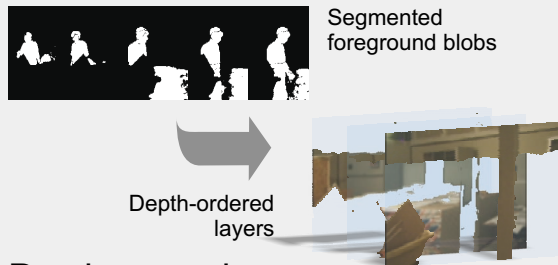


Depth Layers from Occlusions

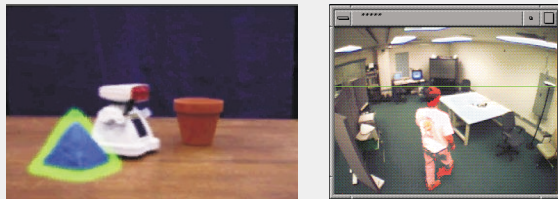
http://www.cc.gatech.edu/cpl/projects/depthfromocclusion



The goal

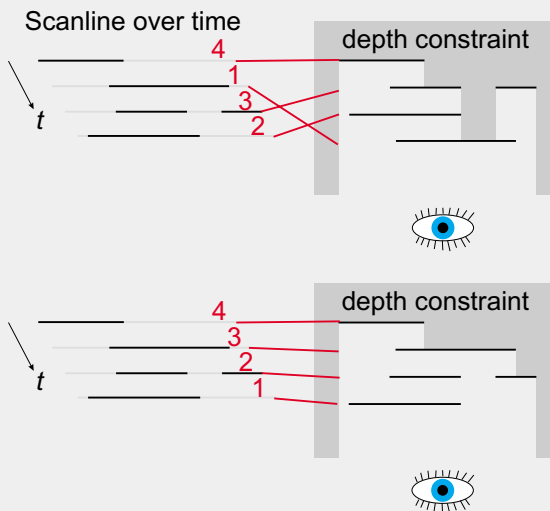


Previous work



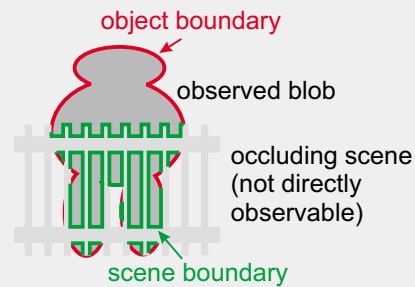
- Brostow, Essa, ICCV 1999
 - Presegment scene
 - Edges form regions of common depth
 - Touch = is behind of
- Stauffer et al. 1997
 - Assume blob is a person, identify head
 - With calibrated ground plane object position known

Problem underconstrained



- Only relative depth recoverable
- Any depth assignment corresponds to possible scene

Nomenclature



Depth assignment using MDL

- Scene boundary pixels hit more often than object boundary pixels
- Use MDL to find simple explanation of observation
 - Devise encoding that exploits scene boundaries
 - Find assignment of frames to layers with short encoding



back layer region
= \cup back layer blobs



front layer region
= \cup all blobs

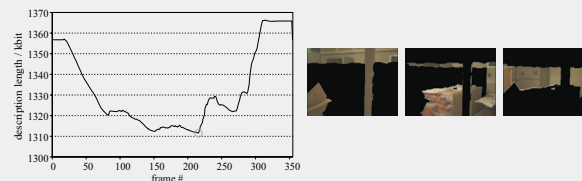


$$E_B = b_L \log s$$



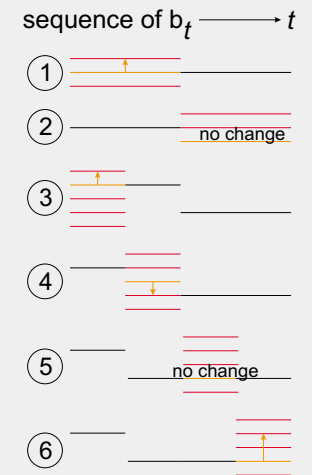
$$E_B = b_s \log b_L + b_o \log l + (b_s + b_o) \log (b_s + b_o) - b_s \log b_s - b_o \log b_o$$

Lab sequence - 2 layers



Optimizing layer assignments

- Wanted
 - number of layers
 - assignments of blobs to layers
- Divide sequence in half
- Adjust depth of halves
- Divide sequence into quarters
- Adjust depth of quarters
- ...
- Final pairwise collapse



Lab sequence

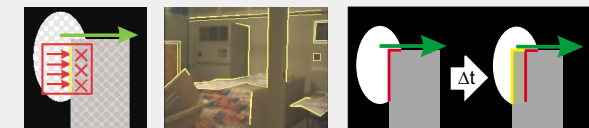


Construction sequence



Future work

- Suppress still images
 - consecutive images must have minimum difference, otherwise delete



- Accretion/deletion
- Image edges
- Semi-rigid shape constraint