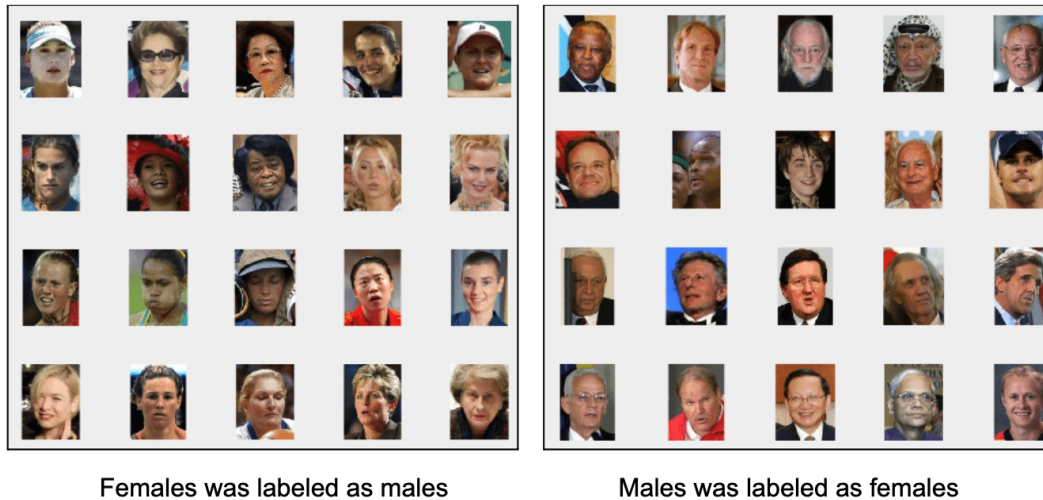# LFW Relabeling

LFWA (Huang et al. 2007) is a widely used face attribute dataset; however it contains some labelling mistakes.

Females was labeled as males   Males was labeled as females

We relabelled the **test portion of the dataset** in order to obtain more reliable results in comparing different face attribute learning algorithms. Note that the relabelling of test set directly affects the quality of the estimated error, while errors in the training set may be tolerated to some extent by a robust model. We share the results as modifications denoting all changes made so that it can be verified, as well as the updated file (label_Updated.mat).

We relabeled the training set for one attribute (Male) as well, so as to measure the effect of training set errors on performance. This attribute was also selected because gender classification is an important problem.

In summary, 15 attributes were relabelled. The attributes were selected such that they would be easy to relabel unambiguously and label change was done only when the label error was clear.

References

G. B. Huang, M. Ramesh, T. Berg, and E. Learned-Miller, "Labeled Faces in the Wild: A database for studying face recognition in unconstrained environments," University of Massachusetts, Amherst, Tech. Rep. 07-49, October 2007.

Table 1. Re-labelled attributes and changed label distributions.

AttributeName	Distribution		Correction		Total
	True	False	True->False	False->True	Re-Labelling
Bald	731	6149	360	200	8.14%
Eye Glasses	1239	5641	236	273	7.40%
Gray Hair	1083	5797	299	16	15.72%
Heavy Makeup	743	6137	200	209	5.94%
Male	5420	1460	202	215	6.06%
Mouth Slightly Open	2841	4039	144	1514	24.10%
Mustache	920	5960	171	198	5.36%
No Beard	4820	2060	60	1447	11.03%
Receding Hairline	4117	2763	47	0	0.06%
Smiling	2717	4163	252	350	8.75%
Wavy Hair	3062	3818	0	2	0.002%
Wearing Hat	996	5884	601	134	10.68%
Wearing Lipstick	995	5885	209	128	4.90%
Wearing Necklace	1342	5538	8	51	0.85%
Wearing Necktie	4410	2470	1568	245	26.35%

Attributes and Re-Labelling Counts

Attribute 5 - Bald
[731 true, 6149 false]

Correction of the testset
From not bald to bald: 200 samples relabelled (3.25% = 200/6149)
From bald to not bald: 360 samples relabelled (49.25% = 360/731))
Total: 560 samples relabelled (8.14%)

Attribute 16 - EyeGlasses
1239 true and 5641 false

Correction of the testset
From not wearing eyeglasses to wearing eyeglasses: 273 samples relabelled (4.84% error = 273/5641)
From wearing eye glasses to not wearing eyeglasses: 236 samples relabelled (19.05% error = 236/1239)
Total: 509 samples (7.4%)

Attribute 18 - Gray Hair
[1083 true, 5797 false]

Correction of the testset
From not having gray hair to having gray hair: 16 samples relabelled(0.02% error = 16/5797)
From having gray hair to not having gray hair: 299 samples relabelled (27.52% error = 299/1083)
Total: 1082 samples (15.72%)

Attribute 19 - Heavy Makeup
[743 true, 6137 false]

Correction of the testset
From not wearing heavy makeup to wearing heavy makeup: 209 samples relabelled(3.4% error = 209/6137)
From wearing heavy makeup to not wearing heavy makeup: 200 samples relabelled (26.91% error = 200/743)
Total: 409 samples relabelled (5.94%)

Attribute 21 - Male
[4761 true, 1502 false]

Correction of the testset
From female to male: 215 samples relabelled (13,31% error = 215/1502)
From male to female: 202 samples relabelled (3.72% error = 202/5420)
Total: 417 samples relabelled (6.06%)

Correction of the trainset
From female to male: 203 samples relabelled (14,72% error = 203/1460)
From male to female: 213 samples relabelled (4.24% error = 213/4761)
Total: 416 samples relabelled (6.65%)

[Attribute 22 - Mouth Slightly Open](#)
      [2841 true and 4039 false]

Correction of the testset
    From closed mouth to open mouth: 1514 samples relabelled (37.48% error = 1514/4039)
    From open mouth to closed mouth: 144 samples relabelled (5.07% error = 144/2841)
    Total: 1658 samples relabelled (24.10%)

[Attribute 23 - Mustache](#)
      [920 true, 5960 false]

Correction of the testset
    From without mustache to with mustache: 198 samples relabelled (3.32% error = 198/5960)
    From with mustache to without mustache: 171 samples relabelled (18.59% error = 171/920)
    Total: 369 samples relabelled (5.36%)

[Attribute 25 - No Beard](#)
      [4820 true and 2060 false]

Correction of the testset
    From with beard to without beard: 1447 samples relabelled (70.24% error = 1447/2060)
    From without beard to with beard: 60 samples relabelled (1.24% error = 60/4820)
    Total: 1507 samples relabelled (21.90%)

[Attribute 29 -Receding Hairline](#)
      [4117 true, 2763 false]

Correction of the testset
    From without receding hairline to with receding hairline: 0 (0% error)
    From with receding hairline to without receding hairline: 47 samples relabelled (0.02% error = 47/4117)
    Total: 47 samples relabelled (0.06%)

[Attribute 32 - Smiling](#)
      [2717 true, 4163 false]

Correction of the testset
    From not smiling to smiling: 350 samples relabelled (8.41% error = 350/4163)
    From smiling to not smiling: 252 samples relabelled (9.27% error = 252/2717)
    Total: 602 samples relabelled (8.75%)

[Attribute 34 - Wavy Hair](#)
  [3062 true, 3818 false]

   Correction of the testset
    From without wavy hair to with wavy hair: 2 samples relabelled (0.05% error = 2/3818)
    From with wavy to without wavy hair: 0 (0% error)
    Total: 2 samples relabelled (0.002%)

[Attribute 36 - Wearing Hat](#)
  [996 true, 5884 false]

   Correction of the testset
    From not wearing hat to wearing hat: 134 samples relabelled (2.28% error = 134/5884)
    From wearing hat to not wearing hat: 601 samples relabelled (60.34% error = 601/996)
    Total: 735 samples relabelled (10.68%)

[Attribute 37 - Wearing Lipstick](#)
  [995 true, 5885 false]

   Correction of the testset
    From not wearing lipstick to wearing lipstick: 128 samples relabelled (2.18% error = 128/5885)
    From wearing lipstick to not wearing lipstick: 209 samples relabelled (21.01% error = 209/995)
    Total: 337 samples relabelled (4.90%)

[Attribute 38 - Wearing Necklace](#)
  [1342 true, 5538 false]

   Correction of the testset
    From not wearing necklace to wearing necklace: 51 samples relabelled (0.92% error = 51/5538)
    From wearing necklace to not wearing necklace: 8 samples relabelled (0.05% error = 8/1342)
    Total: 59 samples relabelled (0.85%)

[Attribute 39 - Wearing Necktie](#)
  [4410 true and 2470 false]

   Correction of the testset
    From not wearing necktie to wearing necktie: 245 samples relabelled (9.92% error = 245/2470)
    From wearing necktie to not wearing necktie: 1568 samples relabelled (35.56% error = 1568/4410)
    Total: 1813 samples relabelled (26.35%)