DesignAR

Real-time Augmented Reality Interior Design

Team DesignAR

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High level goals

- AR system for interior design and architecture
- Interactive, real time furniture layout design
- Real time prototyping of proposed designs for clients
- Allow users to experiment with room configurations

Overview of system design

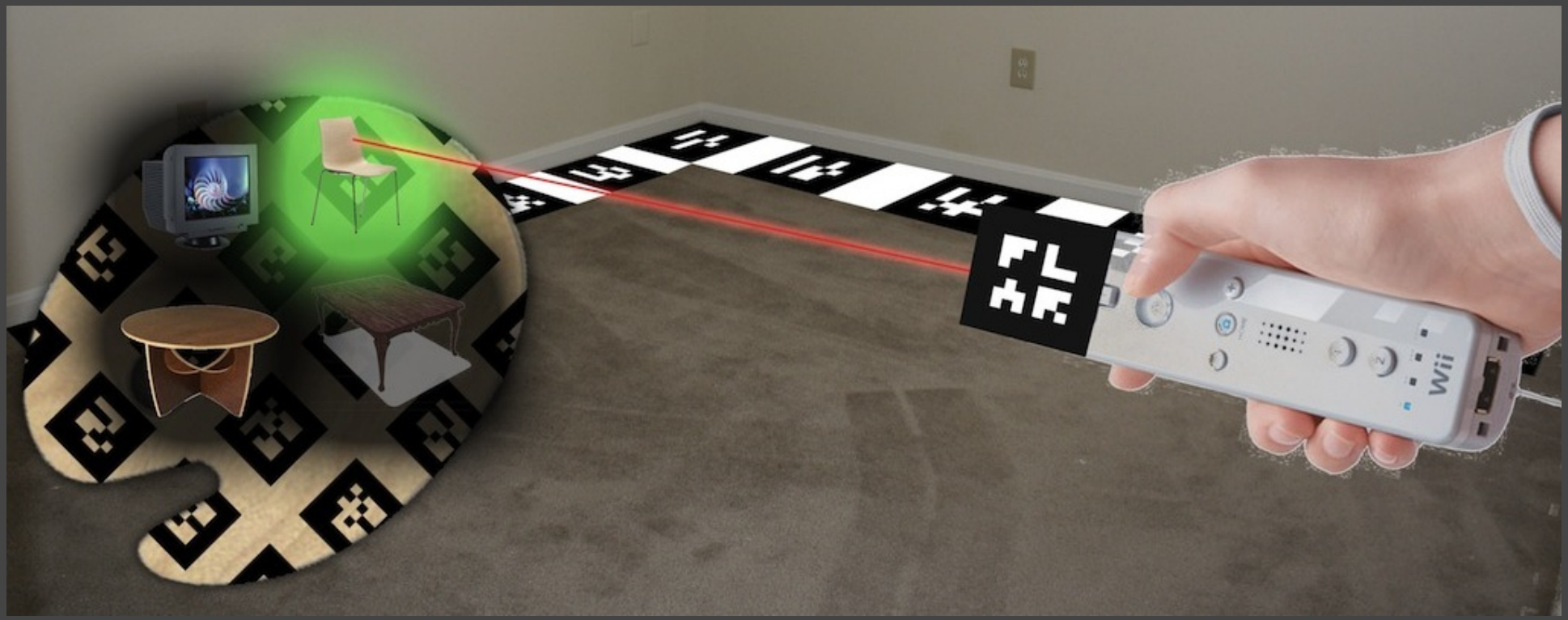
- Palette displays a catalog of furniture and room items
- Item can be placed in room with a virtual pointer (wand)
- Floor and palette are tracked using Markers

Interaction Techniques

Selection, Manipulation, Travel, Wayfinding

Selection

- Selection of items in catalog using a ray cast from wand
- Selection of items in room in similar fashion



Manipulation

- Placement of items from catalog in room using pointing of wand to place
- Snapping of ray to discrete positions in the environment
- Rotation via buttons on wand

The chair is snapping to the ground

Travel

- Travel involves the user physically walking around the room to evaluate it as he/she makes changes using DesignAR or to make changes to the virtual items

Wayfinding

- Virtual grid overlaid on floor to help with positioning of items and highlighting the position of the ray.
- We are considering placing arrows and labels to indicate the position of objects not in view, as well.

Personae and Use Scenarios

Mildred Pummelhorse

Mildred Pummelhorse just moved. She is small and elderly. She is an ardent practitioner of Feng Shui. It is difficult for her to move her furniture owing to her diminutive stature. However she desires to experiment with different possible layouts in her new place, to find the arrangement that is the most astrologically pleasing.

Mildred's Scenario

Mildred installs our software and prints out the marker arrays. She places one array in the corner to detect the ground and another on her forearm like a palette.

Mildred's Scenario

She starts the program and sees on her palette a wide selection of furniture, posters and paintings.

Mildred's Scenario

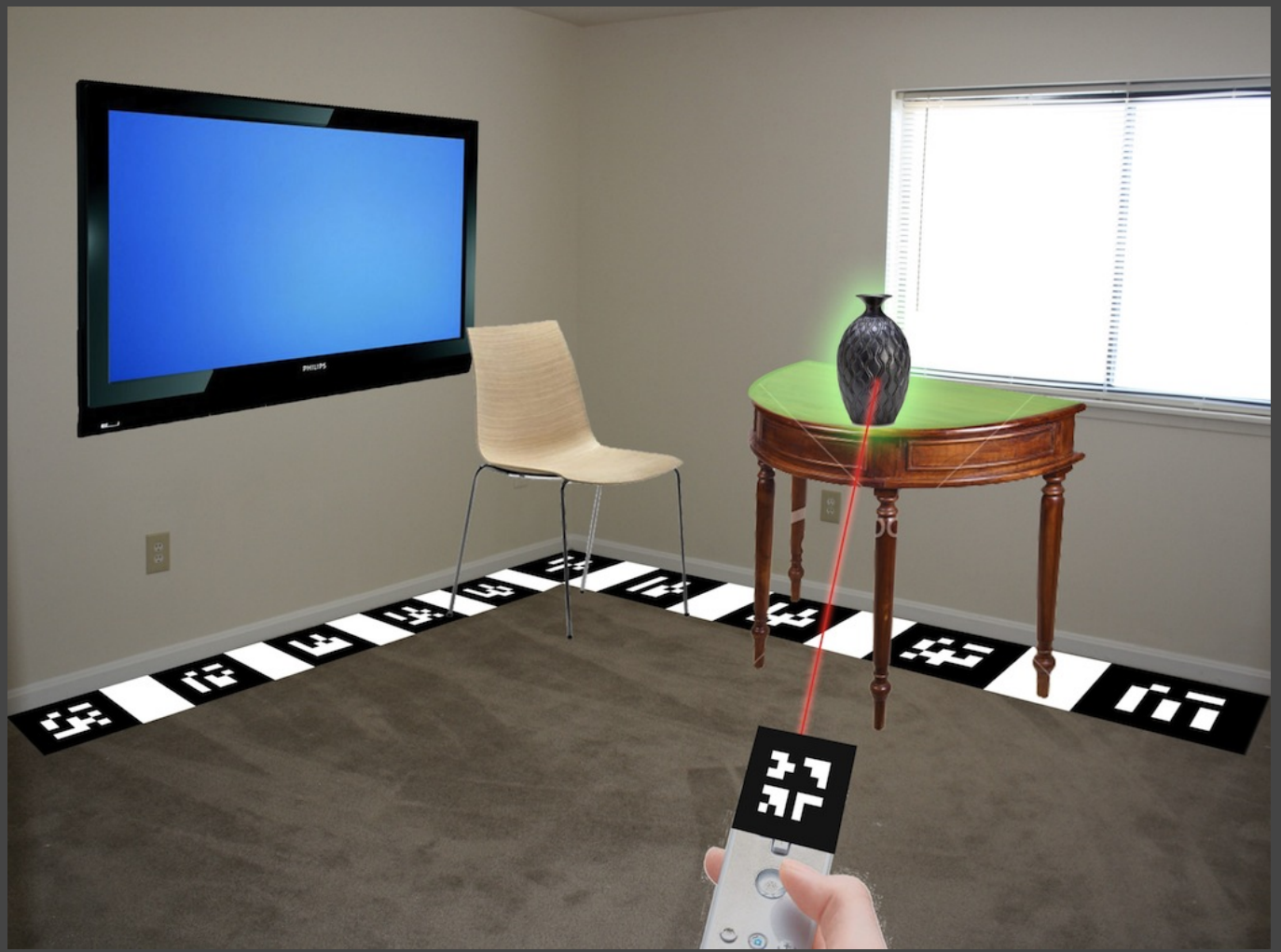
She moves her wand over a beautiful chair.

Mildred's Scenario

She points onto the northeast sun rise facing corner of her room and sees a ray extend from her wand showing where the chair will land. She finds the perfect place, presses the wand's button, and the chair is deposited.

Mildred's Scenario

Using the program and this technique, she goes on to design the entire room according to her taste.



Kevin Smith

Kevin, 35, is an interior designer who serves an upscale clientele. He likes to use state of the art tools to make designing convenient and he is used to using a computer regularly to mock up his ideas in various 3D design programs to show to clients.

Kevin's Scenario

Kevin's client Penny, wants to re-model her room using existing furniture and new items, but isn't exactly sure what will look best. Kevin gets his supercool Vuzix eye gear and hooks it up to his laptop. He wears the glasses and has Penny look at the laptop to see what he sees.

Kevin's Scenario

He then browses through the catalog overlaid on his palette and selects the furniture item that Penny chooses. Having picked an object from the catalog, Kevin points to a place in the room and has the object placed there at the click of a button.

Kevin's Scenario

Using this technique, and dynamic feedback from Penny, he populates the room with furniture, orients them, and deletes furniture if Penny so wishes.

Kevin's Scenario

Penny then wears the glasses, walks around the room, to look at it from different angles and check if that is what she wants. Quite naturally, she is unhappy with the color scheme and goes on to change the color of the furniture to match her fingernails.

Division of labor

- Room and overall program flow
- Wand
  - selection and manipulation
- Palette and Catalog
- Items and 3D Models

Questions needing resolving

- How do we track the whole room?
  - Should we limit the tracking to one corner?
  - Should we put markers on each wall and use a calibration method?
  - Marker "Islands" for the different corners
- How/can we deal with overlap of real items and virtual items?
- Should we allow objects to snap to other objects? Different surfaces? Only the floor?
- Should we just change the project completely? Those saying "Yes", beware!