Active Contours (SNAKES)

- Back to boundary detection

 This time using perceptual grouping.
- This is non-parametric
 - We're not looking for a contour of a specific shape.
 - Just a good contour.

For Information on SNAKEs

- Not in Forsyth and Ponce.
- See Text by Trucco and Verri, or Shapiro and Stockman.
- Kass, Witkin and Terzopoulos, IJCV.
- "Dynamic Programming for Detecting, Tracking, and Matching Deformable Contours", by Geiger, Gupta, Costa, and Vlontzos, IEEE Trans. PAMI 17(3)294-302, 1995
- E. N. Mortensen and W. A. Barrett, <u>Intelligent Scissors for Image</u> <u>Composition</u>, in ACM Computer Graphics (SIGGRAPH '95), pp. 191-198, 1995



Sometimes edge detectors find the boundary pretty well.



Improve Boundary Detection

- Integrate information over distance.
- Use Gestalt cues
 - Smoothness
 - Closure
- Get User to Help.



Strategy of Class

- What is a good path?
- Given endpoints, how do we find a good path?
- What if we don't know the end points?
- Note that like all vision this is *modeling* and *optimization*.



We'll do something easier than finding the whole boundary. Finding the best path between two boundary points.





Discrete Grid

- Contour should be near edge.
 Strength of gradient.
- Contour should be smooth (good continuation).
 - Low curvature
 - •Low change of direction of gradient.

Review Gradient

Blackboard: See notes on Class 6 also.



• Change of direction of gradient from p(j-1) to p(j)







So How do we find the best Path? Computer Science at

last.



A Curve is a path through the grid. Cost depends on each step of the path.

We want to minimize cost.

















Why do we need user help?

• Why not run all points shortest path and find best closed curve?

Lessons

- Perceptual organization, middle level knowledge, needed for boundary detection.
- Fully automatic methods not good enough yet.
- Formulate desired solution then optimize it.

This document was created with Win2PDF available at http://www.daneprairie.com. The unregistered version of Win2PDF is for evaluation or non-commercial use only.