Capture Relationship between Sensibility and Intelligence from Viewpoint of System and Design

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Kansei System
감성 시스템

Measurement (Perception)

Smart Agent

Cognitive system

Artificial Kansei
인공 감성

Kansei recognition Theory
감성 인식론

Kansei representation Theory
감성표현론

Design

Representation

Soft-Computing Multivariate analysis

Modeling

Natural Kansei
자연 감성

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What is intelligence?

Intelligence is a general intellectual ability including ability to infer, plan, solve problems, understand abstractly, understand complex ideas, learn quickly, or learn from experience.

It is not just for learning from books, narrow academic skills, or for getting good mark in the exam.

Rather, it represents a broader ability to understand our environment, that is to "understand" things and "give meaning" and "to see" what to do.
Important Three Elements of Intelligence

The important three elements of intelligence that intelligence experts have reached consensus:

- Abstract thinking or reasoning (99.3% of researchers agree)
- Problem solving ability (97.7% of researchers agree)
- Ability to gain knowledge (96.0% of researchers agree)
It represents a **broader ability** to understand our environment,

that is to "understand things" and "give meaning" and "to see what to do".

An important point to show what intelligence is.
In the interval between intelligence and sensitivity

Artificial Intelligence

Design Intelligence

지능을 디자인

“Understand”
“to See”

“give Meaning”

Artificial Sensitivity

Design Sensitivity

감성을 디자인

It represents a broader ability to understand our environment, that is to "understand" things and "give meaning" and "to see" what to do.
Meaning and Relationship in Design

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How to switch viewpoints?

**Design** is to give the **meaning** of **things**.

For human-centered design, designers need to focus on "**meaning**" people use in real life and understand it.

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 Interaction

—What is the meaning of Krippendorf?

This is the word of Krippendorff, but “meaning” as used here means that the meaning of artifacts is not fixed in objects, nor does it originally exist in the minds of people. It interactively emerges as objects and people meet and are used in the real world.

On the other hand, it is noteworthy that Paul Rand states that:

“All art is relationship, every art must start from there, that is the starting point, it is related to design, the relationship between shape and content.”
How people perceive artifacts varies from person to person. **For example**, as shown below, the role of a chair will depend on the situation in which it is used. Designers need to design in what way people understand and use artifacts and design. Krippendorff calls "secondary understanding" to understand others' minds. This can be said to be the basis of Human Centered Design (HCD) in a sense.
The meaning of getting up by contact between things and people has diversity

It is not a simple thing to think about how other people understand the meaning of artifacts.

It is not simple for a person to understand others' minds.

It shows that the meaning of standing up by contact between objects and people has diversity.
The concept of design driven innovation is:
(A) Think of "meaning" rather than feature of the product.
(B) Explore innovative changes rather than improvements.
(C) We propose "vision" rather than satisfying existing needs.
Design driven innovation is to pursue innovation from these perspectives.

Then, it can be thought that the three perspectives of exploring the design constitute "meaning - innovative change - vision".

By doing this, we can grasp the design based on innovation from a new perspective.
In particular, the important thing is that all products have meaning.

However, many companies are often indifferent about how to make meaning innovation if they do it.
It is **true** that we are trying to understand what was suggested by innovations designed by **competitors** and they have not been able to find **good strategies** for themselves to develop meaningful innovation.
On the other hand, in relation to design, as Paul Rand says, if there is a relationship between "shape and contents", more generally, a relation between "some thing and some thing" like "binary relation" is also included.

Since the relationship in this case is a so-called "correspondence relationship", this can be regarded as a "function" in mathematics.

Therefore, the relationship between the elements constituting the design has the role of "function".

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At the same time, since the system creates one output while its constituent elements are related to each other, the elements behave as functions as well. In this way, it can be thought that the design and the system are connected with "function" as a pivot, as shown in below.
A function is a term in **mathematics**, but its main meaning is "**work**, action, purpose, duty, occupation, ceremony, event".

From this point of view, it can be understood that the **design** and the **system** are **tightly coupled**.
The Work of Design Thinking

How can we actually use **products** and **services** to **people**?

- Evaluation of products in the **market**
- Topics and evaluations in **people's conversation**

The **work of design thinking** is basically to **design a mechanism** to comprehensively **create people's living culture**.

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Therefore, it can be understood that "meaning is incorporated" and "relationship is breathing" in every sense.

The basic concept of design thinking is to guide such concepts from grasping the current situation to creating concrete prototypes.
Framework of design thinking

Realization

Realize Products and Services

Know Context

Know People

Find Purpose

Summery Insights

Exploring Concept

Consider Solution

Analysis

Abstract

Integration

To make

Reality

To understand

Investigation
Design and System

How is design and system related?

To make it clear, we can expect useful tools for on-site designers. The important thing here is that the design comes out of that frame and touching other things, creating the meaning of things for the first time.
The outside environment surrounding the design lies in various fields.
001 3D Projection
002 80/20 Rule
003 Abbe
004 Accessibility
005 Aesthetic-Usability Effect
006 Affordance
007 Alignment
008 Anthropomorphism
009 Apparent Motion
010 Archetypes
011 Area Alignment
012 Attractiveness Bias
013 Baby-Face Bias
014 Back-of-the-Dresser
015 Biophilia Effect
016 Black Effect
017 Blue Effect
018 Cathedral Effect
019 Chunking
020 Classical Conditioning
021 Closure
022 Cognitive Dissonance
023 Common Fate
024 Comparison
025 Confirmation
026 Confirmation Bias
027 Consistency
028 Constancy
029 Constraint
030 Contour Bias
031 Control
032 Convergence
033 Cost-Benefit
034 Crowd Intelligence
035 Defensible Space
036 Depth of Processing
037 Design by Committee
038 Desire Line
039 Development Cycle
040 Dunning-Kruger Effect
<table>
<thead>
<tr>
<th>041 Entry Point</th>
<th>061 Golden Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>042 Errors</td>
<td>062 Good Continuation</td>
</tr>
<tr>
<td>043 Expectation Effect</td>
<td>063 Green Effects</td>
</tr>
<tr>
<td>044 Face-ism Ration</td>
<td>064 Gutenberg Diagram</td>
</tr>
<tr>
<td>045 Factor to Safety</td>
<td>065 Halon’s Razer</td>
</tr>
<tr>
<td>046 Feature Creep</td>
<td>066 Hick’s Law</td>
</tr>
<tr>
<td>047 Feedback Loop</td>
<td>067 Hierarchy</td>
</tr>
<tr>
<td>048 Fibonacci Sequence</td>
<td>068 Hierarchy of Needs</td>
</tr>
<tr>
<td>049 Figure-Ground</td>
<td>069 Highlighting</td>
</tr>
<tr>
<td>050 Fitts’ Law</td>
<td>070 Horror Vacui</td>
</tr>
<tr>
<td>051 Five Hat Racks</td>
<td>071 Hunter-Nurturer Bias</td>
</tr>
<tr>
<td>052 Flexibility Trade-Offs</td>
<td>072 Iconic Representation</td>
</tr>
<tr>
<td>053 Flow</td>
<td>073 IKEA Effect</td>
</tr>
<tr>
<td>054 Forgiveness</td>
<td>074 Inatttentional Blindness</td>
</tr>
<tr>
<td>055 Form Follows Function</td>
<td>075 Interference Effects</td>
</tr>
<tr>
<td>056 Framing</td>
<td>076 Inverted Pyramid</td>
</tr>
<tr>
<td>057 Freeze-Flight-Fight-Forfeit</td>
<td>077 Iteration</td>
</tr>
<tr>
<td>058 Gamification</td>
<td>078 KISS</td>
</tr>
<tr>
<td>059 Garbage In-Garbage Out</td>
<td>079 Low of Pragnanz</td>
</tr>
<tr>
<td>060 Gloss Bias</td>
<td>080 Layering</td>
</tr>
</tbody>
</table>
081 Left-Digit Effect
082 Legibility
083 Life Cycle
084 MAFA Effect
085 Magic Triangle
086 Mapping
087 MAYA
088 Mental Model
089 Mere-Exposure Effect
090 Mimicry
091 Mnemonic Device
092 Modularity
093 Normal Distribution
094 Not Inverted Here
095 Nudge
096 Ockham’s Razer
097 Operant Conditioning
098 Orientation Sensitivity
099 Performance Load
100 Performance vs. Preference

101 Phonetic Symbolism
102 Picture Superiority Effect
103 Priming
104 Progressive Disclosure
105 Propositional Density
106 Prospect-Refuge
107 Prototyping
108 Proximity
109 Readability
110 Reciprocity
111 Recognition Over Recall
112 Red Effect
113 Redundancy
114 Root Cause
115 Rosetta Stone
116 Rule of Thirds
117 Saint-Venant’s Principle
118 Satisficing
119 Savanna Preference
120 Scaling Fallacy
<table>
<thead>
<tr>
<th>121</th>
<th>Scarcity</th>
<th>141</th>
<th>Visibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>122</td>
<td>Selection Bias</td>
<td>142</td>
<td>Visuospatial Resonance</td>
</tr>
<tr>
<td>123</td>
<td>Self-Similarity</td>
<td>143</td>
<td>von Restorff Effect</td>
</tr>
<tr>
<td>124</td>
<td>Serial Position Effect</td>
<td>144</td>
<td>Wabi-Sabi</td>
</tr>
<tr>
<td>125</td>
<td>Shaping</td>
<td>145</td>
<td>Waist-to-Hip Ratio</td>
</tr>
<tr>
<td>126</td>
<td>Signal-to Noise Ratio</td>
<td>146</td>
<td>Way Finding</td>
</tr>
<tr>
<td>127</td>
<td>Similarity</td>
<td>147</td>
<td>Weakest Link</td>
</tr>
<tr>
<td>128</td>
<td>Social Trap</td>
<td>148</td>
<td>White Effect</td>
</tr>
<tr>
<td>129</td>
<td>Stickiness</td>
<td>149</td>
<td>Yellow Effect</td>
</tr>
<tr>
<td>130</td>
<td>Storytelling</td>
<td>150</td>
<td>Zeigarnik Effect</td>
</tr>
<tr>
<td>131</td>
<td>Structural Forms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>132</td>
<td>Sunk Cost Effect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>133</td>
<td>Supernormal Stimulus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>134</td>
<td>Symmetry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>135</td>
<td>Threat Detection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>136</td>
<td>Top-Down Lighting Bias</td>
<td></td>
<td></td>
</tr>
<tr>
<td>137</td>
<td>Uncanny Valley</td>
<td></td>
<td></td>
</tr>
<tr>
<td>138</td>
<td>Uncertainty Principle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>139</td>
<td>Uniform Connectedness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>140</td>
<td>Veblen Effect</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>141</td>
<td>Visibility</td>
</tr>
</tbody>
</table>

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The design rules of 150 shown in here, of course, these are not deterministic, but it seems to be one guideline for solving the various problems encountered when designing.
The task we deal with here is that these **150 design rules do not behave independently**, but are related to each other in some way.

This is the relation matrix. "1" if any two elements are related, and "0" if not related. In general, it is reasonable to associate fuzzy values that take into account the degree of relationship, but here we do not lose generality even if you omit the degree of relationship.

\[
a_i \ R \ a_j = \begin{cases} 
1 & \text{if } a_i \text{ relates } a_j \\
0 & \text{if } a_i \text{ does not relate } a_j 
\end{cases}
\]
This presents the image of the design relation matrix as an undirected graph. In consideration of mutual influence degree, it is also possible to express weight by adding weights to each branch.
The important role of science is to point out the existence of tacit knowledge and turn it into explicit knowledge.

However, this is quite a difficult problem, and there is no concrete methodology.

Normally, it is thought that intuitive things will work in our thinking.

Such things often happen in practice, such as “Strike home” or “Understand well”.

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Certainly, something like an idea that no one can explain suddenly comes to mind.

This is "a new idea" by Perth.

But what does it mean that it is easy to understand when we strike home? If that happens easily, we always want it to be, but unfortunately such things only come from time to time.
Only “Shifting” Emphasizes the Meaning to Make

Perth thinks that what can arise from overlapping, what a leak (missing number) displays, and what deviations are meant to emphasize.

Because contextual circumstances are hidden in “Overlapping” and “Leaking”, the rediscovery will also occur from those gaps.

Logical thinking will try to erase it.

“Shifting” is “Ambiguity”
Problem of Present Age

Currently, we are greatly influenced by efficiency, practical use and utilitarianism which comes from "material reduction theory science versatility" and "business society".

For that reason, it came to encourage that

"to assume that the ambiguity is bad,"
"to avoid unclearness",
"to feel uneasy about the fluctuation",
"to adhere to visible things",
"to think logically and objectively wisely",
"to describe concretely".

These are never wrong, but we have weakened the following aspects.
Again, these are never wrong, but as the bias gets bigger, the **following aspects** are **getting weaker**:

- **To affirm** the ambiguity.
- **Accept obscurity**.
- **Attract fluctuation intentionally**.
- **Seek invisible things**, **make intelligent subjective thinking wiser**, **expressive expressions**.

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I propose **two words** here.

“**Kire**”  
( 깔끔하다 )  
*Sharpness*

“**Koku**”  
( 감칠맛 )  
*Richness Full-body*
From Function to Abduction

From the above, what we need is to understand what is going on, give meaning to it, and *see through* what its essence is. As shown in here, "function" in the *interval* between *intelligence* and *sensitivity* is "relation", it comes from "hypothesis" and flows to "abduction".

Abstractly speaking, the concept of abduction is to attach a "*plausible reason*" to what is happening now.
Abduction does not run Alone

It is not that **abduction** runs alone, "**deduction**" and "**induction**" enter each other, and by repeating the cycle as shown in here, the hypothesis approaches more certain things.

The important role of science is to point out the existence of **tacit knowledge** and turn it into **explicit knowledge**.

For that purpose, we can think that it is gradually converted to explicit knowledge by repeating the inference cycle (creation process) shown in this figure.
Old pond and frog jump into the sound of water
This Basho phrase is a typical example expressing "Koku".
(감칠맛)

오래된 연못이여, 개구리 뛰어드는 물소리 풍당
It is difficult to explain the area of KOKU with KIRE
What is the problem, is *unclear* and *changing*.

The administrator has only a blurred conflicting definition of the problem.

Even with any one problem, there are many times intertwined with other finished problems.
What is the problem of ambiguity?

Since ambiguity comes out in various situations, it is obvious that the assumptions necessary for "rational decision making" are not satisfied. ⇒ limited rationality

The problem of ambiguity is,
► It is not that the real world is understood incompletely,
► There is no better understanding if there is more information,
► It is that the information is useless to solve uncertain understanding.

Ambiguity occurs in the organization and the situation of many behaviors where ambiguity triggers sense making is summarized in 12 features.
Sense making is the process by which human beings give meanings from experience. It is a process of “sensing” and “evaluating” what is not “supposed”, “predicted”, “expecting”. Sense making is applied as a method of awareness in business as well.
<table>
<thead>
<tr>
<th></th>
<th>Features of Ambiguous and Changing Situations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The <strong>nature</strong> of the problem itself is <strong>questioned</strong>.</td>
</tr>
<tr>
<td>2.</td>
<td><strong>Information</strong> (quantity and reliability) is a <strong>problem</strong>.</td>
</tr>
<tr>
<td>3.</td>
<td><strong>Multiple</strong> conflicting interpretations.</td>
</tr>
<tr>
<td>4.</td>
<td>There are <strong>diverse values</strong> and there are <strong>political / emotional conflicts</strong>.</td>
</tr>
<tr>
<td>5.</td>
<td>The <strong>purpose</strong> is <strong>unclear</strong>, or there are <strong>multiple objectives</strong> and they are in <strong>conflict</strong>.</td>
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<tr>
<td>6.</td>
<td>Lack of <strong>time, money, or attention</strong>.</td>
</tr>
<tr>
<td>7.</td>
<td><strong>Contradiction</strong> and <strong>paradox</strong> appear.</td>
</tr>
<tr>
<td>8.</td>
<td>The <strong>roles</strong> are <strong>vague</strong> and the <strong>responsibilities</strong> are <strong>unclear</strong>.</td>
</tr>
<tr>
<td>9.</td>
<td>A <strong>measure of success</strong> is lacking.</td>
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<tr>
<td>10.</td>
<td><strong>Understanding</strong> of causality is <strong>poor</strong>.</td>
</tr>
<tr>
<td>11.</td>
<td><strong>Symbols</strong> and <strong>metaphors</strong> are <strong>used</strong>.</td>
</tr>
<tr>
<td>12.</td>
<td>There is <strong>fluid participation</strong> in <strong>decision making</strong>.</td>
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</tbody>
</table>

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Innovation exists between the humanities and technology.

So, we must always pay attention to this intersection.
A new research area of the innovation will be developed at the intersection of KIRE and KOKU.
In the past scientific research, we have been using the method of “Kire” to solve the problem of “Koku” region. However, there is a limit to that method. So, thinking from both **design** and **system** will be **fine**.

Since the new research area of fuzzy exists at the intersection of “Koku” and “Kire”, it is necessary to positively approach this area from now on.

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SONY Alarm clock TOMATO with radio
¥ 12,000
This product was a big hit! Why 12,000 yen?
Why 12,000 yen?

When we have a factoring 12, it follows: $12 = 2 \times 2 \times 3$

Do you understand this meaning?

Someone people to use the alarm clock? Do not “new employees”, “new college students”, “new married couples” buy this alarm clock with radio for own goods?

Academic (going on to university), New Employment, Marriage, etc., to people who start a new life in the life of the milestone is a "celebration" is inherent.

If a gift, to sell even at high price. If 12,000 yen, even two people, even in three, even four people, division can be easy.
Why would you be able to think such logic?

(감성이 논리를 지원한다)

• It is important that Kansei Supports Logic! → Koku
• Who thought this, they have the following idea.
• They are like to provide fun people.
• They are enjoying its process of the fact that people rejoice.

• It is important that for some products and services, what consumers, how to buy, actually how by using, for what kind satisfy the feel (user of the real image), and are serious about my daily life.
Form and Swallowing of Supplement
The designing method of “the tablet excellent in swallowing” is develop (Asahi Breweries, Ltd.)

The mimetic diagram of a swallowing map

The relation between the form of a tablet and swallowing easy was expressed as shown in a contour map. A designer is referring to this figure and can design the tablet form which is swallowing easily.

Red: Excellent in swallowing
Blue: No excellent in swallowing

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What is most suitable tablet shape for swallowing?
Since medical supplies and a supplement are understood in many cases, without biting, compared with common food, it can be said that the burden of swallowing is heavy. For example, we have a question that are these forms of tablets suitable for swallowing?
All, it is for our customers feel, “delicious”

The definition and the classification were performed for the Kansei image which consumers have sensuiously about “Ease of drinking”, and “Ease of pouring” to evaluation terms of 14, such as a feeling of inflow, a feeling of outflow, and a feeling of fit, in development of a new can container.

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It was extracted as the **physical characteristic** of the can container in connection with "the ease of drinking", and the "ease of pouring."

Those main items are

- **Sound** when **pouring out** beer
- Area of the taste of a can
- Stability when beginning to pour out beer
- Degree of roughness of the surface of the lid of a beer can”, etc.
Based on this valuation modeling, we clarified the physical characteristic of the strong higher rank of the Kansei image about “the ease of drinking”, and “the ease of pouring”, and correlation, and developed the optimal new container.
These products are examples that solve the problem between "Koku" and "Kire" from both sides of them.
Thank you very much for your attention