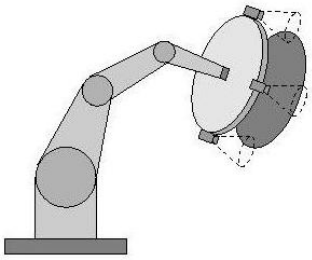
Vision-Based Control
Chairs: Sylvie Boudet, Nicola Ferrier

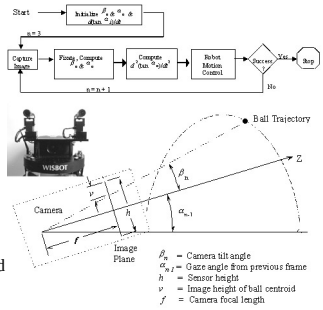
Multi-Cameras Visual Servoing
Ezio Malis[1], Francois Chaumette[2] and Sylvie Boudet[3]
[1]University of Cambridge, [2]IRISA / INRIA and [3]EDF-DER

- In this work, the classical visual servoing techniques have been extended to the use of several cameras observing different parts of an object.
- A multi-cameras visual servoing task of maintenance in the steam generator of a nuclear power plant is considered.
- The multi-camera visual servoing has been designed as a part of the task function approach. The particular choice of the task function allows us to simplify the design of the control law and the stability analysis.
- A positioning task on a cumbersome object has been realized using 2D and 2 1/2 D visual servoings with two cameras, mounted on a manipulator robot, and observing two different parts of the object.



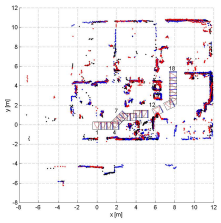
Interception of a Projectile Using a Human Vision-Based Strategy
Justin Borgstadt and Nicola J. Ferrier
University of Wisconsin, Madison

- Based on human studies a robot motion control strategy using only a single image-based parameter (without elaborate 3D modeling) is proposed
- Direction of motion is determined by the sign of the second derivative of the vertical angle of gaze between the robot and the projectile
- Various strategies for control of the magnitude of motion are evaluated
- A constant acceleration strategy, combined with the human-based directional strategy is demonstrated on a mobile robot



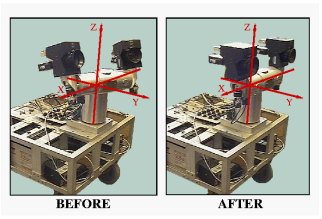
Motion Estimation by Iterative 2-D Features Matching in Range Images
G. A. Borges and M. J. Aldon
LIRMM

- Motion estimation by fusing simple geometrical features.
- Alternated features matching and motion estimation.
- Experimentation with different indoor cluttered environments.
- Good performance from experimental results.



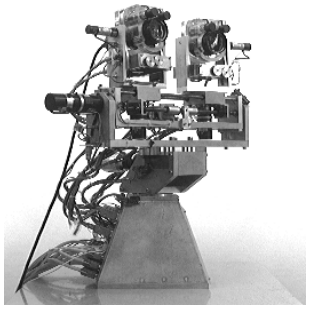
Active Visual Alignment of a Mobile Stereo Camera Platform
J. Knight and I. Reid
University of Oxford

- Four DOF head/eye platform mounted on mobile vehicle
- Initial alignment essential precursor to visual navigation
- Alignment and calibration achieved from visual cues and controlled motion alone
- Tests show 1 degree alignment error and good calibration



A focusing by Vergence System Controlled by Retinal Motion Disparity
J. Batista, P. Peixoto and H. Araujo
University of Coimbra

- Real-time binocular focusing.
- Velocity Control.
- Combination of vergence and focus motor calibration (off-line calibration).
- Focusing velocity controlled by retinal motion disparity.



Subpixel Stereo Method: a New Methodology of Stereo Vision
K. Umeda and T. Takahashi
Chuo University

- Control of Disparity less than One Pixel
- Simple Introduction of Disparity as k = (bf-b)/(a-b)
- Avoidance of Correspondence Problem
- Although not Accurate, very Simple and Practical