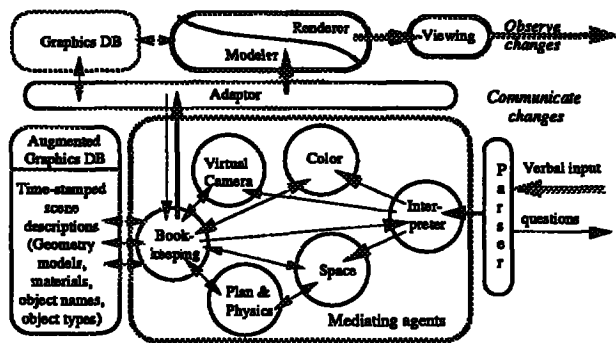


## VIENA: A Multiagent Interface to a Virtual Environment

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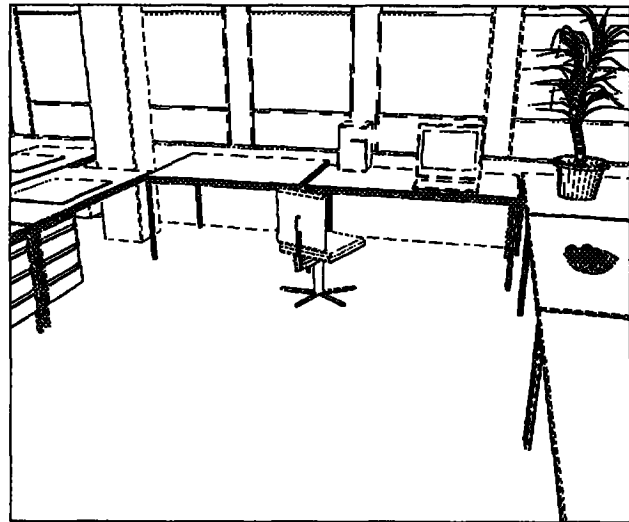
### The VIENA Project

Started 1993, VIENA is a project in a new research focus theme of "Artificial Intelligence and Computer Graphics" at the University of Bielefeld. The overall goal is to enable an intelligent communication with a virtual environment, in order to relieve the user from technical detail. Instead of using the mouse and menus to manipulate objects in a virtual scene we employ a multiagent interface which mediates qualitative verbal instructions by translating them to quantitative commands that are used to update the visualization scene model.



### Multiagent Mediator System

For the interaction with 3D graphical scenes, different tasks are distributed among specialized agents. For example, a bookkeeping agent has access to an augmented scene data base to supply current situation information to agents on request. A space agent translates qualitative relations such as 'left of' to appropriate scene coordinates. Agents cooperate to offer a goal scene corresponding to a user's inquiry. The offer can be changed in further interaction, that is, the user can negotiate the computed semantics of instructions. A MACE-type agent framework was developed which combines "contract-net", "master-slave", and "blackboard" cooperation models.



### Example Application

The VIENA agent system is tested in a prototype scenario from interior design (cp. figure above). Various items of furniture as well as color and light impressions of a virtual office room can be changed interactively. The system accounts for implicit assumptions of the human when manipulating such an environment; physical laws are reconstructed to avoid collisions of solid objects in the virtual world; cognitive factors of space are recognized when converting verbal instructions to scene alterations.

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**Reference.** Wachsmuth, I., and Cao, Y. 1995. Interactive graphics design with situated agents. In Stras-ser, W., and Wahl, F., eds., *Graphics and Robotics*. Springer. 73-85.