

## Virtual actors for a patient oriented virtual hospital

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### 1. Introduction

A virtual hospital is realized as an interactive information system based on a 3D- model of a real hospital. In preparation for a future stay, a patient can visit the location, where later a therapy may take place, and get a first impression or look at the data in his electronic patient record, as described in [1]. To be able to experience an almost realistic impression of the real healthcare process, it is also necessary to offer the patient the possibility to see and interact with doctors, nurses, administration personnel and also other patients in the virtual hospital. The authors present a system of virtual actors that can be used to fill the wards and stations with virtual life. One special purpose for employing virtual actors is the simulation of diagnostic or therapeutic treatment. For example, to present an orthopaedic diagnosis, a virtual doctor can take the leg of a virtual patient and make a reflex test with a rubber hammer.

### 2. Methods

The virtual actors are based on a simplified hierarchical skeleton model consisting of bones and joints. The body parts are moved using an inverse kinematics algorithm that is based on non-linear optimisation. By representing the hierarchical transformations in the skeleton model as a neural network the algorithm can be reduced to a standard learning algorithm for feed forward neural networks. The virtual actors can also be animated using predefined motion data such as captured data from real actors.

### 3. Results

A prototype of the system has been realized. It is possible to show animated virtual actors, and interact with them. Several examination scenes have been modelled and can be used to demonstrate the procedures to a patient.

### 4. Conclusions

The virtual hospital is intended to be an information system to provide all information related to healthcare. 3D visualization, animation and interaction techniques can be employed to give the user a realistic impression of healthcare processes. The presented virtual actors are an important component to make the visit to the virtual hospital not only an impressive experience, but also to provide the patient with appropriate information and demonstrations of diagnostic and therapeutic procedures.

### References

[1] S. Märkle, K. Köchy, R. Tschirley, H. U. Lemke. The PREPaRe system - Patient Oriented Access to the "Personal Electronic Medical Record". In: Proc. of CARS 2001, pp. 849-854.