Clothes Recommend Themselves:
A New Approach to a Fashion Coordinate Support System

Mio Fukuda*, Yoshio Nakatani**

Abstract— **Fashion coordination is one of the self-expressions, and choosing clothes is daily enjoyment. In choosing clothes, people consider various kinds of factors. Therefore, we are worried about what to wear every morning. This paper concerns research on "Talking Closet" system that helps in coordination of your everyday fashion. It involves fashion coordination via the "Clothes communicating, and making fashion proposals" when clothes in your hand in front of the closet in making the act of choosing clothes when the system is used more enjoyable. Experiments took place with subjects and the feel of the operation and significance of the system verified.**

Index Terms— **fashion coordination, recommendation system, feeling, IC tag ,multi-agent system**

I. INTRODUCTION

Nowadays fashion not only involves clothing but is also used in a broader sense. For example, fashion is involved in a lot of things of our lives, including hairstyles, footwear, makeup, recreation, housing, ways of thinking, food, art, and so on. Fashion can reflect the age, society, and lifestyle modifications with reality. In addition, fashion is now used to emphasize self-expression a lot more than ever before. Fashion is now also focusing on tools that can use one's own sensibility and intellect. Moreover, when you put on your favorite clothes you can improve the way you feel, or by putting on clothes that differ what from you always wear, too. Choosing clothes to put on can help you in recognizing your own possibilities and can be a form of control, both also quite significant matters.

The variety of fashion is extremely diverse throughout the world, with the combinations being basically infinite. People's choice of fashion is in reality, however, influenced by the cost, trends, culture, society, and religion, etc. Making that choice can involve internal communication and enrich your self-awareness, being based on fresh discoveries and failures. However, it can also involve psychological stress for some people now. People nowadays can find it difficult to find the time to coordinate their fashion within a limited time in the morning and when they need to take into consideration the various abovementioned elements. Moreover, a vicious

*. Graduate School of Science and Engineering,
Ritsumeikan University,Shiga,Japan.
(e-mail: cc010072@ed.ritsumei.ac.jp)
**. College of Information Science and Engineering
Ritsumeikan University,Shiga, Japan.
(e-mail:nakatani@is.ritsumei.ac.jp)

circle can occur in that case the onus of your fashion coordination can ever increase, along with the conditions that should be considered if the target situation is important, thus making it impossible to determine very easily. Young people also generally don't have many clothes, thus making it even more difficult to coordinate new styles of clothing.

This study therefore proposes an unprecedented system wherein the coordination of clothing is assisted through quasi-interactions of the clothing and guidelines from past experiences in solving the abovementioned problems, being intended for use in assisting with coordination of clothing.

II. ASSOCIATED STUDY

An extremely large number of fashion coordination support systems have taken place to date.

This research was first directed to a system and method of providing a virtual fashion closet [1]. The system coordinates clothing by combining two or more fashion items via a Virtual Closet on a computer. In some embodiments the Virtual Closet system can recommend outfits based on the weather, season, or the user's calendar. In addition, a Virtual Closet social network site can be made available. The Virtual Closet social network can be used to allow friends to view each other's Virtual Closets, recommend outfits to one another, recommend fashion items to buy, recommend fashion items to get rid of, recommend outfits to wear at a particular event, share and borrow each other's fashion items, or otherwise provide an appropriate social networking environment via the Virtual Closet.
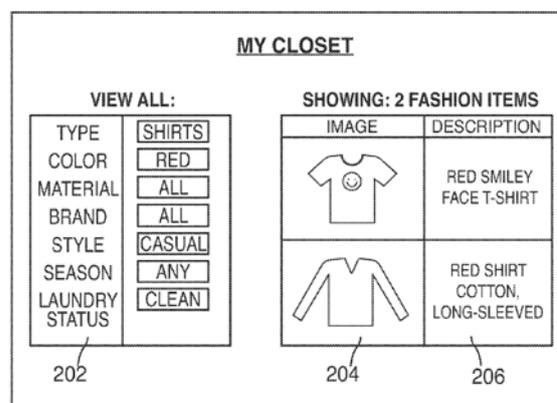

Fig.1. Illustration of fashion items displayed

This research then involves garments being presented to the user via a computer and a database of garments, wherein the

database of garments includes parameters for at least some of the garments represented by records in that database, with the parameters including at least the type of garment, data on any plurality of garment types, on each type of plurality of garments, a set of tolerance ranges for that garment type, the user's measurements, as obtained from the consumer or a source derived from the consumer, the measurements of garments in the database, comparing the user's measurements to the garment measurements, giving the garments a score from the database of garments based on their measurements, the user's measurements and a set of tolerance ranges for each garment based on its type, and the presentation to the user with a computer generated filtered list of garments from the database in order, or at least approximately, according to those scores. [2].

However, the act of choosing clothes while considering the computer system gives the user the interval separated from daily life, and it doesn't become the one to look forward to coordination though these existing fashion coordination support systems are convenient to support the acquisition of the dissemination and the skill for the user to choose clothes. There is also a psychological sense of resistance to accepting fashion coordination that a system has one-sidedly decided upon. The user making their own choice is necessary, and, if possible, the act of doing so enjoyable. It is necessary to achieve a process wherein the system enables a situation in which clothes are chosen very naturally in daily life in ensuring that the user is not psychologically affected by the system, with no resulting burden and the person making the final decision. This approach therefore involves each of the individual clothing plugging itself to the person.

III. OUTLINE OF SYSTEM

This system supports the user making judgments in real time and interactively by each of the clothes wishing to be selected and based on variety of knowledge concerning fashion coordination and its own particular features, past history of being worn, and the day's schedule, etc.

A. Operational procedure

Figure 2 shows the system configuration. The user first registers their feelings and purposes of the day into the system. The registration of feelings is achieved by choosing a color from a palette. The user then needs to stand in front of the closet. At this time the clothes that best matches the chosen color image and purpose insist that they be chosen because of their uniqueness. It also starts to insist that it be chosen, if the different clothing is touch. The user therefore needs to feel, after having picked some specific clothing, gratitude for choosing the clothing. At this point, and if the user has selected the top clothes the clothing at the bottom start to insist from the viewpoint of compatibility with the top. Finally, the user makes a decision that is based on the insistence of the various clothing. The coordination then finally decided upon is then stored in the data base with information input that includes the date and the purpose, etc. (Fig.2)
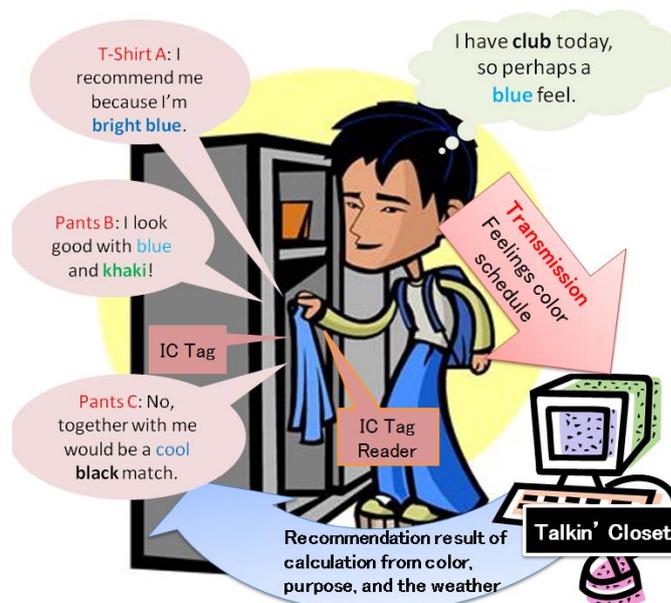
Fig.2. Image of system utilization

B. System configuration

Figure 3 shows the system configuration.
The temperature on the day acquired from the data base from the associating feeling and color, the user's schedule, and the Internet for the clothing data base and coordination knowledge database and weather information etc. were all used. A template must be referred to from the conversational data base for the content of what the clothes insists.
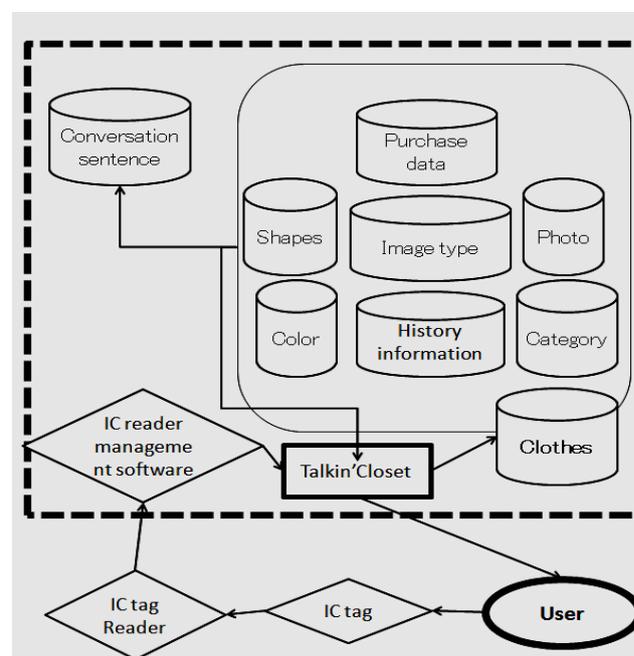
Fig.3. System configuration chart

A. Recommendation algorithm

First any candidate clothing from the color and purpose of the feeling input by the user are selected from the data base. The candidates from the color based on the same and the contrast of hue and the tone include three color choices that match the color of the input feeling clothing or input feeling. Moreover, the color image is considered by defining using 14 image words. The one that the color image is corresponding to the image of clothes is made a candidate. (Fig.4). The attribute of clothes that is appropriate for the schedule on the day is chosen from the purpose (It is pants and T-shirt in case of sports. / If it is an announcement, the blouse and skirt, etc.). The features of clothing that is touched when first being decided upon (color, image, and attribute) are then analyzed, and candidates selected by it that have been frequently touched given priority, and are then recommended by the system from candidates selected by the user in past recommendation situations. When the first clothes are decided, the clothes appropriate for the purpose are recommended as a candidate.

The self-recommendation from clothes is output by the voice, and the content is elected from the conversation template according to the condition of arriving at the candidate.
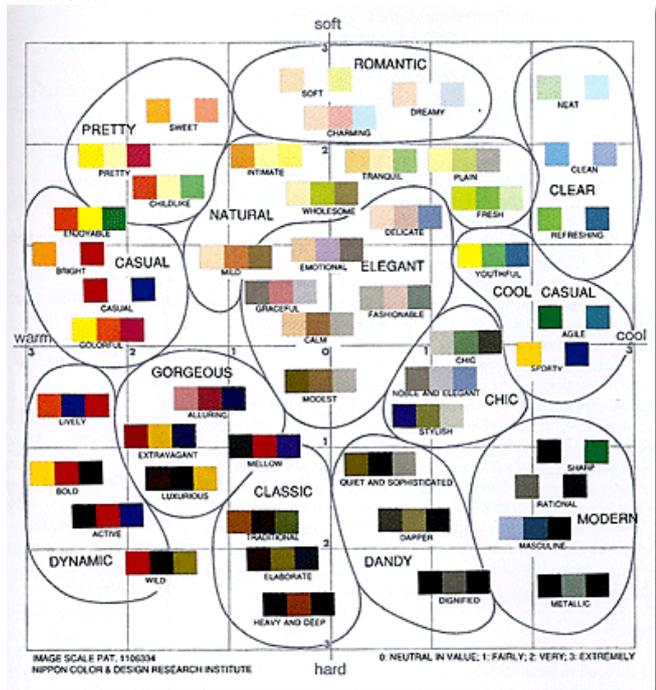
Fig.4. Color image scale [5]

B. Mounting tool

Figure 5 shows IC tag and IC tag Reader. The user has an IC tag reader strapped to his hand. Specified clothing is then recognized by the IC tag on the pertinent hanger. The IC tag reader of "Yubitan" of AP-REFINE INC. Co. and key ring type IC tags of WATADA PRINTING CO., LTD were used.

The clothing was thereby identified with that equipment and the clothes "Touched" in daily life recognized, and cooperation within the system thus achieved. The intention to equip with the reader in hand mentioned is that this device is available to use in a wide area, not just the closet. In addition, the shape of clothes is not ruined by adding the IC tag that is not added directly to clothes it set in suspenders and individual information can be prevented from leaking. The

aim with the system was to create an enjoyable feeling after having chosen some clothing, thus making communication important. The data was managed by a terminal PC. A prototype system for trial purposes was constructed using Java on a Windows PC.

Fig.5. IC tag and IC tag Reader

IV. PROTOTYPE SYSTEM

Because the system was made for trial purposes this time registers author's wardrobe was used, ten kinds of colors that are appropriate for the college woman were able to be set into the color palette, and to select a target item from six. The screen was divided into three fields, from the left being the input field, the candidate display field, and a detailed information display field. Six or less pieces of candidate clothing are displayed on the screen in the center once the user has specified a color and purpose (Fig.6). The process can be restarted again by pushing the lower right UP button if there are no suitable clothes. Clothes that are touched start self-insistence when they are displayed in the center, and detailed information on the clothes displayed in the detailed information field on the screen. The user listens to the insistence of clothes to which a voice has been output, and thus can visually decide upon the clothing. Clicking the FIX button at the bottom of the detailed information field stops it. Once the top half of your clothes have been decided upon, the bottom suitable for the top is elected a candidate field. However, it becomes a coordination decision at that time when it is chosen. In the same way the coordination is completed by deciding upon the second set of clothes, the combination, date and input information are registered in the data base, and it is reflected in the future (Fig.7).

V. EVALUATION AND CONSIDERATION

The utility of the system was evaluated via experiments and a questionnaire. Author's 38 clothes were used for ten college women and the system was used. The operation and significance of the system were then considered using the results.

A. Evaluation result

With operability the answer "It was easy to use" was received from all the experimental subjects and the opinion that using it was enjoyable was also received.

The answer "Would use it once it is put to practical use" was received from all the experimental subjects with regard to its significance. However, there were many that answered, although not by all members, that they "Used it every day", but found it "Embarrassing" or "Had no time", etc. In addition, the act of coordinating clothing can be understood and demand high with anyone who finds coordinating their clothes every day annoying but understands the system, and

thus happy with it. In addition, the opinion of "The lack of hesitation can be recommended with anyone not confident about their fashion sense" was also obtained.

B. Consideration

The direction of the system will not be changed because of the above-mentioned results in the future, and the aim of a system that can be naturally operated in choosing clothing and an interface pursued. Moreover, it turned out that "The interested parties would be both men and women who are insecure about their fashion sense", which is a significant result.

The following views will be achieved to assume it to the system that specializes in the user or more in the future.

1) Creation of user's preference learning function
2) Introduction of trends
3) changed into the multi agent.

Moreover, to correspond to a more complex condition, the enhancement of the following functions is aimed at.

4) Diversification of retrieval function (expansion of weather information and vital information, addition of priority, figures, and consideration of balance)

5) Recommendation routine made perpetual (increase in volume of data and variation in the conversations).

6) Increase in number of combinations (heavier clothing, accessories, and shoes)

VI. POSTSCRIPT

This paper proposed a system that supports fashion coordination in everyday life, used it for trial purposes, and then evaluated it. The system involved research and development with the aim at creating it and thus supporting fashion coordination in an original, enjoyable way. Experiments involving a prototype system and subjects revealed its significance.

Now, to clear above-mentioned problems, the research is advanced, and the inducement of the action is enabled by analyzing the user's behavior and doing modeling and it will develop with the system where the fashion coordination is felt happier in the future.

REFERENCES

[1] C.Kim Cho, Monica T and Stanley Carl Ng on SYSTEMS AND METHODS FOR PROVIDING A VIRTUAL FASHION CLOSET, USPTO Patent Application 20100191770, 2010.
[2] W. Louise and Lambert, J P on COMPUTER SYSTEM FOR RULE-BASED CLOTHING MATCHING AND FILTERING CONSIDERING FIT RULES AND FASHION RULES, United States Patent Application 20100023421, 2010.
[3] S Nishi, Toshiaki S, Yasushi H, Shoji K and Kenji M," Design and Development of the Textile Fashion Coordination System--- a communication aid for the customer and the salesclerk in real shop ---", CollabTech, 2008
[4] WATADA PRINTING CO., LTD.
[5] AP-REFINE INC. Co.
[6] Mary Lou Andre:Ready To Wear: An Expert's Guide to Choosing and Using Your Wardrobe, 2004,p180-p198
[7] Color Image Scale with RGB Values.
http://blogs.veracitysolutions.com/tag/rgb/ (accessed May 27, 2011)

Fig.6. Screen displaying candidate clothes

Fig.7. Screen displaying coordination decisions