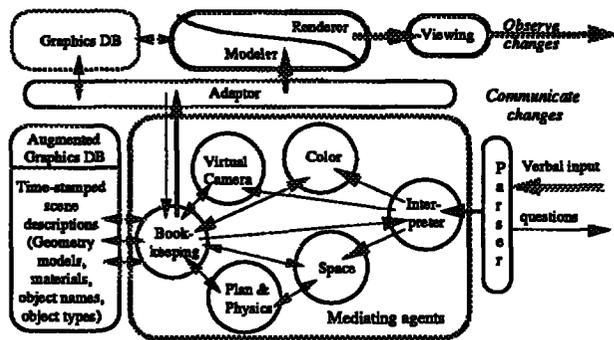


VIENA: A Multiagent Interface to a Virtual Environment

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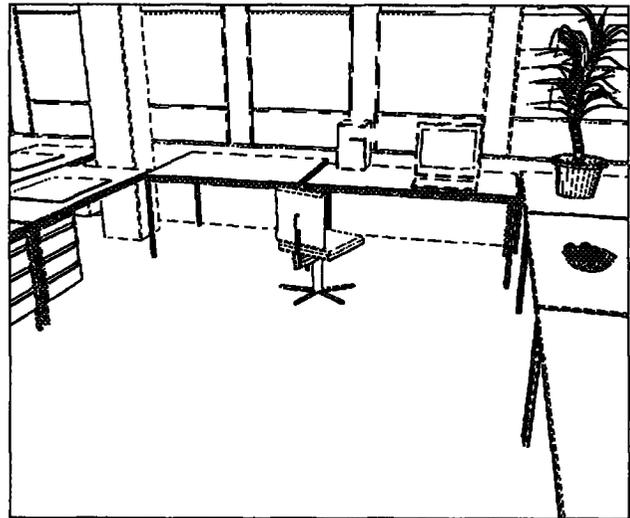
The VIENA Project

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 "black-board" 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.