Project Presentation – Week 2

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For: Computer Vision R.E.U. at University of Central Florida
Learned Edge Detection - Filters
Learned Edge Detection - RoC

- False alarm = 10%, Detection = 63.5%, Threshold = ~62.0%

- False alarm = 30.3%, Detection = 90%, Threshold = ~32.6%
Learned Edge Detection

False alarm = 10%, Detection = 63.5%, Threshold = ~62.0%

False alarm = 30.3%, Detection = 90%, Threshold = ~32.6%
Clustering via $K$-Means
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- 15 cluster centers, without location weight
- 15 cluster centers, with location weight
Clustering via $K$-Means
(Color weight vs. Location weight)
"Blob" of flow?

Noise?
Optical Flow Results – Larger Win (levels: 3, win: 5, iter:3)

Bigger “blobs”

Less noise
Optical Flow Results – More iter (levels: 3, win: 3, iter: 20)

- Shrinks “blobs”
- Better alignment
- Vector magnitudes reduced
- Lessens noise
Optical Flow Results – Second
Optical Flow Results - Thoughts

- Larger windows
  - Reduce noise (+)
  - Increase “blob” size (-)
- More iterations
  - “blobs” better modeled (+)
  - Computationally expensive (-)
  - Changes vector magnitudes (More accurate?)

- Levels
  - Each scene/scenario seems to have an ideal pyramid count.
  - Inappropriate level size greatly affects the resulting flow adversely.
Background Subtraction - Median
Background Subtraction – Single Gaussian

Standing shadows
Background Subtraction – Standard Deviation
Background Subtraction – Comparing Results

Frame 152

Median (10 dist.)

Frame 670

Gaussian (-2 < z > 2)
SLAM - Simultaneous localization and mapping

- Likes: Problem well defined
  - Plethora of research – good ideas and algorithms
  - Could be coupled with machine learning for other tasks?
- Idea: Could aide in the accuracy of Dr. Lobo’s 4-camera device? Extend uses in market?
  - When coupled together, localization and mapping correct errors in each-other.
Augmented Reality

- Likes: Combining 3D interpretation with applications
- Dislikes: Seems to have moved away from research and more into application fields
  - Most papers were system specific or discussed a use of AR rather than AR itself
- Idea: Coupling “Where am I” with AR
  - Sort of already done though, see Layar app for Android phones
Likes: Couples 3D field with Machine Learning field
  - Useful base for other work; see Depth-map To Skeleton project
Dislikes: Too broad of a problem
  - Would prefer focused project to ensure good results from REU program
  - Also, not sure of project ideas other than DTS project....
Likes: Low-level
  - I tend to gravitate to “fundamental problems”
  - Again, building a framework for other work
Dislikes: Dead field?
  - Most techniques are well researched
  - New technology automagically grabs reliant depth; stereo and 3D cameras
  - Again, not sure on project topics other than depth from defocus