Home Improvement Assistant

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CS 490G
The power of visualization

- Tired of wandering through IKEA or Home Depot, carefully measuring items to see how they will fit in your home?
- Imagine a visit to the store with only a memory card full of photos in hand, and leaving with the perfect upgrades for your home...
How many times have you come into this room and wondered, “Why doesn’t CS101 have a big screen TV?”
Welcome to HIA

♦ Wonder no longer!
♦ Drag and drop your photos into HIA and quickly begin to place new items in your home
♦ Quickly visualize your home’s new look and feel
♦ Rearrange until satisfied!
HIA at work
Others have tried

Other software packages are based on the time-consuming approach of building 3D re-creations of your home and then adding new things.

All are aimed for home users, and have features such as “easy kitchen builder wizard”, and an “easy to use tabbed interface.”

None feature the innovative photo-based approach taken by HIA
How does HIA work?

♦ You click on four points in the corner of your room
♦ A 3D frame of reference is established based on these points
♦ After final adjustments, it is perfectly aligned with your image, and ready for home improvement!
Main Components of HIA

- Alignment
- Object dynamics
  - Placement, orientation, movement
- Scene/Object management

Let’s start with the first component, Alignment
What just happened?

- Alignment
- 2D photos have no depth information
- HIA works on the assumption that the walls forming the corner of your room are at 90° angles
Utilizing this assumption, depth values for each of the four user-provided points can be selected, such that the points become 3D vectors forming an orthogonal set of axes.
Time to add to your room

♦ When you are ready to add objects to a room, just select the object you want by pressing its button in the GUI

♦ Click the point you want to place it on in the scene

♦ Drag and drop until it is just the way you like it
Moving Objects

- HIA calculates the vector made by the point you click on, and the position of the camera.
- This vector is intersected with the floor plane, giving the exact point under the mouse.
- This way objects move along the floor smoothly.
HIA works by maintaining a list of every photo you have loaded into it, and the data associated with each photo.

This data includes modelview matrices, alignment information, and scaling information.

There is also a detailed list of each object that has been added to a room, and information such as location and orientation.
Efficient Design

- When it is time for HIA to actually render each scene, its design allows for easy access to necessary scene information.
How HIA generates what you see
Object Manipulation

- What if your new chair is facing the wrong way?
- Use the object manipulation tool to rotate and scale your objects once they are in position
What an improvement!

- Compare the original images to the new and improved room!
Questions?