The problem

- How do we accurately detect ego-motion using optical flow?
- How do we recognize gestures with the device?
Antipode technique

- Based on the projection of the optical flow onto a great circle, we have two possible constraints:
  - If the projections are in the same direction, then we have a translation
  - If the projections are in opposite directions, then we have a rotation
Antipode technique

- The left shows a case where we would guess there is a rotation
  - The axis of rotation is always perpendicular to the great circle
- The right shows a case where we would guess a translation
  - The direction of translation is always parallel to the projection vectors
Good!

- For gestures, we want the following to be the same:

Since our technique is not concerned with scale, it should facilitate the above idea.

Arm courtesy of Jon Harter
Problem!

- Our system is not spherical
- How can we get the actual DOT and AOR?
  - Short answer: We don’t. Well, we can’t…
  - Instead, get a close guess that is within a cone of the actual answer

Brodsky et al
The technique

- Number the image plane into four or six sections
- Average the optical flow in each section
The technique

- The less great circles we use, the less accuracy.
- However, the number of great circles is limited by our system.
Preliminary Results

- Thin red lines are the actual DOT
- Thin blue lines are the actual AOR
- Our results in thick lines

AOR = [0, -3, 1]
DOT = [1, -2, 3]

AOR = [3, -4, 2]
DOT = [1, 0, 7]
The future

- Compute the math behind the technique

- Classify gestures
Questions?

Wizards of the coast et al.