real binoculars
with virtual functions
for mixed environments
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goal

make scene exploration and object selection in VR / MR applications easier

methods

● use real binoculars as an interface object for zooming into virtual content

● treat binoculars as a generic view enhancing tool: X-ray, night-vision, etc.
related work

- 'optical sight' (Sherstyuk, Treskunov, Pair '07)
  the basic design principles, applications, extensions

- *flashlight* (J. Liang, M. Green, '94)
  conic rays, partial coverage ok, multiple selections

- *aperture* (A. Forsberg, K. Herndon, R. Zeleznik, '96)
  *flashlight* + variable cone size, full object coverage,
  problems with close/large objects.

- *image plane techniques* (J. Pierce et al, '97)
  direct ray-casting, “sticky-finger”, “head-crusher” and
  more methods that help to aim probing rays
basic model

real binoculars + mixed (virtual) scene
applications and extensions
[black box with i/o video channels]

- mixed reality systems
- natural LOD control
- actions everywhere
- x-ray vision
- infrared vision
- precise pointing
- reality-freezer
- zooming out

coconut-shooting demo (Flintstones)
user study

Volunteers needed for
BIRD WATCHING IN MIXED REALITY

When: May 21 – 24, 9am – 3:30pm
Where: MEB 2nd floor, Sim Lab or room 212C
Contact: Andrei, 692-1088, andreis@hawaii.edu

"... the best VR system in the Pacific"
Developers
user evaluation

20 volunteers participated in the study and graded the virtual binoculars as follows (on scale 0 – 5):

- useful as a tool: 3.4 – 4.3
- easy to operate: 3.4 – 4.2
- enjoyable overall: 4.0 – 4.7

Neither subjects' gaming habits nor previous VR experience or lack of it didn't have significant influence on the evaluation.
conclusions:

- easy to integrate to most systems
- intuitive in usage, no training required
- adds to the sense of presence by giving immediate tactile feedback
- increases the resolution of UI apparatus
- entertainment applications: joy rides
- serious applications: lifeguards, coast guards, military etc.
thank you for your attention
do we have time for questions?

the end