SITUATED CREATIVITY AS A BASIS FOR SOCIAL CREATIVITY
A simple agent architecture
Agent with STM
Learning agent with STM and LTM
Novelty detection

- Construct a categorisation of the current situation.
- Determine the probability of the categorisation.
- Compute novelty as the inverse of the probability.
Curious agent
Wundt’s hedonic function

![Graph showing Wundt’s hedonic function with labels for H_x, n_1, n_2, and N_x, and indicating reward and punish axes.](image-url)
Modeling interest

\[ i_t = R(n_t) - P(n_t) \]

\[
R(n_t) = \frac{R_{\text{max}}}{1 + e^{-\rho(n_t - R_{\text{min}})}}
\]

\[
P(n_t) = \frac{P_{\text{max}}}{1 + e^{-\pi(n_t - P_{\text{min}})}}
\]
Situated Sketching

1. An area of interest is focused on.
2. Memory constructed from previous, recalled experiences.
3. Situations are constructed/recalled.
4. “Interesting” new shapes are learned.

Situated “Reflection-in-Action”
Situated sketching

- Pixels
- Moving
- Line drawing actions
- Seeing
- Novelty, interest and learning goals

- Categories, 'shapes' and shape drawing actions
- Lines, regions and figures
SITUATED ANALYSIS

• Designing doors

<table>
<thead>
<tr>
<th>Description of situated social force</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pedestrians try to move as efficiently as possible to a destination.</td>
</tr>
<tr>
<td>Pedestrians try to maintain a comfortable distance from other pedestrians.</td>
</tr>
<tr>
<td>Pedestrians try to maintain a comfortable distance from obstacles like walls.</td>
</tr>
<tr>
<td>Pedestrians may be attracted to other pedestrians or objects.</td>
</tr>
</tbody>
</table>

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Narrow door
Wide door
Two doors
Designing for performance

![Bar chart showing the evaluation of different widths of roads for varying numbers of pedestrians. The chart includes bars for 'Narrow', 'Wide', and 'Double' widths. The x-axis represents the number of pedestrians, while the y-axis represents the evaluation score.](chart.png)
Designing for novelty
Csikszentmihalyi’s model

CULTURE

Domain

Selects Novelty

Transmits Information

Produces Novelty

Stimulates Novelty

Field

SOCIETY

Individual

PERSONAL BACKGROUND
Dual model

Field
Social-cultural recognition of creative ideas by a group of authorised people

Individual
Personal creative solution generation and recognition

Domain
Source of initial data and knowledge in the domain

Problem Finding
Generate
Creativity Test

Field
Socio-cultural test

Individual
Socio-cultural generate

Domain
Problems & Solutions

Problem Finding
Generate

Creative Product

Individual
Personal generate-and-test

Domain Knowledge

(a)

(b)

(c)
Behavior-based creativity

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Individual B

Problem Finding → Generate → Creativity Test

no

yes

Individual A

Problem Finding → Generate → Creativity Test

no

yes

To Domain
(interactive Genetic Art III)
Curious art evolver

Evolved images

Evolutionary System

Image selections

bitmap images, edge detected images

Selection commands

image categories

novelty, interest and learning goals

Evolved images

Evolutionary System

Image selections

bitmap images, edge detected images

Selection commands

image categories

novelty, interest and learning goals

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Image detection

(a)  

(b)
**SOM (self organizing map) neural network**

![Image of SOM neural network]
Different novelty functions
Different novelty preferences

N=0  N=1  N=2  N=3
N=4  N=5  N=6  N=7
N=8  N=9  N=10 N=11
N=12 N=13 N=14 N=15
N=16 N=17 N=18 N=19

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# Social agents

<table>
<thead>
<tr>
<th>Agent ID</th>
<th>Preferred Novelty</th>
<th>Attributed Creativity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>5.43</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>4.49</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>4.50</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3.60</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4.48</td>
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<tr>
<td>5</td>
<td>1.82</td>
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<td>6</td>
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<td>8</td>
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<td>9</td>
<td>5.39</td>
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<tr>
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<td></td>
</tr>
<tr>
<td>11</td>
<td>0.0</td>
<td></td>
</tr>
</tbody>
</table>
Law of novelty
Novelty cliques

(a)

(b)