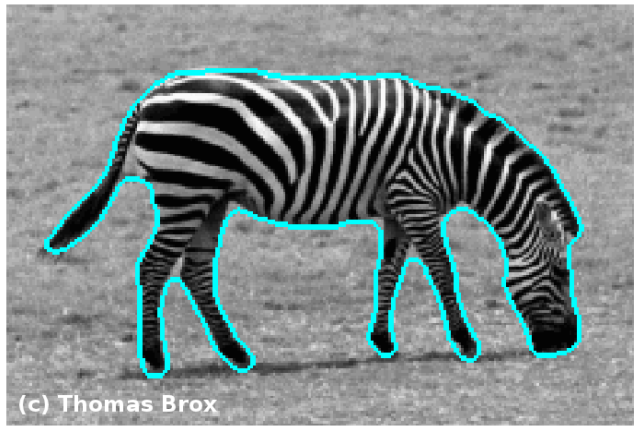
Figure ground segregation in video via averaging and color distribution



Introduction to Computational and Biological Vision
2013

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Introduction

- Motivation:
  - Sometimes it's quite important to be able track an object in a given video (tracking drivers in the road, identifying moving objects in night vision video etc.)
  - What are the approaches for segmenting a figure from a set (>1) of images (I.e. video file)?
- Main goal:
  - To achieve a high quality of figure ground segregation (good segmentation).

Assumptions

- **Background**: Known background OR unknown background
  - Unknown background
- **Camera**: Stationary camera OR moving camera
  - Stationary camera
- **Lighting**: Fixed lights OR varying lights
  - Varying lighting

Approach and Method

- Step 1 – Averaging:
  - Divide each frame of the video into fixed size blocks.
  - Average each block (for all 3 components).
  - Divide the video into sets of frames. For each set calculate the average.

Approach and Method (2)

- Step 2 – Segregation throw color distribution:
  - Compute the absolute difference between the block values and the corresponding average

$$F(x,y) = \begin{cases} I(x,y) & if \quad D(x,y) > \Gamma \\ 0 & otherwise \end{cases}$$

Approach and Method (3)

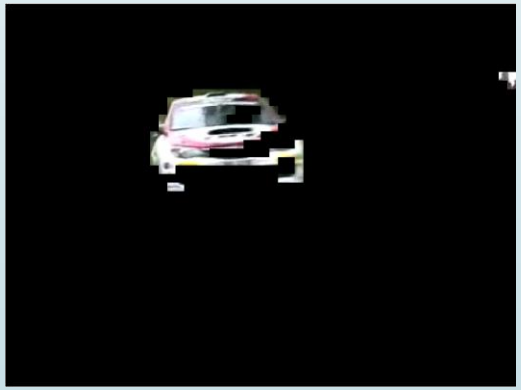
- Step 3 – Locate object components:
  - I had a sketch of the figure I want to segment but it wasn't accurate enough since there were a lot of noises.
  - Only figures with size bigger then 24*24 pixels considered as an object.
    - Remove noises.
    - Locate figures position

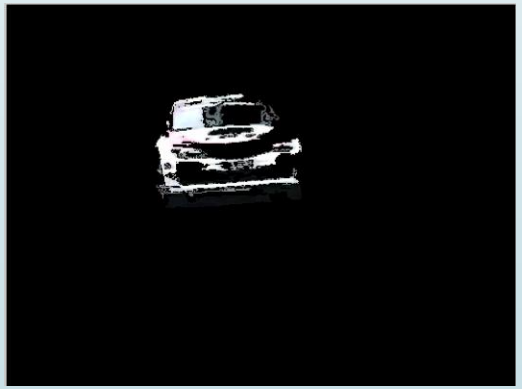
Approach and Method (4)

- Step 4 – "Magic wand"
  - Takes pixel and find all the pixels in the area that correspond to its color
  - Return binary mask of the figure pixels.

$$Segmented\_(x,y) = binaryMask\_(x,y).*originalFrame\_(x,y)$$

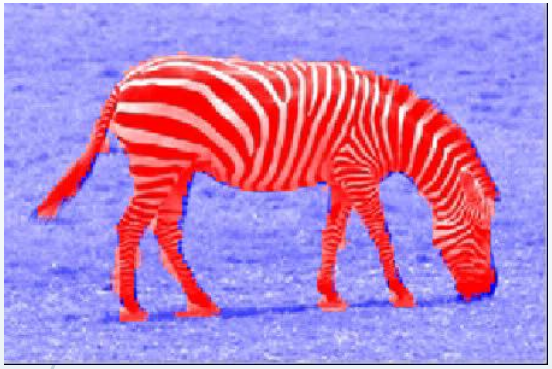
Some more examples





Conclusions

- The algorithm is done offline since it takes have calculations are made
- Thing that affect segmentation:
  - Object size
  - Object speed
  - Object location
  - Object color



Questions ???

Thank you ☺