sanders Peirce (1839–1914)



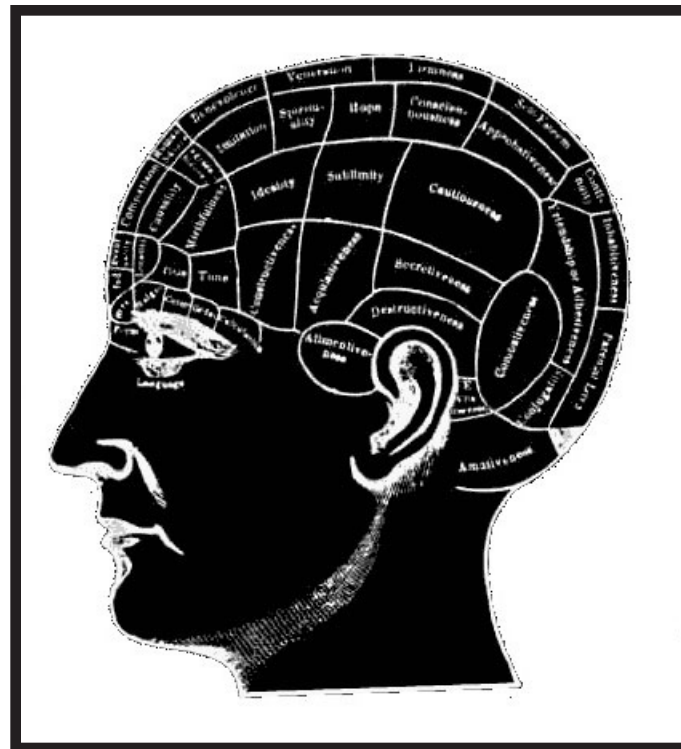
Diachronic / dynamic perspective / structure

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# 1. Semiotics – the "mathematics" of CHI

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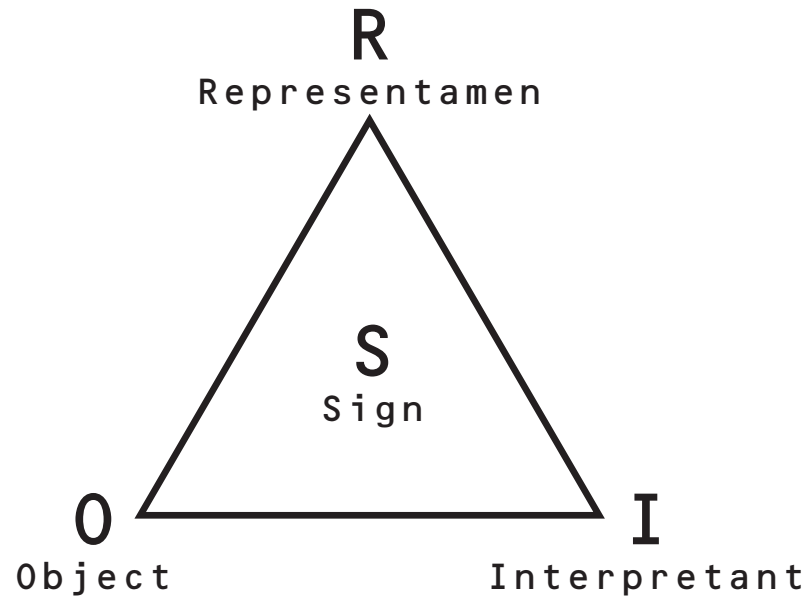


sign as a construct

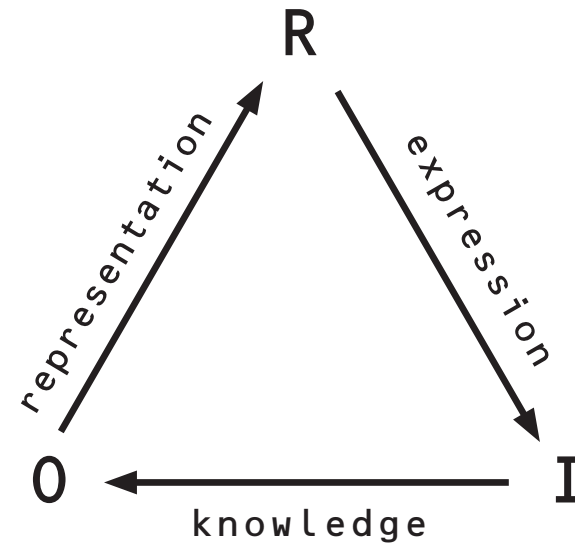
## 2. Ethics of terminology

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Sign:  
unity of object represented (O), means  
of representation (R), and process  
[infinite] of representation



Sign functions:  
representation, communication,  
knowledge acquisition

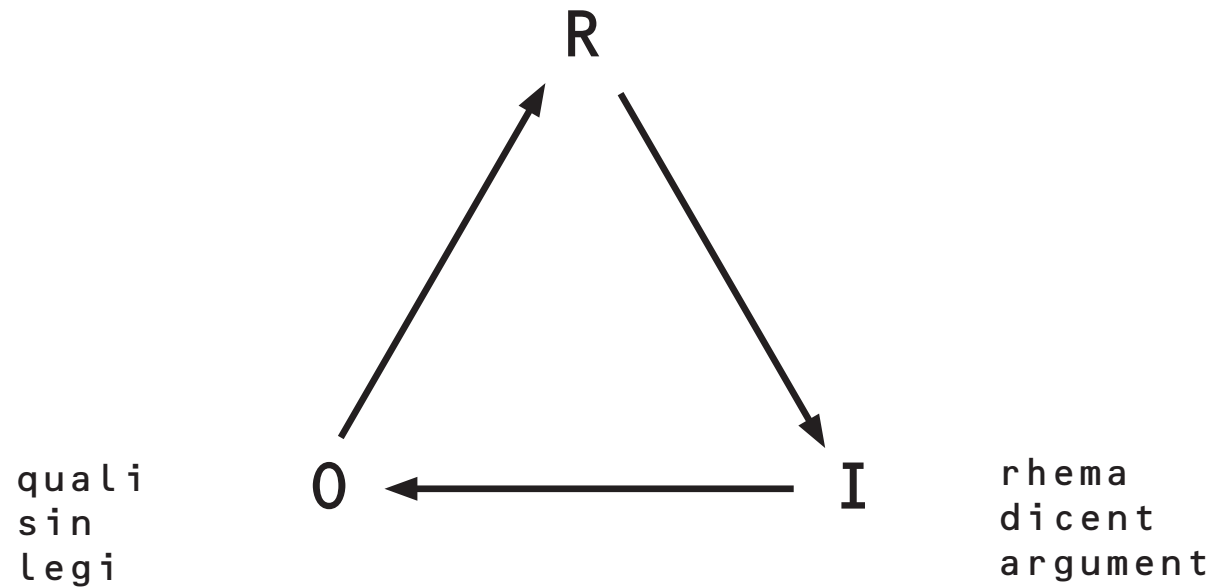
## 2. Ethics of terminology

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Forms of representation:  
based on resemblance,  
marks left, conventions OR

Forms of representation  
iconic: based on resemblance  
indexical: based on marks left  
symbolic: based on conventions

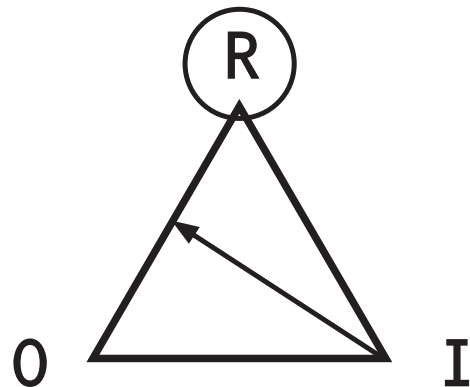


## 2. Ethics of terminology

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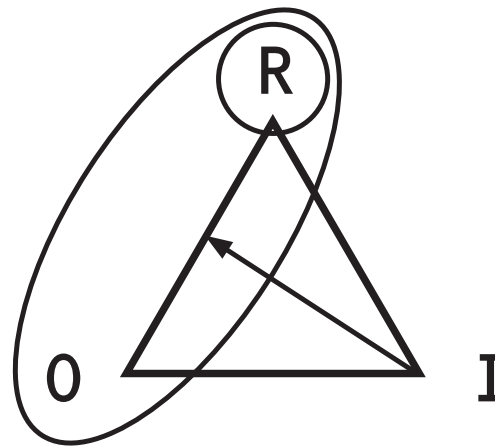
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Syntax



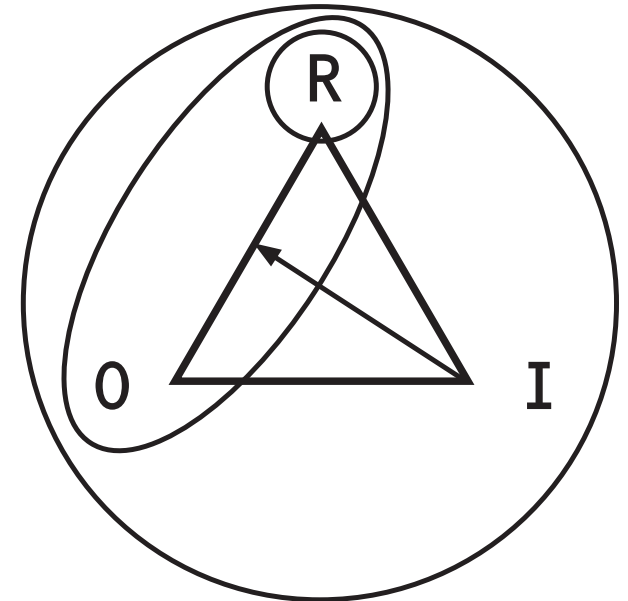
formal aspects of  
representation

Semantic



meaning of  
representation

Pragmatic

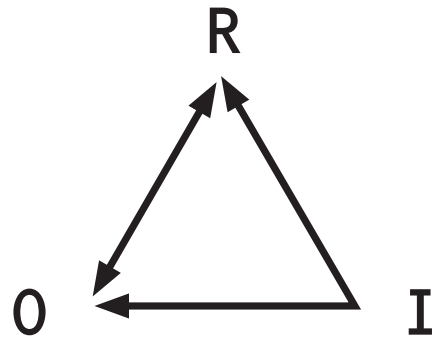
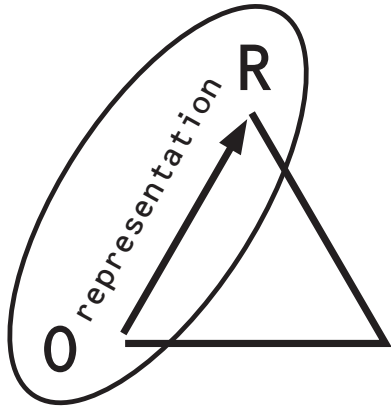


practical use of  
representation

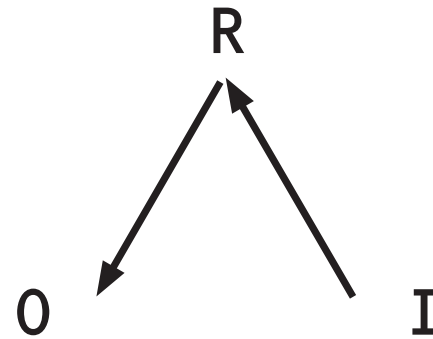
## 2. Ethics of terminology

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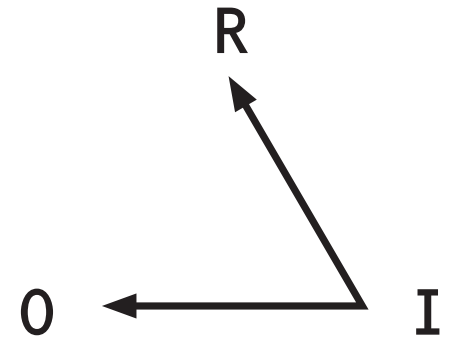
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Iconic

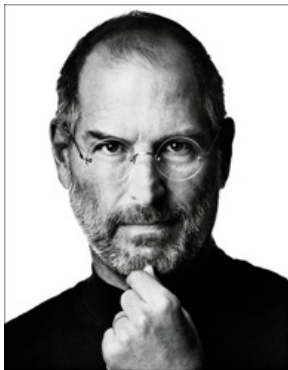


Indexic



Symbolic

The nature of specific representation:



person's picture

person's fingerprint

person's name



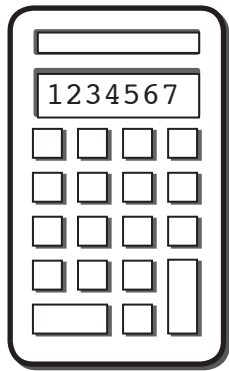
**Steve Jobs**



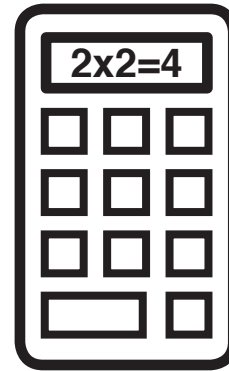
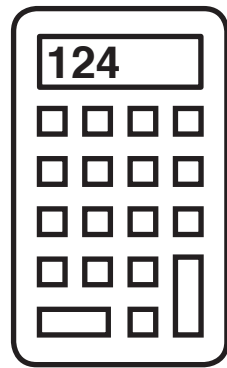
## 2. Ethics of terminology

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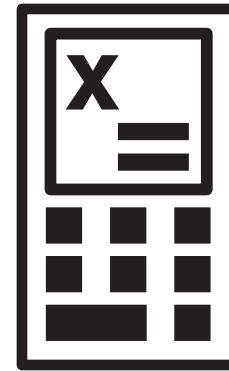
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pictographic representation →



iconic sign →

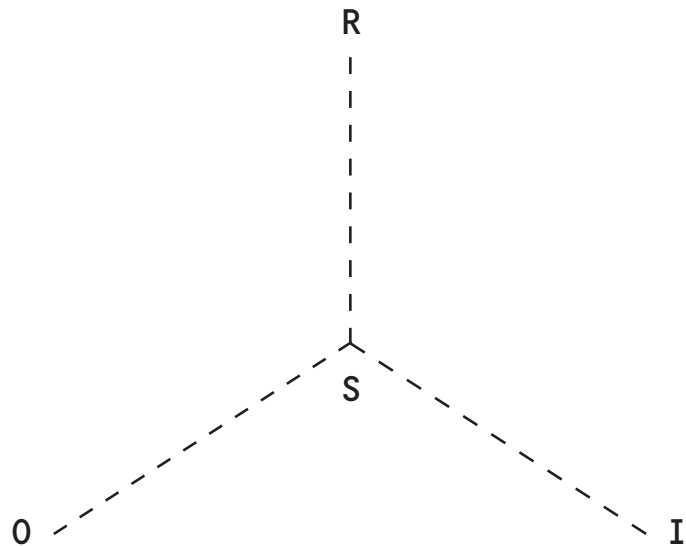


symbolic sign

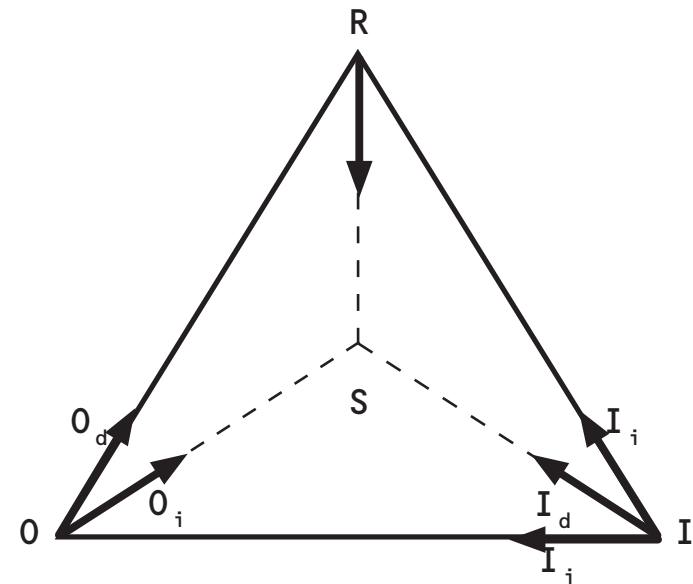
## 2. Ethics of terminology

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a) the functional and relational aspects of the definition of syntax (R), semantics (R,O), pragmatics (R,O,I);



b) demonstrating the pyramidal structure of semiosis, and in particular the active (I,R,S), sensational (O,R,S), practical (I,S,O), theoretic (I,R,O) forms of belief distinguished in Peirce's pragmatic system.

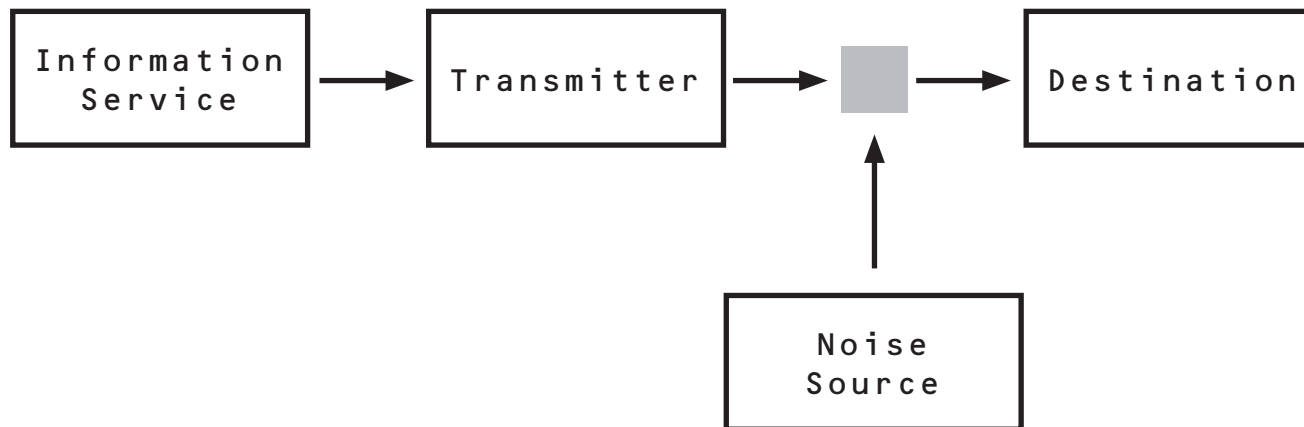
Semiosis = sign process

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## 2. Information Theory (1948)

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Claude Shannon (1916–2001)



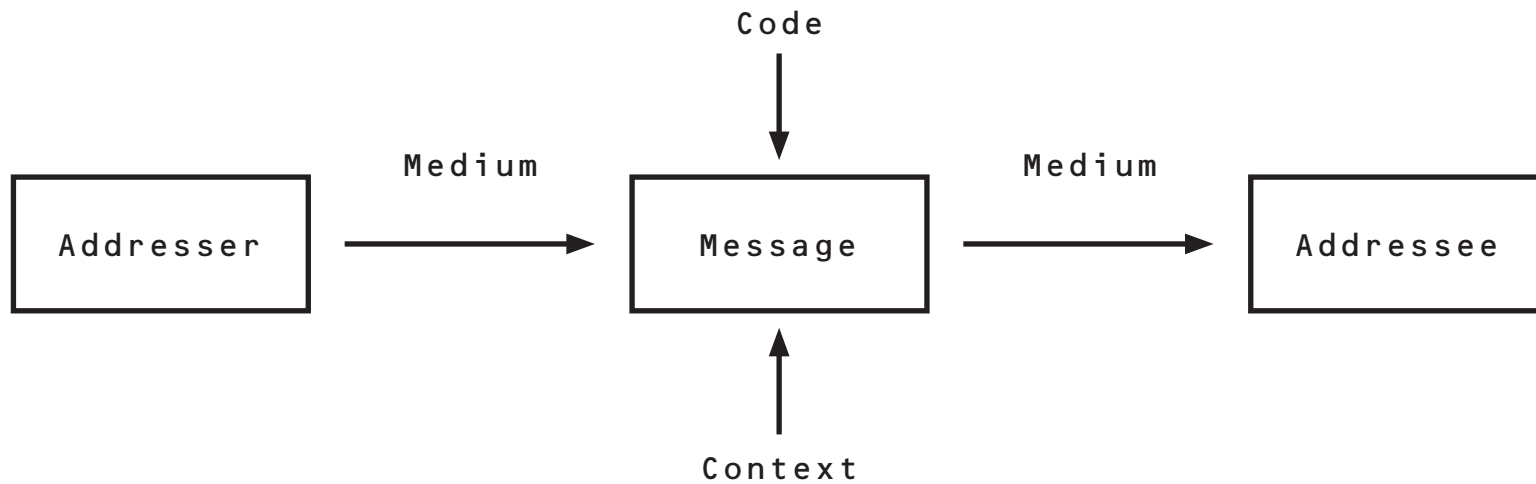
General Communications System

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### 3. Semiotics, information, communication

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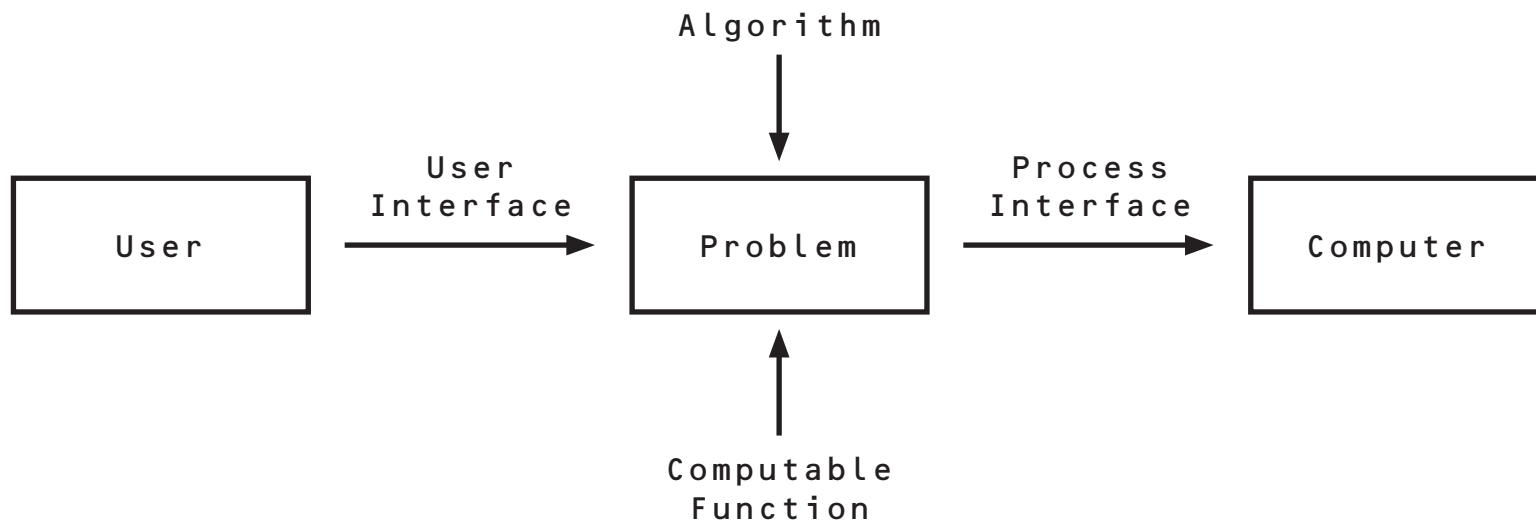


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### 3. Semiotics, information, communication

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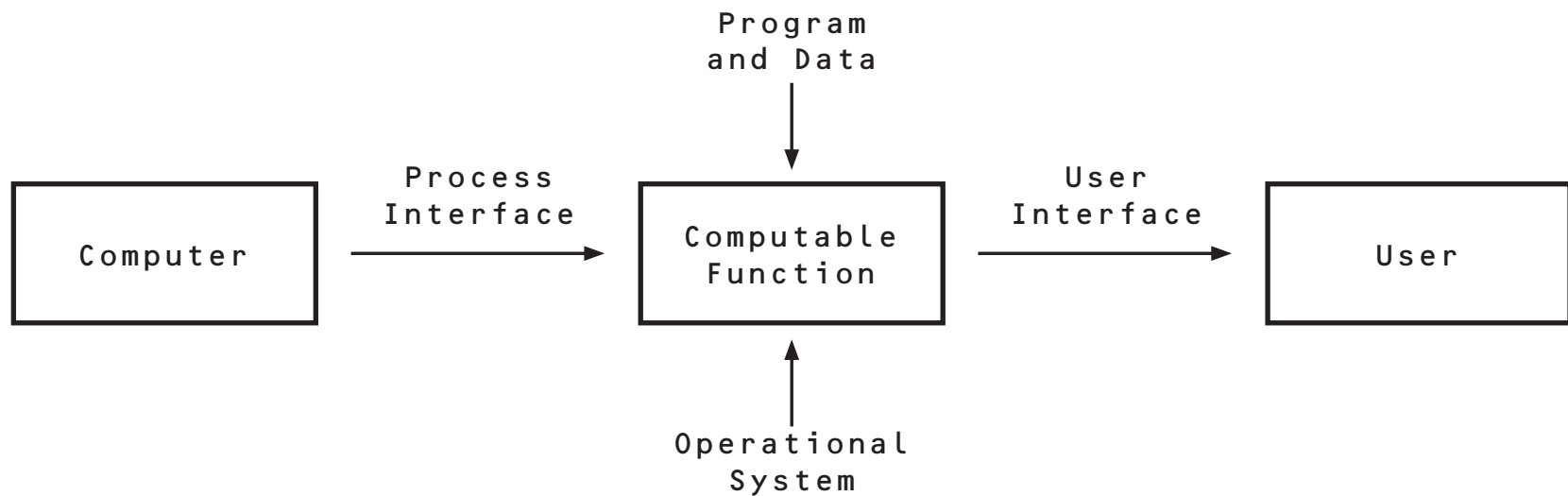
Adapting Shannon's model to computation

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### 3. Semiotics, information, communication

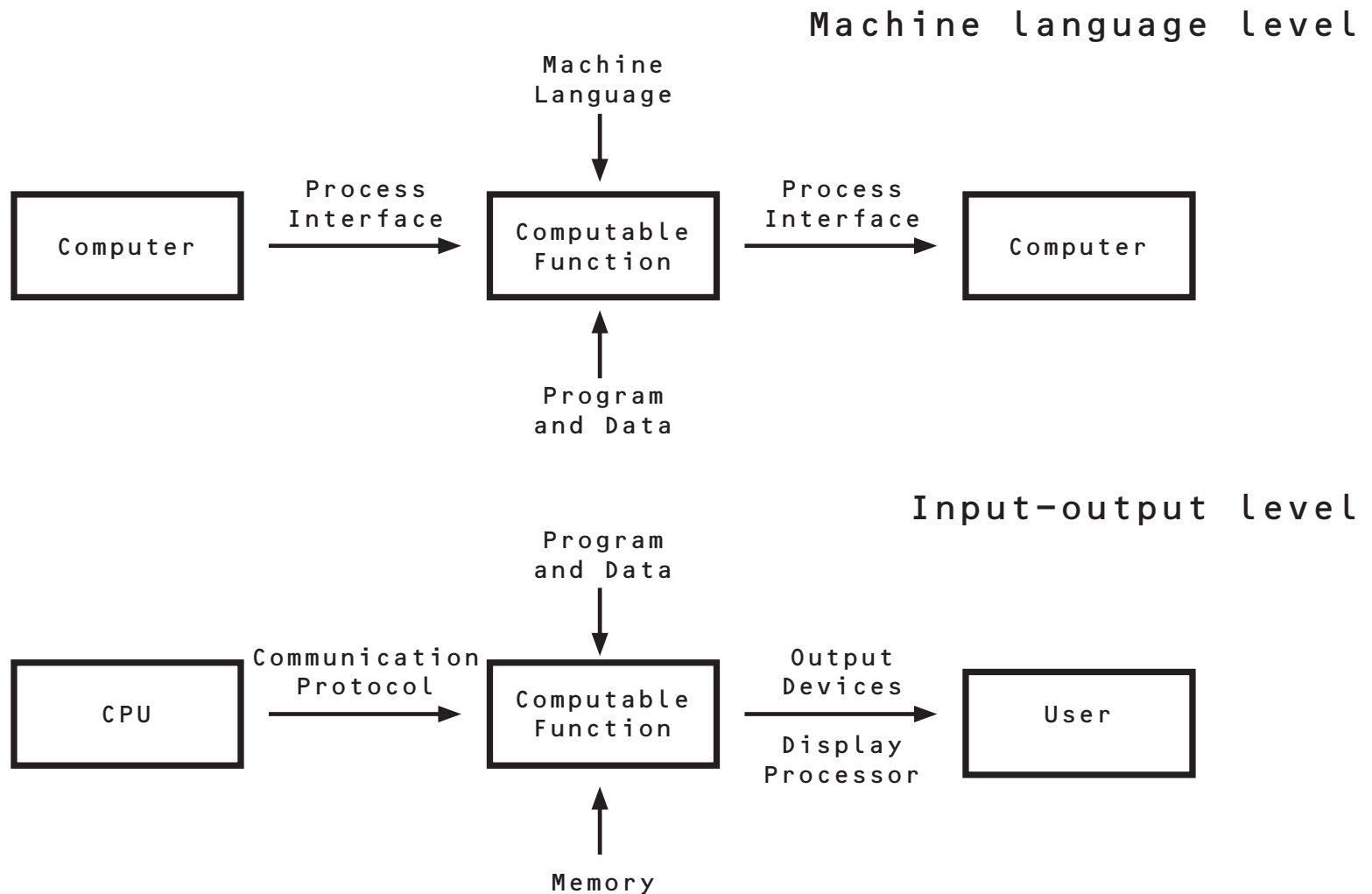
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Operating system level



### 3. Semiotics, information, communication

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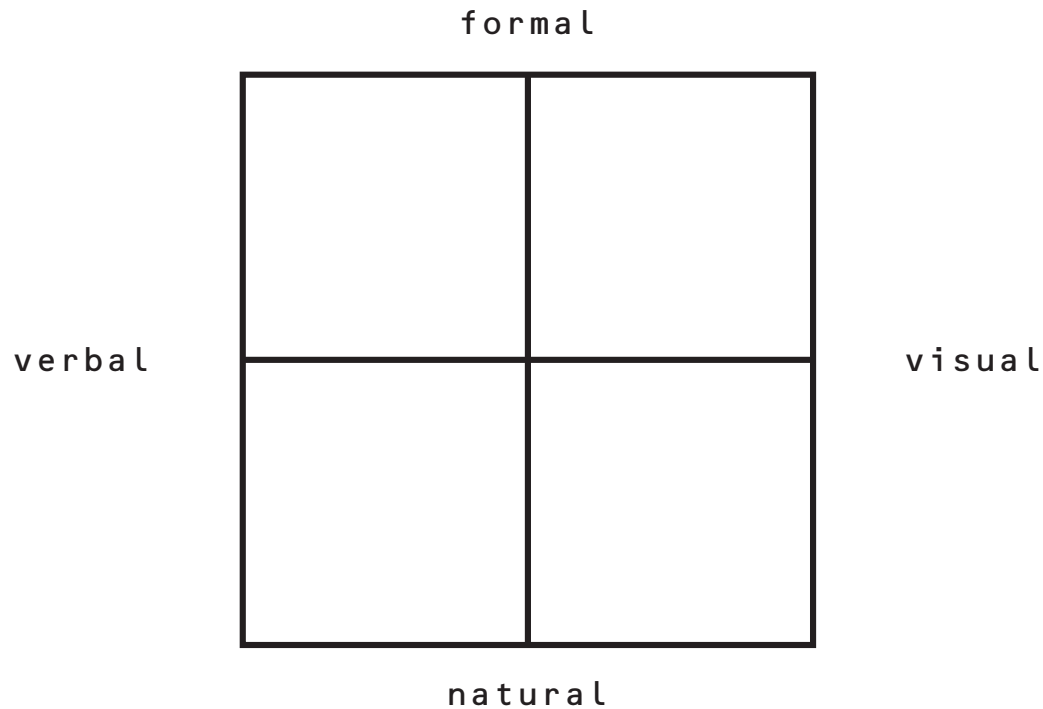


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### 3. Semiotics, information, communication

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Ways of describing human-machine interaction

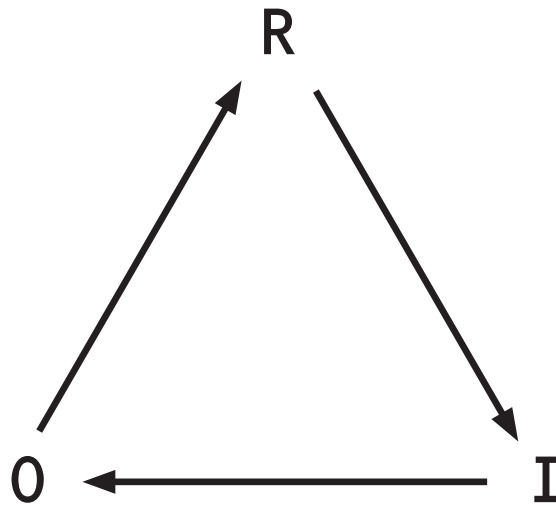


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## 4. Examples

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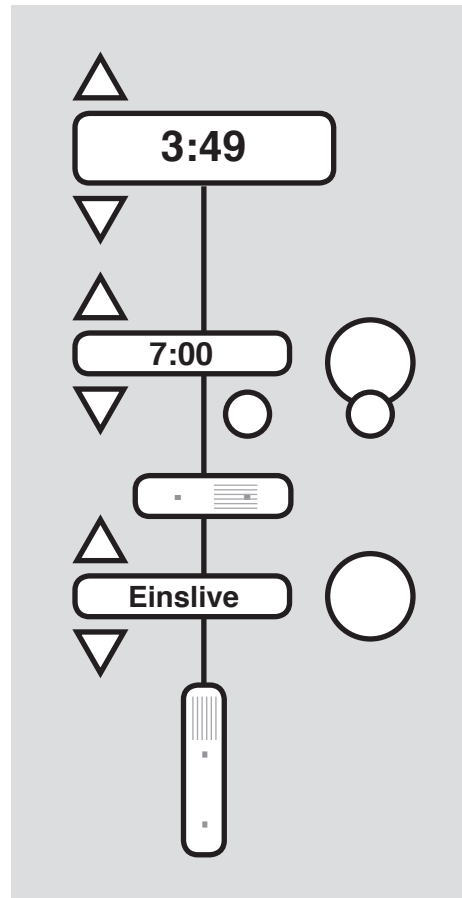
CHI Types:  
Representation/Software/Design  
Interaction  
Navigation  
Retrieval  
Transaction

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Representation/Software/Design

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## 4. Examples

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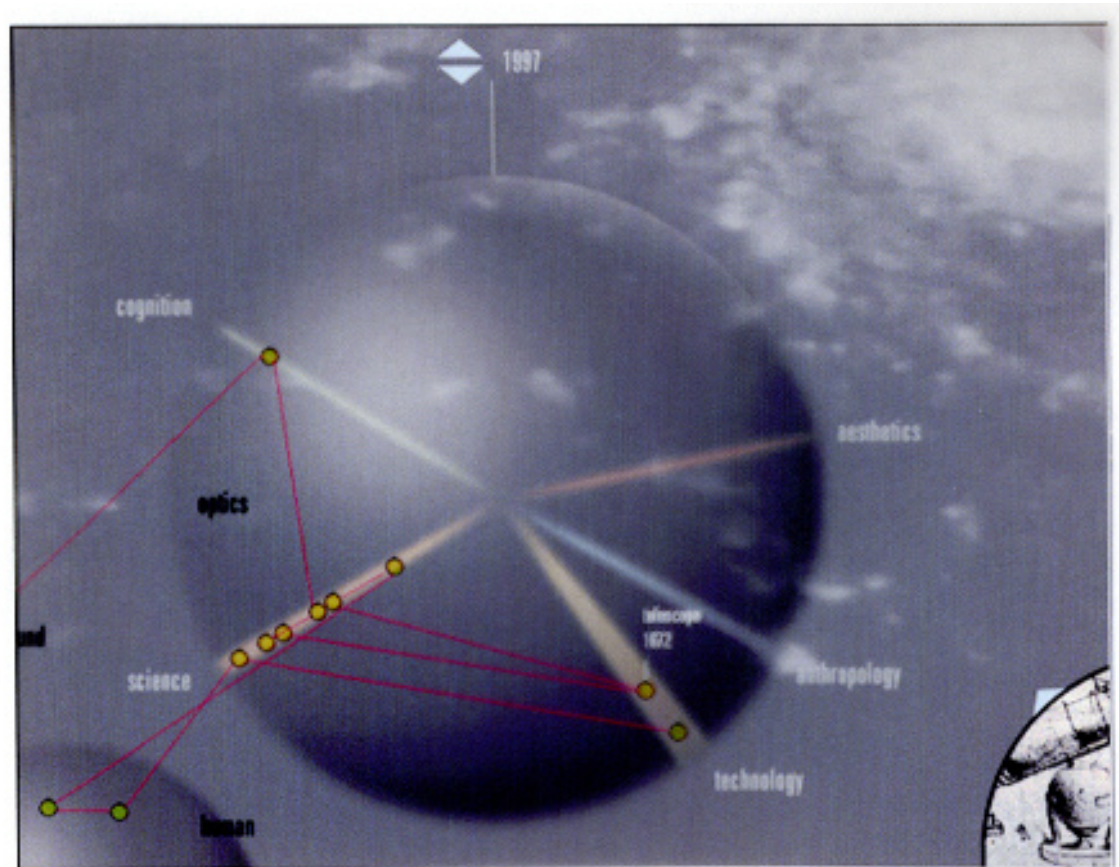
Interaction

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## 4. Examples

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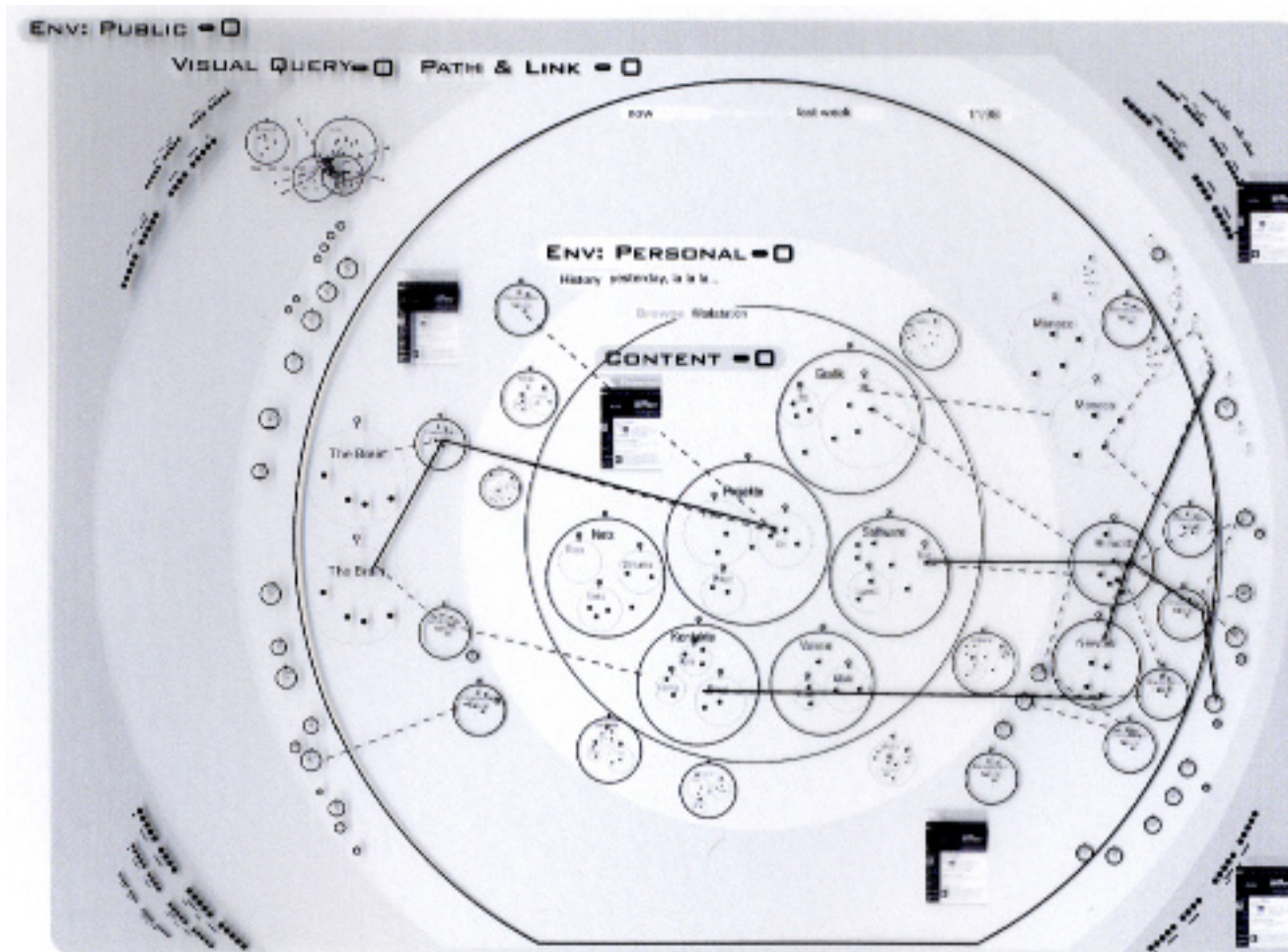
Navigation: Knowledge Acquisition Through Associative Processes  
(Nadin, Associative Encyclopedia)

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## 4. Examples

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Retrieval