

Color Naming



J. van de Weijer, Cordelia Schmid, Jakob Verbeek, Diane Larlus. **Learning Color Names for Real-World Applications.** IEEE TIP 2009.

learning color names

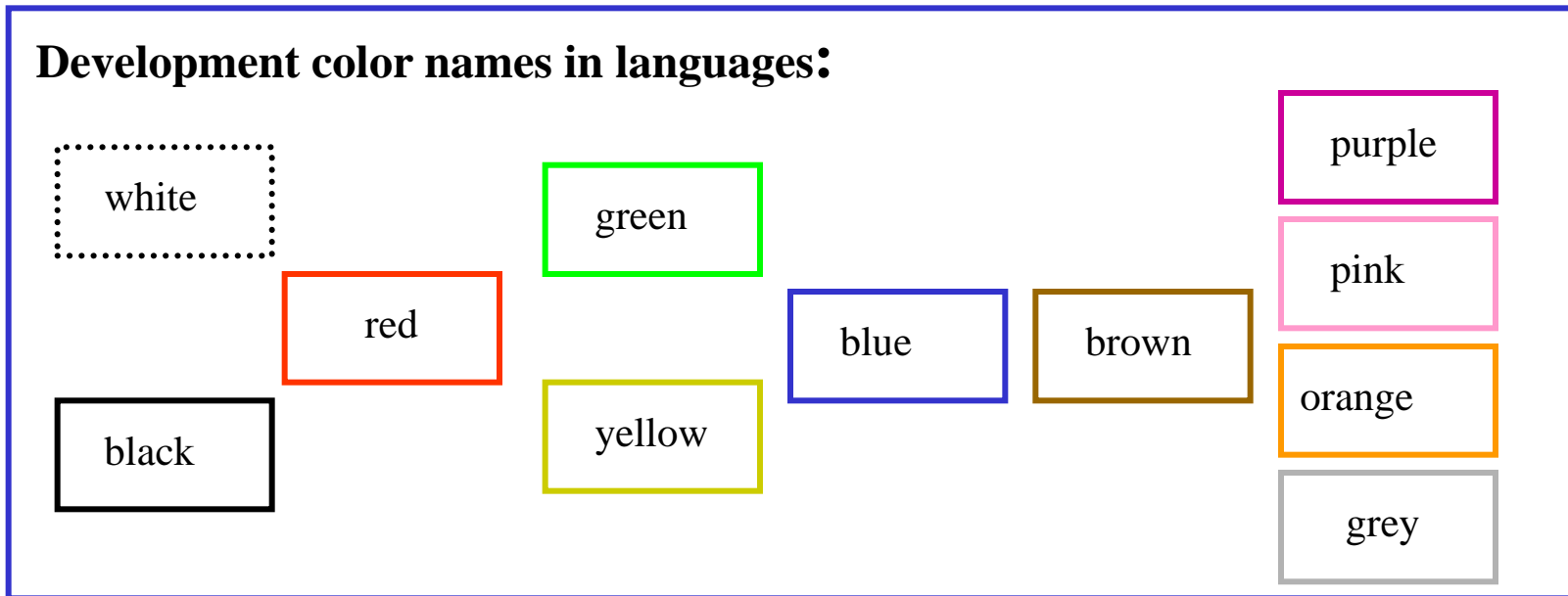
task: Object colors in many images are often not explicitly labeled. Can we label these image automatically with color names ?

Ebay user: “Find me all yellow cars ?”



learning color names

From linguistic studies it is known that the development of color names follows a similar pattern for all languages.



The english language has 11 basic color terms.

learning color names

- Use google image to assemble a set of weekly labeled images.

black

blue

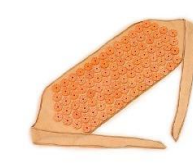
brown

green

orange

purple

white



false positives

Images retrieved with Google image

learning color names

Labeled input images:



yellow



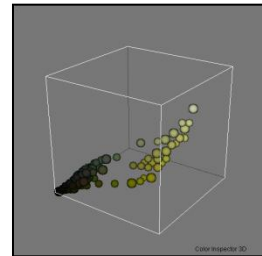
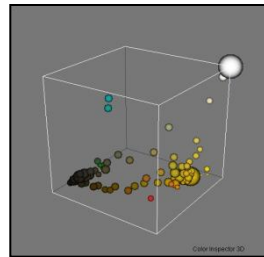
yellow

...

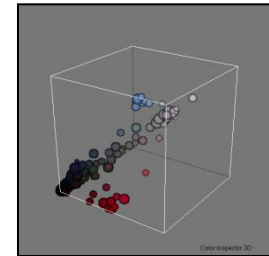


red

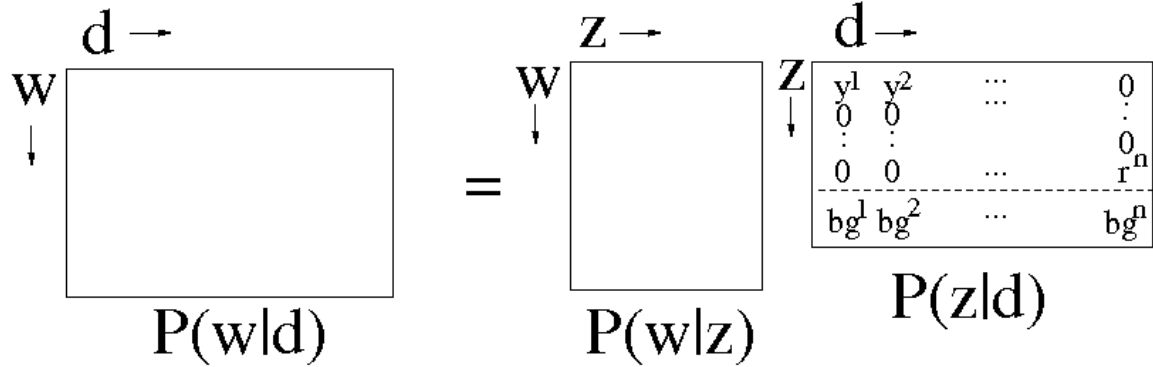
LAB-histogram
representation:



...

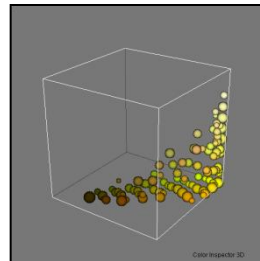


PLSA-bg



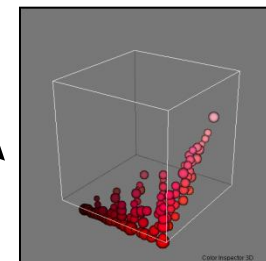
Color name
distribution:

yellow



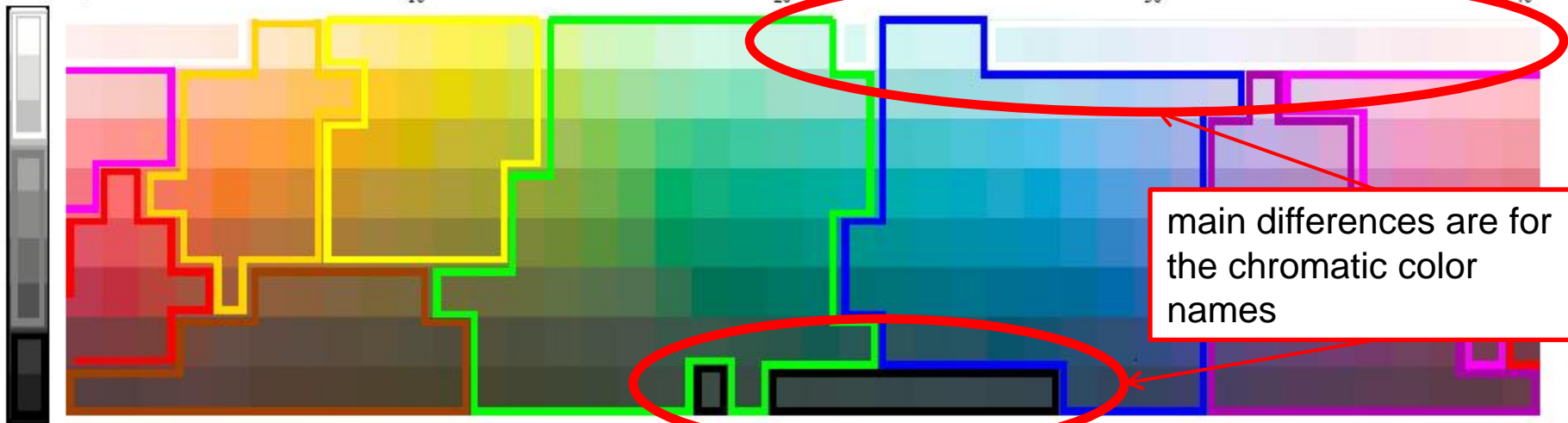
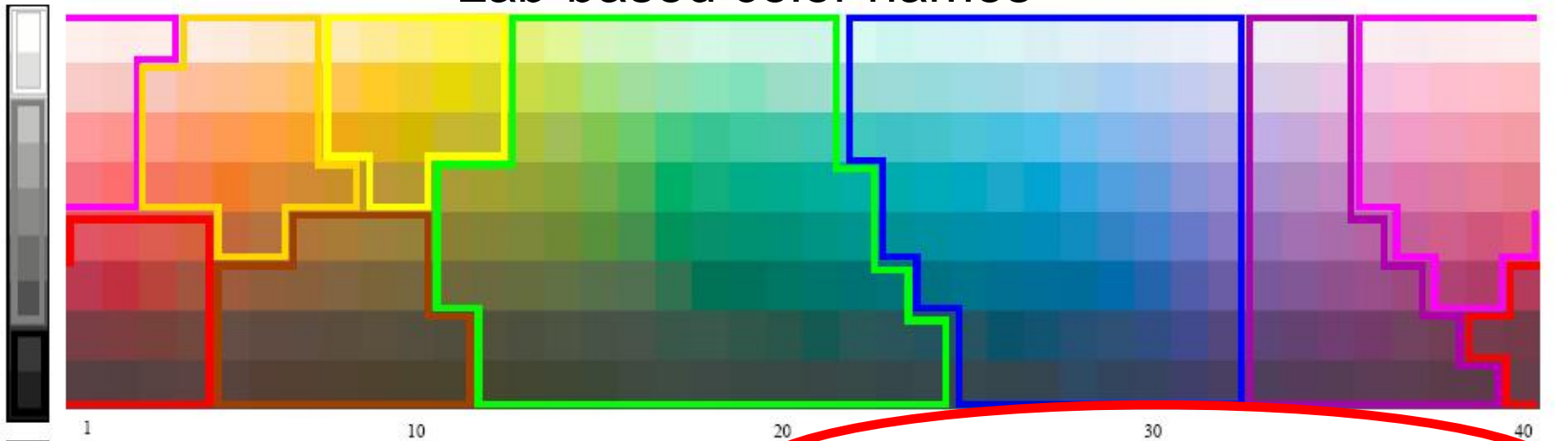
...

red



learning color names

Lab-based color names¹



main differences are for the chromatic color names

google-based

retrieval of color names

EER	cars	shoes	dresses	pottery	overall
lab ¹	91	97	97	92	94.0
google	93	99	99	94	96.4

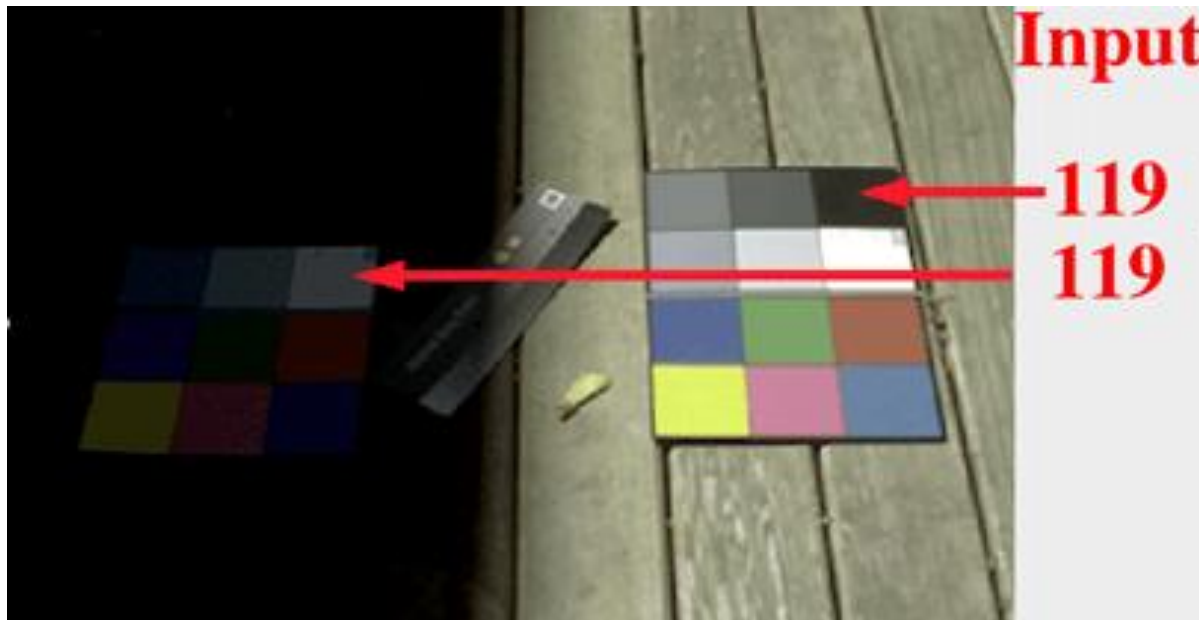


Ebay data set of 4 categories: shoes, cars, dresses, and pottery.

retrieval of color names

EER	cars	shoes	dresses	pottery	overall
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Errors are mainly due to absence of lightness estimation, which is a very little studied problem in computer vision.



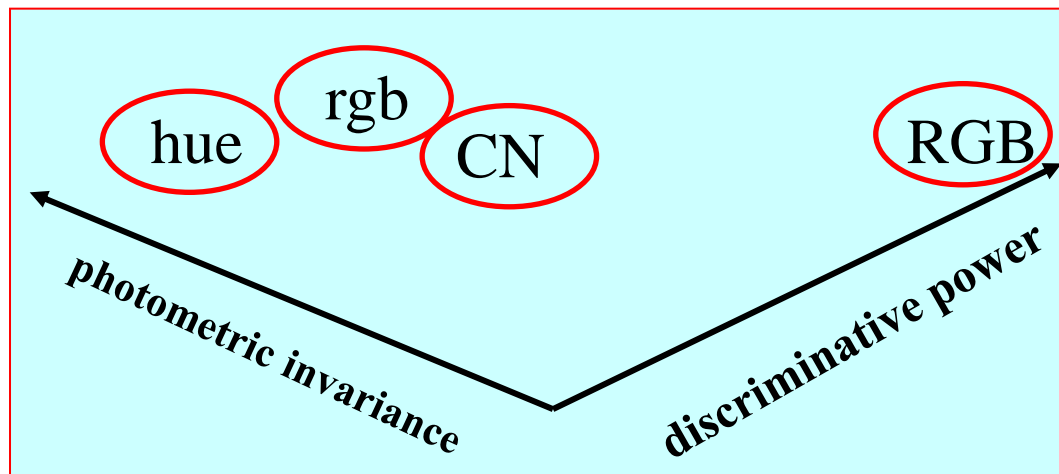
Color name descriptor

- Achromatic colors are very abundant in the world, about 45 % (67 % with brown) .

black	blue	brown	grey	green	orange	pink	purple	red	white	yellow
19	12	23	19	10	2	2	2	4	6	1

statistics based 40.000 corel images.

- when using photometric invariance always consider discriminative power.



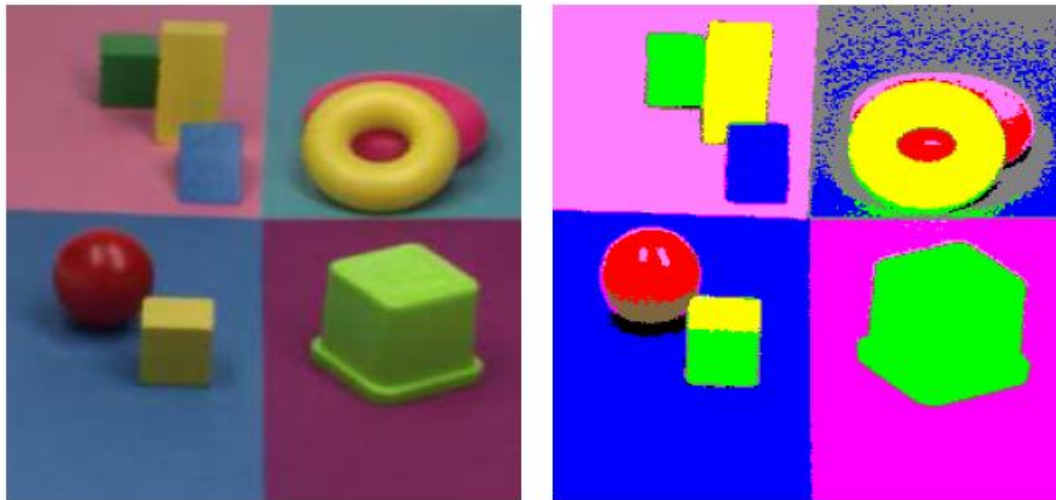
Color name descriptor

- Achromatic colors are very abundant in the world, about 45 % (more than 60 % with brown) .

black	blue	brown	grey	green	orange	pink	purple	red	white	yellow
19	12	23	19	10	2	2	2	4	6	1

statistics based 40.000 corel images.

- when using photometric invariance always consider discriminative power.



Color name descriptor

- test color names for image classification on a flower data set of 1360 images over 17 classes.



dataset		flower	
method	color	shape	color & shape
HSV-SIFT	-	-	78
hue	40	65	79
opponent	39	65	79
color names	57	65	81

references: color naming

- B. Berlin, P. Kay. *Basic Color terms: their universality and evolution*. Berkeley: University of California, 1969.
- A. Mojsilovic. *A computational model for color naming and describing color composition of images*. IEEE TIP 14(5), 2005.
- K. Yanai, K. Barnard, Image region entropy: a measure of *visualness* of web images associated with on concept, ACM MM 2005.
- R. Benavente, M. Vanrell, R. Baldrich. *Parametric fuzzy sets for automatic color naming*, JOSA 25(10), 2008.
- G. Menegaz, A. L. Troter, J. Sequeira, and J. M. Boi, “A discrete model for color naming,” EURASIP Journal on Advances in Signal Processing, vol. 2007, 2007.
- J. van de Weijer, Cordelia Schmid, Jakob Verbeek, Diane Larlus. *Learning Color Names for Real-World Applications*. IEEE TIP 2009.