C. GEORGOULAS, T. LINNER, T. BOCK. ***Vision controlled robotic furniture system.*** *Gerontechnology 2012;11(2):370;* doi:10.4017/gt.2012.11.02.622.00 **Purpose** Ergonomics is the engineering science that is concerned with the physical and psychological relationship between machines and the people who use them. The key is to get the best out of something with the smallest possible effort. In ergonomics function is as important as aesthetics. Ergonomics is concerned with the creation of a product or an environment, where the connection between human skills and the surroundings is optimized. The aim of the proposed paper is the implementation of an ergonomic furniture system concentrating on height adjustments in particular. **Method** Furniture is designed to adapt to specific needs, supporting various human activities. According to the application, a set of guidelines or rules is followed during design in order to provide ergonomic features. Small or large sized furniture can be found within the household, comprising individual modules, placed at a specific height, based upon the desired functionality[1]. In order to realize the proposed concept, a development approach was followed. First, thorough research was conducted to identify the actual need of such a system and define the appropriate design specifications. According to the various existing technologies and processes, the authors identified those that met the design requirements, and those better adapted to the proposed system. Once the initial concept was finalized, a series of experiments were carried out in a real environment, implementing the prototype of the proposed system (*Figure 1*). **Results & Discussion** The proposed robotic furniture system provides an integrated solution, consisting of reduced space utilization, modularity, and intelligent operation, while respecting ergonomic principles. A set of electrical motors was used to position the various sections of the system at the correct height level, and to displace them on the horizontal axis to allow a rotational motion path. The implemented prototype (*Figure 1*, top right) was evaluated in terms of ergonomics (using an age simulation suite), organizational ergonomics within a room, and space utilization (as the individual sections/shelves can rotate in a vertical direction, the proposed system can be installed in small rooms, achieving 20% space utilization efficiency providing more space for mobility with walking frames or wheelchairs). A vision system was integrated into the prototype to perform object recognition—for efficient classification of objects stored into the various system sections, for assistance in retrieving a specific previously stored object by moving the appropriate section of the furniture up or down to the correct height [2]. The real-time response of the vision system, efficiently addresses the need for a short time delay between user queries and system response. The robotic furniture system also serves as a lift, a seat, or a working place for elderly people, i.e. it efficiently applies ergonomics to issues in the living environment of the ageing society. Fusing functions and services such as infotainment or internet connectivity, also provides extended functionality to the user. Many everyday activities can be dealt with a more efficiently from a single terminal.

Figure 1. Concept and prototype

References

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