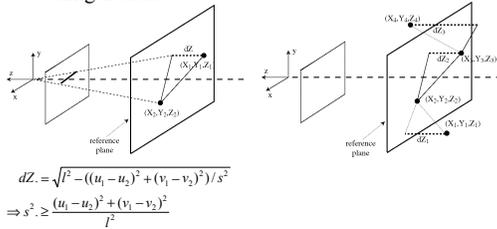


Reconstruction of Articulated Objects from Point Correspondences in a Single Uncalibrated Image

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- **Objective:** To recover the configuration of an articulated object from image measurements
- **Assumptions:**
 - ▼ Scaled orthographic projection (unknown scale)
 - ▼ *Relative* lengths of segments in model known
- **Input:** Correspondences between joints in the model and points in the image
- **Output:** Characterization of the set of all possible configurations



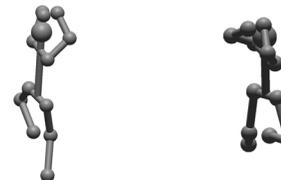
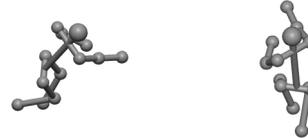
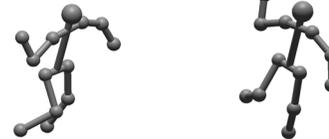
- Reconstruction proceeds by analyzing the foreshortening of each limb in the figure
- The set of all possible solutions can be characterized by a single scalar parameter, s , and a set of binary flags indicating the direction of each segment



Input Image

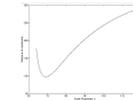
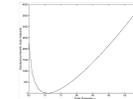


Solutions for various values of the s parameter



- These reconstructions were obtained from images downloaded from the web or scanned from newspaper photographs
- The scalar, s , was chosen to be the minimum possible value and the segment directions were specified by the user.

- **Exploiting Additional Constraints:** If additional constraints are imposed on the object, such as closure or coplanarity, then it is possible to determine the parameter, s , uniquely.



Input Image

Optotrak results

Proposed method

- **Comparison with ground truth data:** The results obtained with this method were compared with measurements taken with an OPTOTRAK system. Mean and median estimates in the estimated joint angles were 5.27 degs. and 3.81 degs..
- **Possible Applications:**
 - ▼ Recovering the pose of an actor in keyframes of a video sequence
 - ▼ Recovering the configuration of an articulated robot.
- **Contribution:**
 - ▼ A simple but effective approach to estimating the configuration of articulated objects from commonly available imagery.

