



UNIVERSITÀ DEGLI STUDI DI PADOVA

Introduction to segmentation

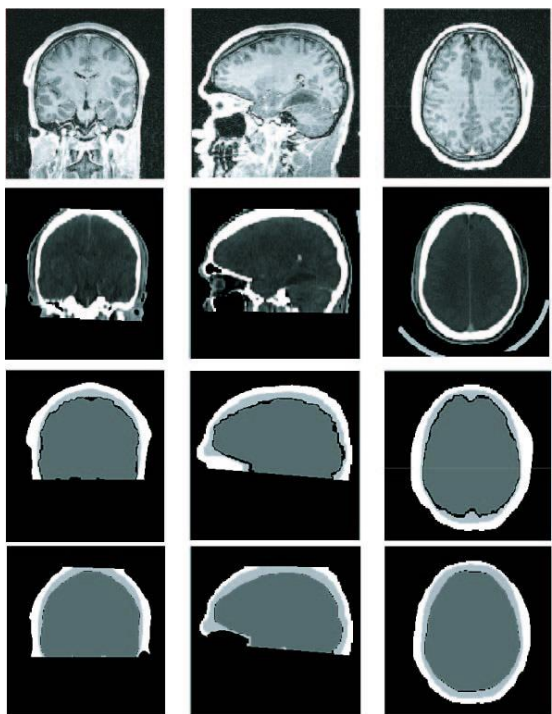
Stefano Ghidoni





- Intro to image segmentation
- Segmentation and categories
- Principles of segmentation

- Intuition: partition an image into regions corresponding to different categories



(a) Color Labels (ACA)



(b) Texture Classes



(c) Crude Segmentation



(d) Final Segmentation

- Intuition: partition an image into regions corresponding to different categories
 - Which categories can you recognize in (c)?



(a) Color Labels (ACA)



(b) Texture Classes



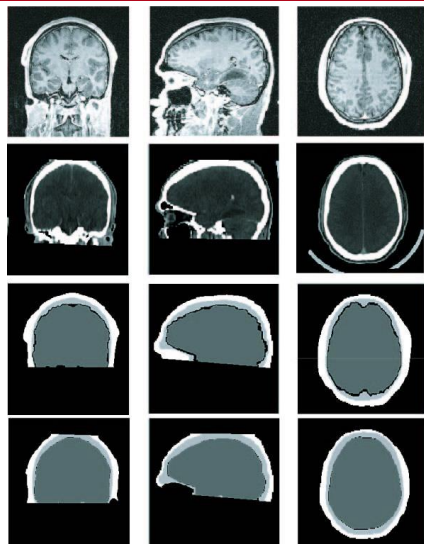
(c) Crude Segmentation



(d) Final Segmentation

- Segmentation depends on the categories we have chosen
 - Which categories can you recognize?

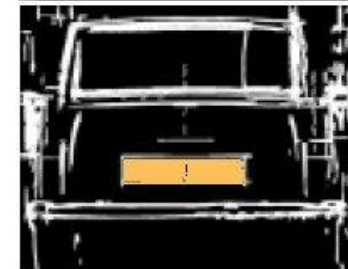




Medical Imaging



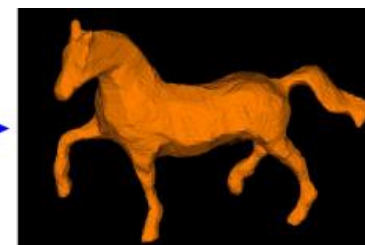
*Movies/Special Effects
keying)*



*Features (chroma
extraction/detection)*



Object Recognition



3D Reconstruction



- Subdivide an image into n regions R_1, R_2, \dots, R_n such that
 - $\bigcup_{i=1}^n R_i = R$
 - $R_i \cap R_j = \emptyset \quad \forall i, j \ (i \neq j)$
 - Optionally: each region shall be connected
- Two main criteria:
 - Similarity (between pixels in the same region)
 - Discontinuity (between pixels in different regions)



- Segmentation by thresholding (histogram-based)
- Region growing methods
- Watershed transformation
- Clustering-based methods
- Model-based segmentation
- Edge-based methods
- Graph partitioning methods
- Multi-scale segmentation
- Many others...



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Segmentation, region growing & watershed

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