Computer Vision Workshop:
Object detection using colour

By Laura Madrid

01 What is Computer vision

02 Object detection through colour detection

03 RGB, BGR, HSV value scales

04 Activity

Detect groups of m&m's → car detection!

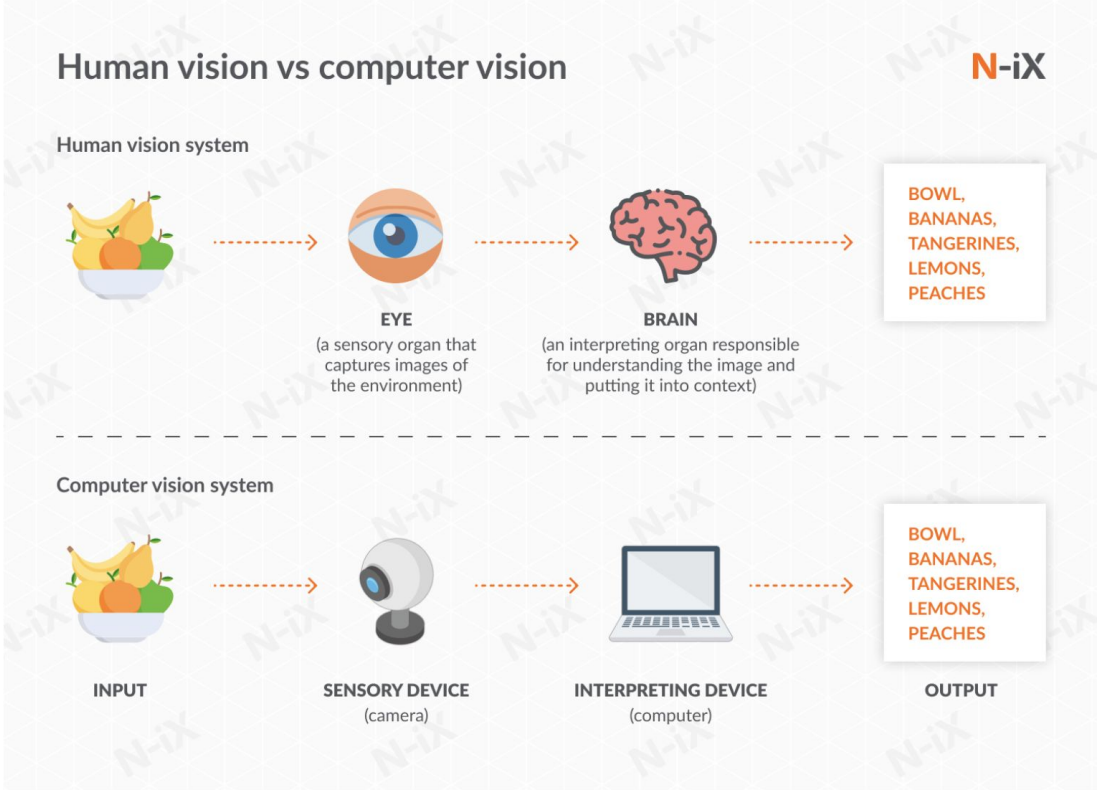
05 Method Limitations

Computer Vision

Brief definition

The field that gives devices the ability to have human-like vision (ie. perceive objects and patterns in images and video frames) to make decisions or analyze an environment

Image by vecstock on Freepik

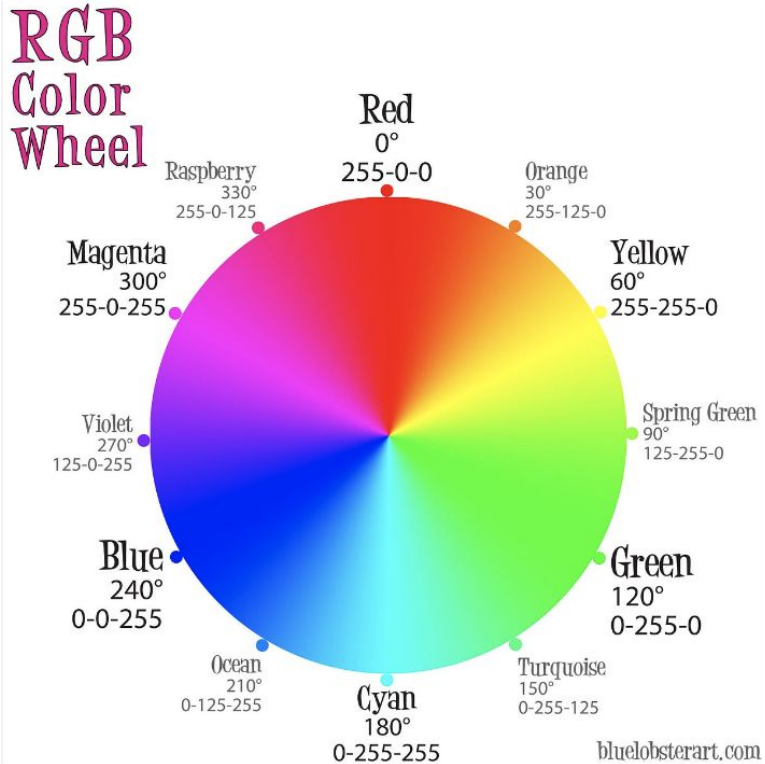


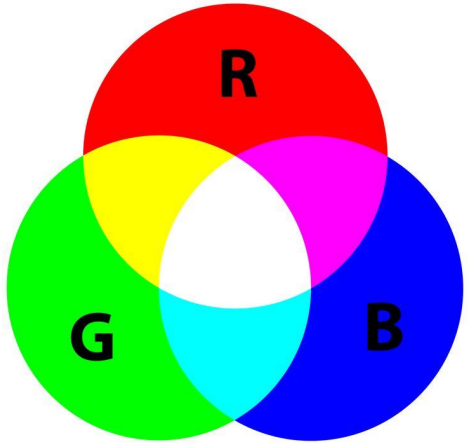
Source: https://www.n-ix.com/computer-vision/

Object detection through colour detection

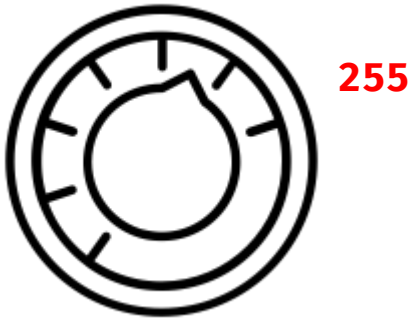
1. Look for an image and an object that you want to detect
2. Make sure that the object/s stands out in your image
3. Find a range of colour that helps you define the pixels of the object
4. Form a mask by looking for the group of pixels within the range you defined, in the image
5. Get the contours of the mask

RGB & BGR value scale



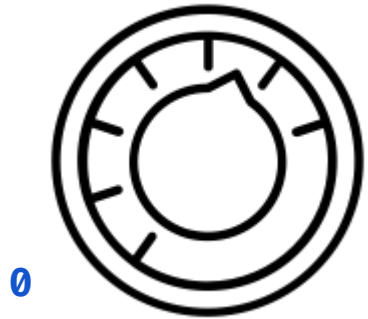


Additive colour system, similar to having 3 dials (red, green, blue) and then adding from value 0 to value 255 of the particular colour into the mixture!



Red

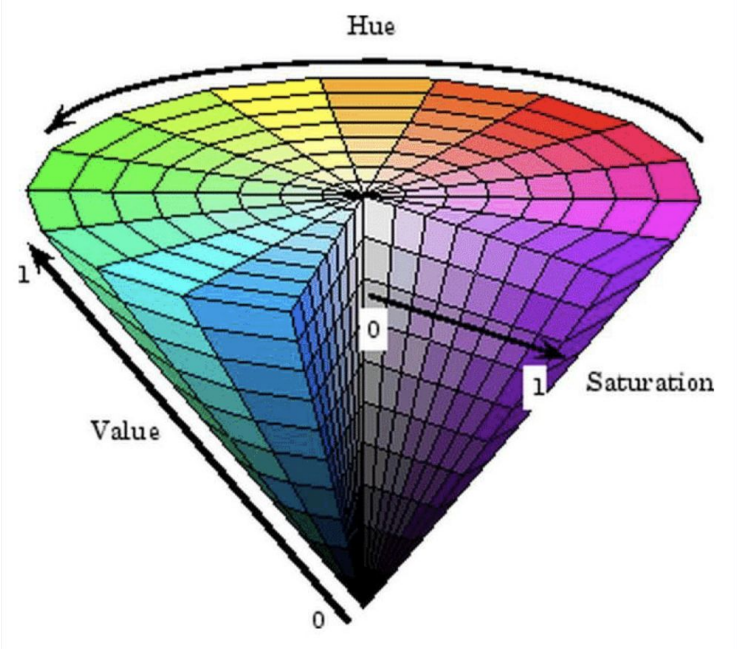
Green



Blue

The total number of colours in an RGB system:
256 x 256 x 256 = 16,777,216

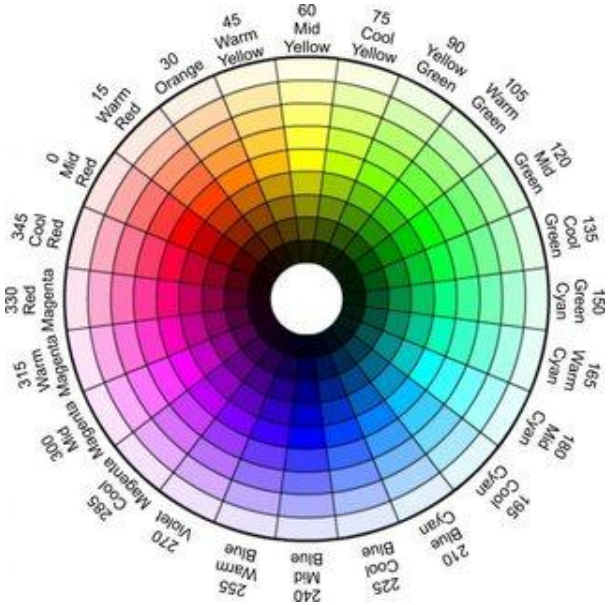
HSV value scale



Hue: What colour along the circle we are at
Value: How dark or black the colour is
Saturation: How rich the colour is (ie. how much pigment is mixed into white paint to get the colour you want)

Source: https://www.youtube.com/watch?v=gv9iEmGaE6Y

Hue



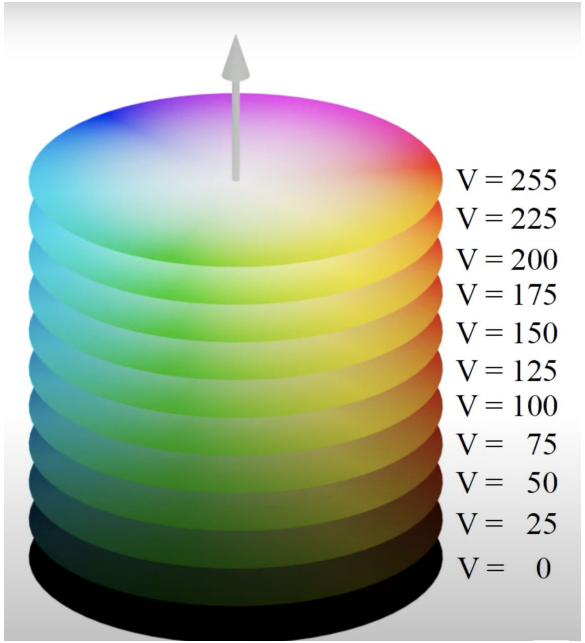
Source: https://stackoverflow.com/questions/34095491/given-the-numerical-value-of-hue-saturation-and-value-how-to-tell-the-name-of

Saturation

Source: https://www.tipard.com/video/compare-hue-and-saturation.html

Less saturated colours tend to look grey

Value

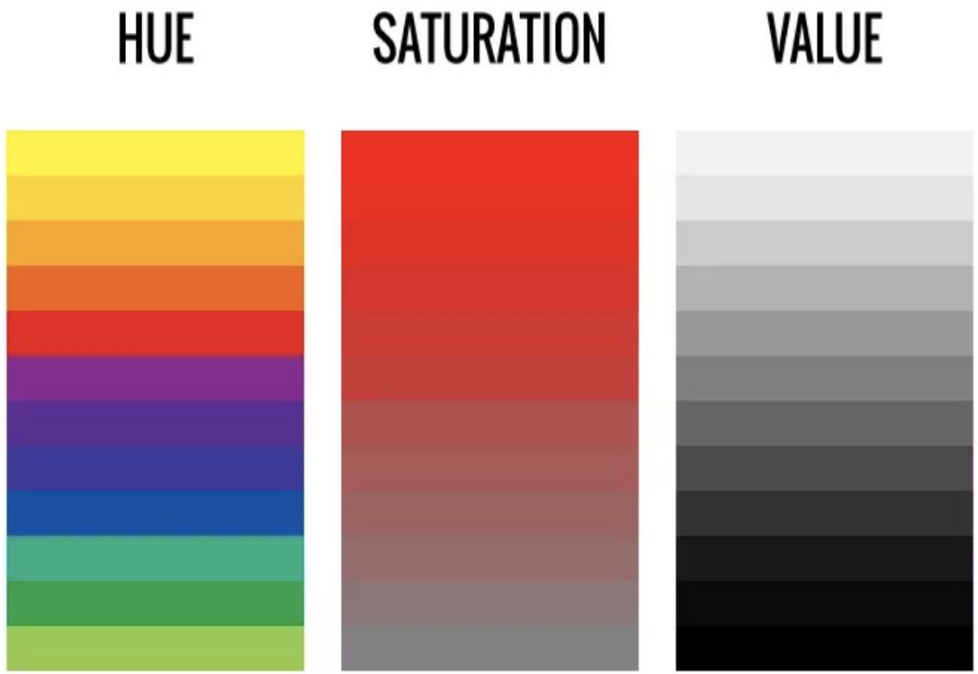


Source: https://www.youtube.com/watch?app=desktop&v=4Kvefi8_wls

Hue range:
0 → 179

Saturation range:
0 → 255

Value range:
0 → 255



Source: https://www.virtualartacademy.com/three-components-of-color/

ACTIVITY

Let’s apply what we learned!

FOR THE ACTIVITY, GO TO: https://github.com/Laura05010/colour_detection

git clone https://github.com/Laura05010/colour_detection.git

Object detection through colour detection : Limitations

LIMITATION	POTENTIAL SOLUTION
There might be other objects of the same colour that you don’t want to track.	You can filter contours by area size and make sure that HSV value range is a precise as possible
Cannot be generalized for different kinds of the same object	Using this technique along with other techniques that give info on size, shape can provide more accurate results

Thanks!

If you have any questions or want to share what you build from this workshop you can email me at :
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