Vesti-AmI: The Intelligent Wardrobe

Alexandra Plexousaki[1], **Maria Korozi**[1], **Asterios Leonidis**[1#], **Vassilis Kouroumalis**[1], **Emmanouil Stamatakis**[1], **Nikos Stivaktakis**[1], **Theodoros Evdaimon**[1], **Antonis Katzourakis**[1], and **Constantine Stephanidis** [1,2]

[1]Institute of Computer Science, Foundation for Research and Technology – Hellas (FORTH), Heraklion, Crete, Greece

[2]University of Crete, Department of Computer Science Heraklion, Crete, Greece

Presenting & Corresponding author: Asterios Leonidis, email: leonidis@ics.forth.gr

ABSTRACT

The selection of clothes and accessories is part of the daily routine of individuals [1]; however, it is not a straightforward process for people with large inventories or limited time, while it is a challenging task for user with disabilities. In the recent past, the Internet-of-Things (IoT) and Ambient Intelligence (AmI) have been enhancing the domestic environment with new connected devices, appliances, and smart furniture, aspiring to assist independent living [2]. Building upon these developments, this work proposes Vesti-AmI; an intelligent wardrobe which, in cooperation with the existing technological infrastructure of the Intelligent Home, aims to assist people in getting ready for their various activities in a context-sensitive, user-friendly and intelligent manner. With respect to the target audience, the facilities of Vesti-AmI are foreseen to accommodate a wide variety of users, including adults, children, elderly people, and people with disabilities. Indicatively, Vesti-AmI permits end-users to: (i) browse clothing items manually or digitally, (ii) preview their choices on a Smart Mirror, (iii) retrieve and store clothing items (semi-)automatically, (iv) get outfit recommendations based on contextual information, and (v) keep their garments odor-, mold-, moisture-, and moth-free with the help of appropriate sensors and actuators that monitor the interior of the wardrobe.

Vesti-AmI features a full-height hanging space appropriate for storing clothing like shirts or skirts, but also longer garments such as dresses. An electrically-powered closet rod automatically raises and lowers the clothes so as to bring them closer to the user, while a sophisticated mechanism permits the system to identify each hanging item and present it to the user upon request. The next two compartments contain shelves and drawers in order to provide organized storage solutions for folded clothes and accessories, and a custom-made in-closet steamer that permits users to freshen up their clothes. Sophisticated mechanisms permit the shelves and drawers to move in a vertical fashion (like a carousel), making the stored items easily accessible. Additionally, cameras hidden on the top of each drawer and shelf permit Vesti-AmI to be aware of their contents, while light and sound cues in combination with vibration feedback are employed to assist users (especially blind or visually challenged individuals) to locate the required items inside the wardrobe. In order to maximize time efficiency, an embedded "Smart Mirror" allows users to virtually try their clothes on in an immersive way.

Vesti-AmI promotes multimodal interaction that includes touch interaction, air gestures and voice interaction, which can be used complementary to support all users (including those with disabilities). For example, voice interaction can be used by blind or visually challenged users to ask for certain items, while motion-based interaction and gestures can enable users to naturally select the outfit they wish to try on the "Smart Mirror".

REFERENCES

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