A work on interface design type for wearable computer

Focused on the uses of the metaphors of the clothes

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Abstract: This paper describes the research on the new interface design types for a wearable computer via the relationship between clothes and information (devices) on the basis of the semantic analysis of design area and clothes from the perspective of interaction with clothing. We divide the metaphor of clothes into behavioral and semantic metaphor; and define the adjustment factor, which is a factor of a behavioral metaphor, as an interface factor of clothes. We classify the interface factor into 17 types so as to identify their relationship with information devices. Based on this and with the operation method being used in two clothes with different usage and various clothes, we propose an interface design example for a wearable computer.

Key Word: Wearable computer, Interface Design, Metaphor of Clothes, Fashion Detail

1. Introduction
Various researches are currently underway focusing on technology, product, and clothes. As a wearable computer will have a closer relationship with a user physically, cognitively and psychologically, multi-perspective approach is required rather than approaching it with a simple logic—a combination of clothes and technology. As the wearable computer gets closer to users, a research focusing activities are essential, but the reality is that such research activities are not sufficient.

The purpose of this research is to propose the interface design types for a wearable computer from the perspective of interaction with clothes rather than functions. From the viewpoint of ‘wear’, the human being wears clothes, not their functions; while from the viewpoint of clothes, the wearable computer adds new functions and actions—‘information manipulation’—to clothes. Therefore, the analysis from the perspective of clothes is very important. In this work, the functional aspect of a product will be analyzed on the basis of existing products, and the behavioral and semantic analysis will be conducted by using the metaphor of clothes to research the interface design types for a wearable computer.

2. Wearable computer
Apparent meaning of a wearable computer is the computer (technology) device being wearable on body (clothes), but it has a more important internal meaning—the close and continuous interaction with the human being. The types of interfaces for a wearable computer (digital ware) under current research are those using detachable devices; those using clothes characteristics and up-date textiles; and those using body characteristics.

3. Metaphor and Interface Factor of Clothes
Clothes play an important role apparently and internally in design of a wearable computer, and they are of great significance in interaction with users due to its closeness to a human body.

3.1 Metaphor of Clothes
In this research, the metaphor of clothes is defined as a behavioral and semantic icon that clothes have in connection with the design of wearable computer. The metaphor of clothes is generally divided into a behavioral metaphor related to the action of putting on and off clothes, and a semantic (symbolic) metaphor related to the meaning and status of clothes. It can be further divided into behavioral, semantic, and behavioral + semantic metaphor.

Figure 1. Goal and Scope of Research

1. Apply Fashion Detail as Interface factor that controls information
2. Reanalysis of Semantic relationship between clothes and information

Figure 2. Definition of Clothes Metaphor

3.2 Interface Factor of Clothes
To define the interface factor of clothes in regard to a behavioral metaphor, we generally divide the clothes handling behaviors into two types. The primary behavior is the action of putting on and off clothing elements such as coat, trousers and hat. The secondary behavior is a concrete user action to manipulate the clothing elements put on a body. The secondary behavior includes the factors required to arrange clothes such as buttons, zippers and Velcro during manipulation, and those factors are defined as adjustment factors. Since the adjustment factors of clothes are used to arrange clothes via an intentional manipulation
behavior, it can be interpreted as a contact point between a user and clothes. Therefore, in this research the adjustment factors are defined as the interface factor of clothes that incorporate manipulation actions.

From the viewpoint of an interface, we have classified the interface factors into 17 types according to characteristics of operation and utilizing method.

### Table 1. Interface Factors of Clothes – TYPE2 [ZIPPER]

<table>
<thead>
<tr>
<th>Control Type</th>
<th>Information Device</th>
<th>Clothes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select Type</td>
<td>Push, Lever, Rocker</td>
<td>Snap, Clip, Button</td>
</tr>
<tr>
<td>Complex Type</td>
<td>Push-Pull + Rotary</td>
<td>Snap + Zipper</td>
</tr>
<tr>
<td>Continuation Type</td>
<td>Rotary, Slide</td>
<td>Zipper, String</td>
</tr>
</tbody>
</table>

4. Experiments
Assuming, on the basis on the study result, that the utilizations differ depending on the usage and context of clothes, the cases are to be prepared where the interface factors of clothes can be utilized.

Prototype 1. Formal Suit for man
Prototype 2. Snowboard Wear
Prototype 3. Mountain Wear
Prototype 4. Audio Player Vest

5. Conclusions and Future work
The wearable computer requires approaches from various perspectives of technology and design since its area is still wide open for research and development. This research, on the basis of analysis of clothes metaphor and the interface factors of clothes, aimed to interpret the wearable computer from the perspective of interface and propose its prototype. In addition, the design of interface using the long-educated metaphor of clothes will be of great help to the users who will use a new type of product, a wearable computer.

The analysis of interface with clothes and prototype proposed by this study is based on concept. A profound study on re-interpretation of the semantic relationship from the perspective of integration of clothes and information devices should be followed, using the behavioral metaphor based on the definitions and types of the interface factors of clothes.

References