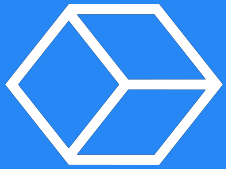

Introduction to computer vision

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Role in the project

- Camera is the most important sensor of the robot
- CV, model, localization, strategy, motion

https://inkme.it/veni-vidi-vici-tattoo/

Problems

- Input is an image
- Output for detection – object coordinates
- Tracking, segmentation

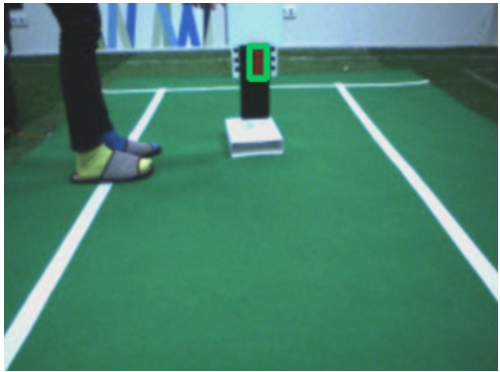
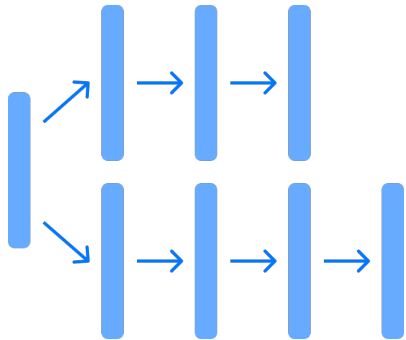


Image processing

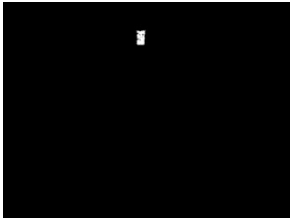
- Processing branches
- Filter sequences
- Configuration files



A simple detection pipeline

- Object mask obtainment (InRange/threshold)
- Mask processing by morphological operators
- Object bbox obtainment (connected components analysis)

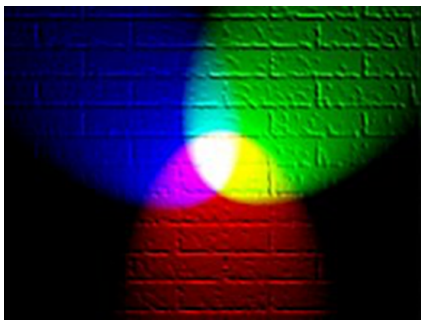


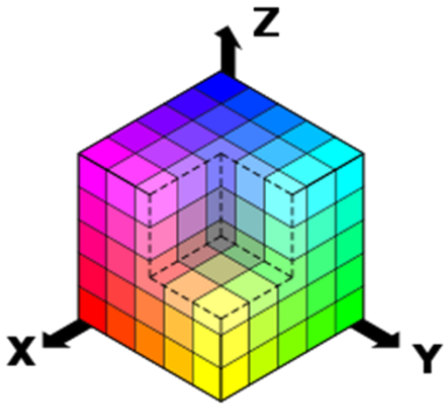



Color spaces

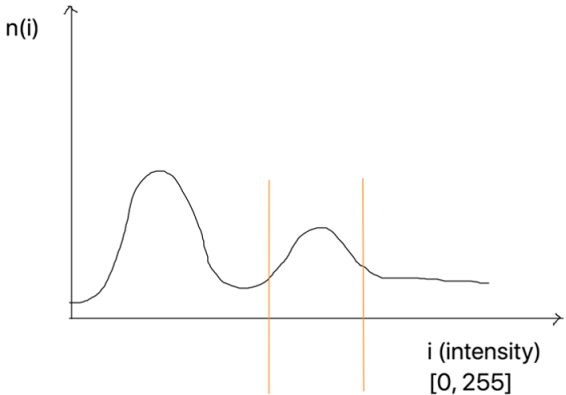
- RGB, HSV, YCrCb, RB-chromaticity, ...
- Different parameterizations of the same data
- Choice of space depends on the problem

RGB

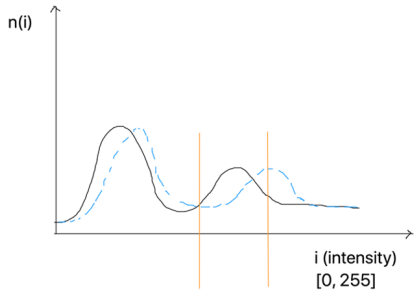




Mask obtainment

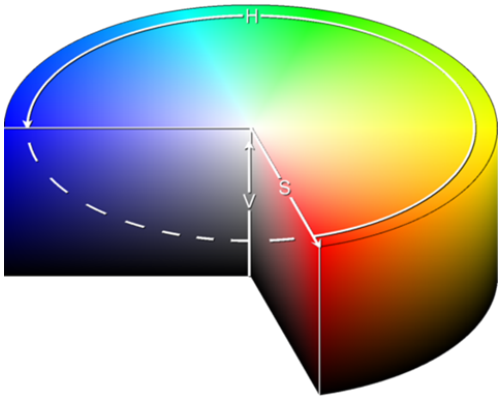


RGB drawbacks



HSV

- Hue(color tone), saturation, brightness(value)
- Allows to ignore brightness changes
- Non-linear conversion into RGB and back



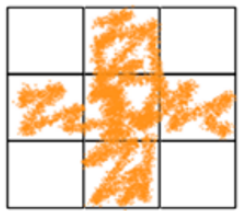
https://en.wikipedia.org/wiki/complementarycolors

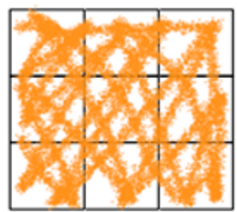
Morphological processing

- Morphological erosion - “dissolving”
- Dilation - finding max in kernel-shaped surrounding
- Closing = dilation + erosion, opening - in another order

Connected components analysis

- Finding connected components
- Filtering
- Criteria - area, width/height, density, roundness, etc.





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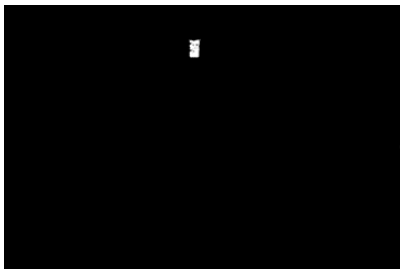
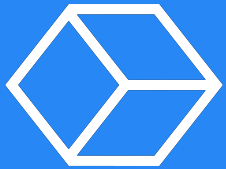


Why do we need neural networks?

https://www.reddit.com/r/RATS/comments/kts4fc/for_those_of_you_who_liked_the_lego_rat_i_made/

https://thispersondoesnotexist.com/



Thank you for your time

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