

Health System – Rehabilitation 2026

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Abstract

The concept paper at hand explains a vision of a revolutionary health system that is able to improve peoples' lives concerning short term as well as long term conditions. This health system consists of an array of different technical developments that support people physically and guide them towards a more health-conscious life and rehabilitation. Our medic vision has been anticipated in a short video demonstrating the functionality of the new system in typical application scenarios.

1 Introduction

Our goal was to develop a system that is capable of aiding injured or physically affected people in a way that allows them to feel as if they were healthy. The healthcare system we developed consists of “wearables”, i.e., clothing that support peoples' muscles. Further, we employ a holographic system that displays different kinds of medical information to the user. Therefore special glasses are used, which are able to augment the person's view with virtual information overlays (Pedersen & Trueman 2013). The whole system can be used at home as well as in public places which will support the system by providing special display regions in combination with other interaction possibilities.

The general innovations are described in section 2.1, while section 2.2 will provide an example scenario.

2 Concept

The general concept is to provide a holistic system based on supportive clothes, glasses and the collaboration with public places, supporting the user in his daily life by providing information, suggesting activities or aiding the user to live more health-conscious or even support him during training or rehabilitation. Therefore, our medical vision consists of hardware, as well as software parts (see Image 1), which receive and trigger data to the actual wearable.

2.1 Innovations

The first innovation we introduce is a new kind of clothing that reinforces peoples' bodies (i.e., muscles) and supports the movements when worn by adding strength to the muscles or allowing greater flexibility. This way, for instance, people not being able to walk properly could be taught to walk, using so called "technical trousers". Other supportive clothes like gloves, shirts and shoes are also possible. The idea for the supportive clothes is based on the design of a human exoskeleton (Miatliuk & Siemieniako2011).

The second innovation our system introduces is some form of AR (Augmented Reality) (Azuma 2004). For this, we employ holographic information that is shown to the user and with which the user can also interact. That holographic information can be seen as tables, elements but might also be an avatar explaining something to the user. The health system covers three different kinds of information. The first aspect is about the personal health progress, i.e. the status of rehabilitation or suggestions for training; the second is a nutrition advice for a health-conscious nutrition and the third part of the system deals with the technical aspects, i.e. the status of "technical trousers". Therefore it is possible to plan the whole rehab program at home, without the need to stay at a rehabilitation institute for some weeks as usual. For example, an injured person could make a self-made plan and get advices and helpful information from the system to rehabilitate from an injury and control the personal progress.

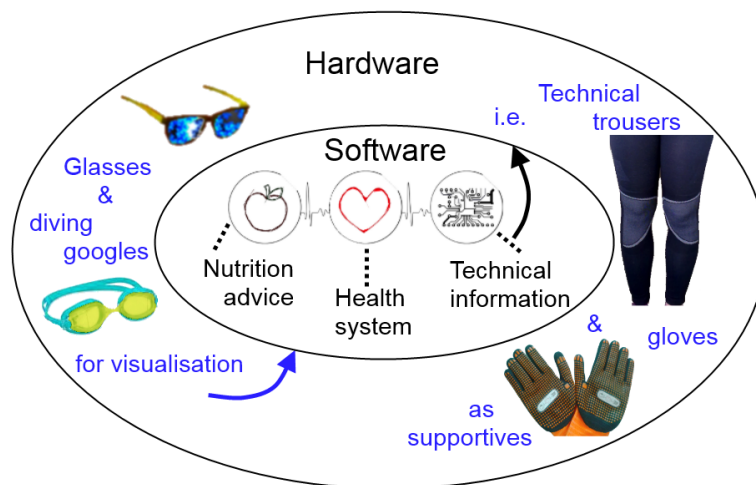


Image 1: The health system covers different hardware and software aspects.

The system also is cooperative in a way that one can train or compete with other persons who are doing the same exercises. This will support the social life of those who are willing to use such a feature.

2.2 Example Scenarios

The following example scenarios are meant to show when the health system could be used.

Imagine a person who was involved in an accident and therefore needs to learn to walk again. The responsible doctor may then prescribe some technical trousers that in addition to our health system allow the person to walk and even to swim in order to assist the rehabilitation and training process. The trousers will support the muscles in order to disburden the injured bone or muscle until he or she will not need those trousers anymore. This will help the person to live a normal life although he is affected nowadays.

Another scenario for the use of supportive clothes could be a watchmaker who suffers from Parkinson's disease. Today, he would not be able to continue his job, but with the help of such clothes, the shaking of his hands and body could be controlled and curbed.

In addition to the supportive clothes, users have a control system located inside some glasses. These glasses will provide digital avatars as a hologram, or rather inject digital information into the actual view of the user. Moreover, information like heart rate or burned calories can be displayed. The system also supports the planning of sports, activities and a nutrition guide to aid the rehabilitating person. The user can control the system using simple natural and intuitive gestures, with which he is able to interact with the holographic elements displayed in the air in front of him. Reasonable gestures in this context are swipe, drag, twist & turn as well as push, which the user will execute in mid-air in front of him.

As shown in Figure 2, the left side shows how a user could start the system using a dragging gesture. On the right side it is shown how the visualization could look like. Here, the health system is giving suggestions about useful medical training alternatives, which can be browsed using a swiping gesture. By pushing on one of the other symbols (apple or control) the other parts of the health system would be displayed.



Image 2: Gestural interaction and visualization of the health system

The health system can be also used in different environments, like swimming pools or other public places, which support the system by providing mini games, tasks which can be loaded into the system by interacting with special display regions, or additional information about a place. When looking at such a region every person would see different information according to his status and plan. By touching the virtual items in those regions the user might load the data, games or tasks into his personal system or may watch videos or instructions directly on that region.

At the end of the day the injured person described above is able to check whether he made progress that particular day or even during the past days or weeks. The system is capable to suggest the training for the next day or the meals which the person should eat to optimally support the training.

3 Summary

The health system we envisioned paints a better picture for peoples' lives in the future. It aims at aiding physically as well as mentally by allowing injured people to recover and by helping healthy people to live a more health-conscious life. Due to the natural and intuitive controlling everybody should be able to use the system without a long period of training.

This combination of natural user interfaces and technical innovations, i.e. supportive clothes, is capable of aiding harmed persons in a way that they can live a normal life. We hope that the interaction between human and computer can be used in such a beneficial way sometime.

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