

Advanced Tele-operation Control System for PR2 Humanoid Robot

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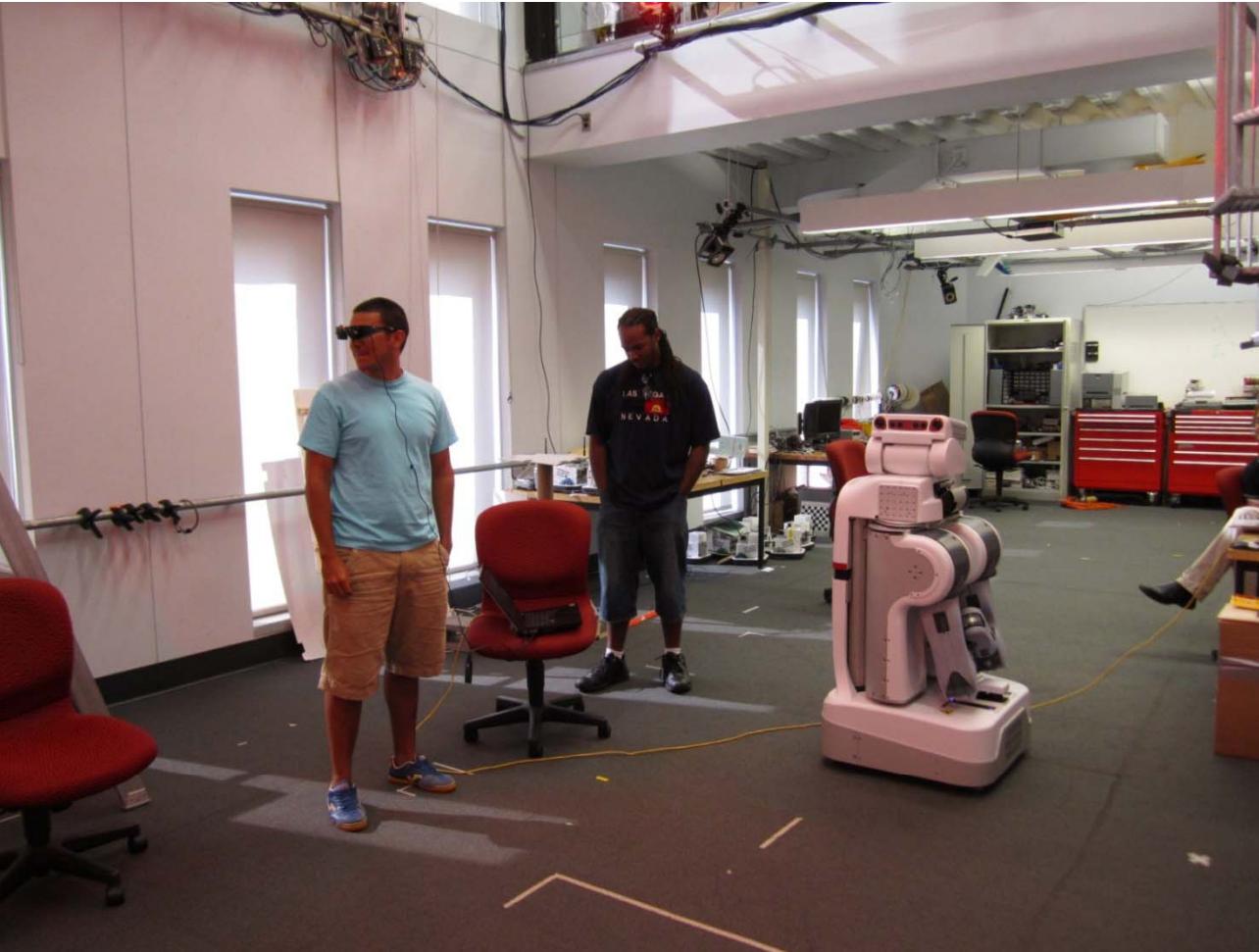
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Outline

- ▶ Introduction
 - What we did?
 - Why?
- ▶ Process
 - How we accomplished this?
- ▶ Outcome
 - What happened?



Towards Advanced Teleoperation



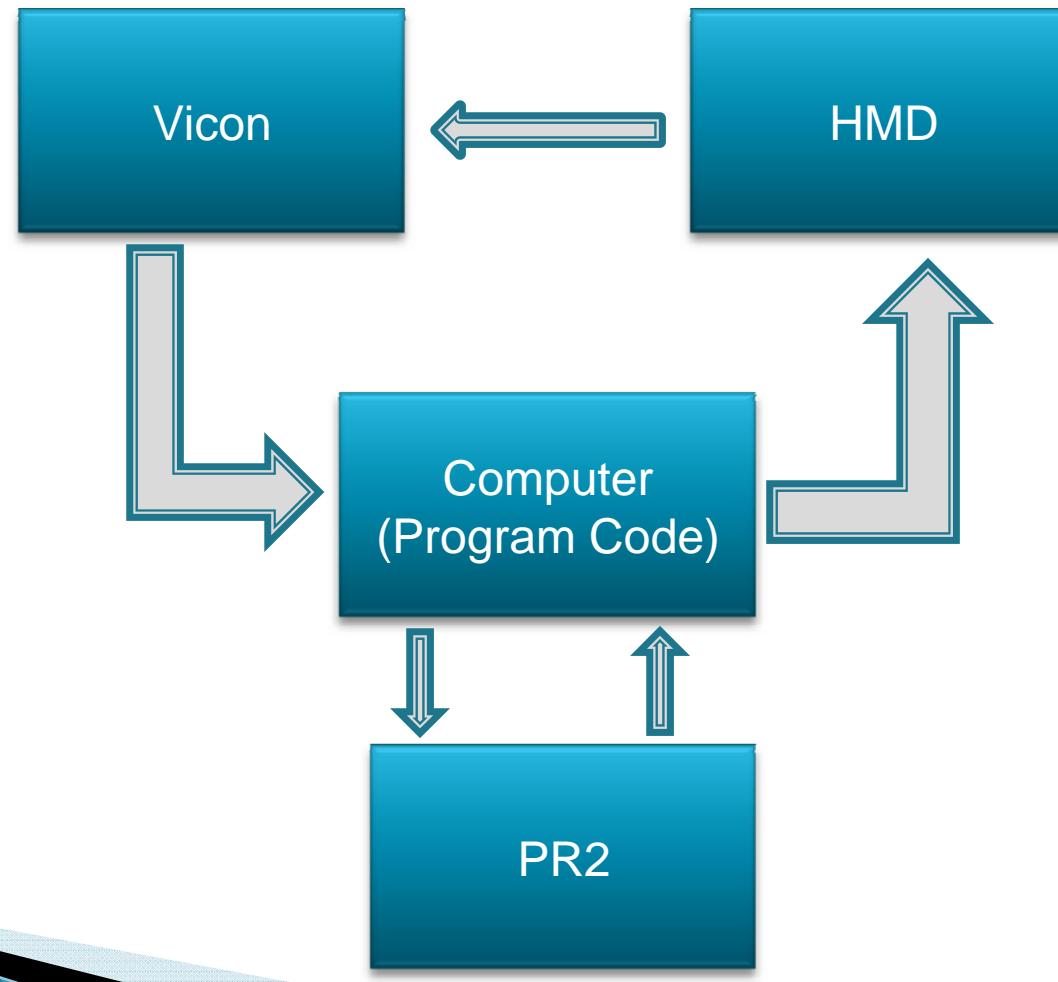
[Video](#)

Purpose

- ▶ Joystick control vs. Human Body Control
- ▶ Teleoperation
 - Map the human body onto a dexterous Robot
 - Use the robot to perform complex, dangerous tasks
- ▶ Examples
 - iRobot “Urbie”
 - Foster Miller “Talon”

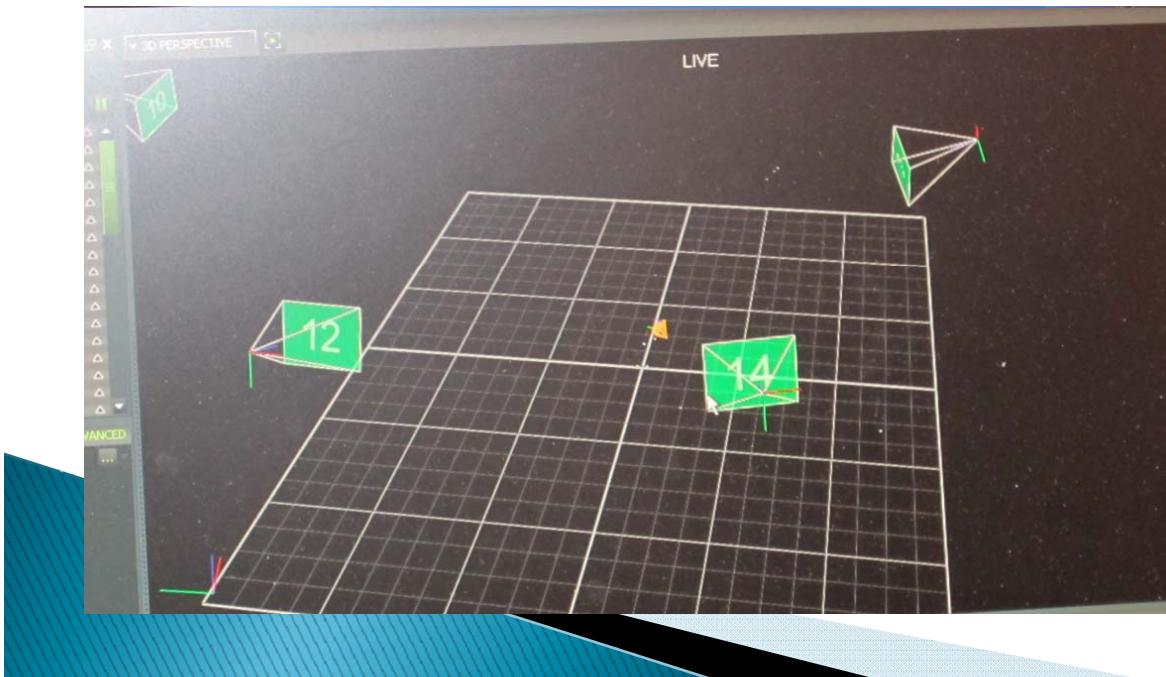


Teleoperation System Block Diagram



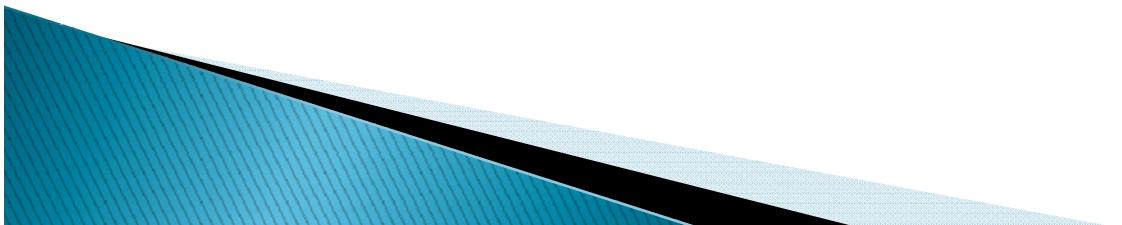
Vicon

- ▶ Uses 3D model of HMD
- ▶ Outputs HMD position
- ▶ Uses an array of IR cameras



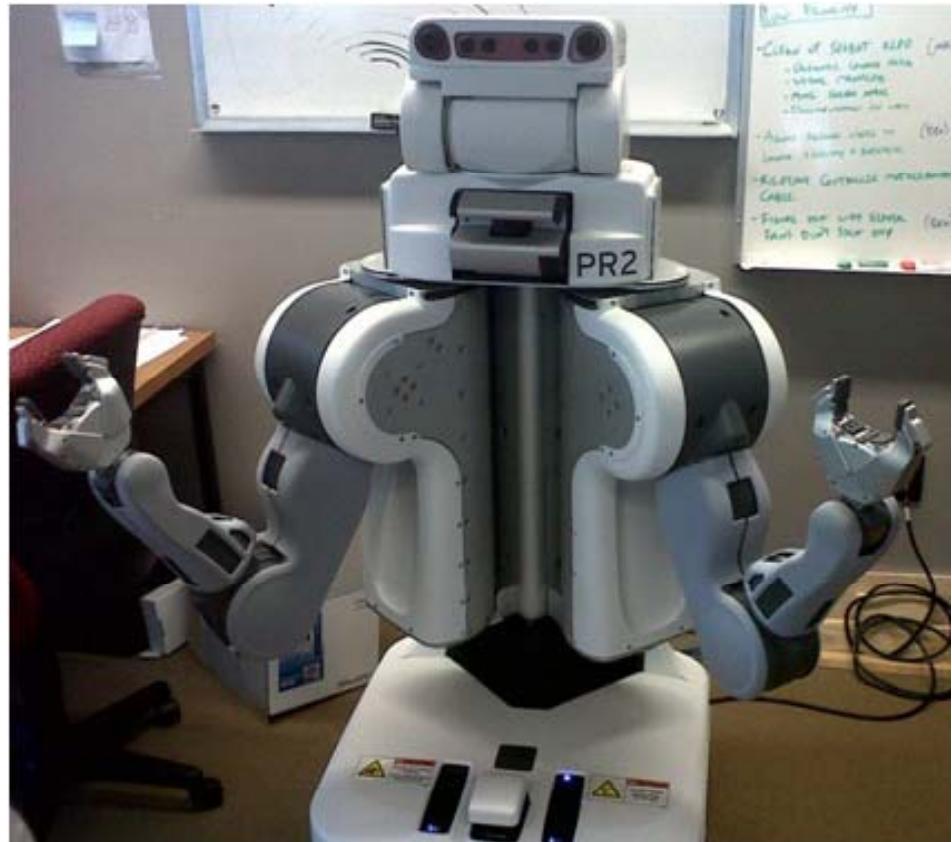
Head Mounted Display

- ▶ Vuzix Wrap 920
- ▶ Two display; one in each lens
 - 640x480 resolution
- ▶ Six motion tracking markers added



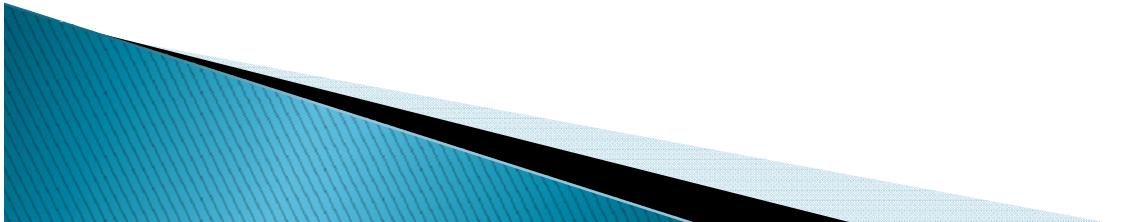
PR2 Humanoid Robot

- Modular software architecture, ROS (Robot Operating System)
- Multiple sensors and actuators
- Can be teleoperated through joystick



Programming Code

- ▶ ROS
 - Robot Operating System
 - Modular design
 - Open Source
- ▶ Python & C++
- ▶ Program
 - Receive position information from Vicon
 - Convert Vicon measurements to PR2 commands
 - Send video from PR2 to computer



Conclusion

- ▶ Avatar
- ▶ Components Used:
 - PR2
 - Vicon
 - HMD



Acknowledgements

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