Cvičenie 10

Cvičenia z Počítačového Videnia **2**

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CBIR

CBIR= Content based image retrieval
1. Text based search
2. Content based search

ESP game, Google Image labeler

https://www.ted.com/talks/fei_fei_li_how_we_re_teaching_computers_to_understand_pictures

Porovnavanie histogramov

$$intersection(h(I), h(M)) = \sum_{j=1}^{K} min\{h(I)[j], h(M)[j]\}$$

Euclidean $$d_E(h, g) = \sum_{m=0}^{M-1} (h[m] - g[m])^2$$

L1
$$\begin{aligned} \mathrm{d}_{L_1}(H_1, H_2) &= 1 - 0.5 * \|H_1 - H_2\|_{L_1} \\ &= 1 - 0.5 * \sum_{i=1}^{C_p} |H_{1_i} - H_{2_i}|. \end{aligned}$$

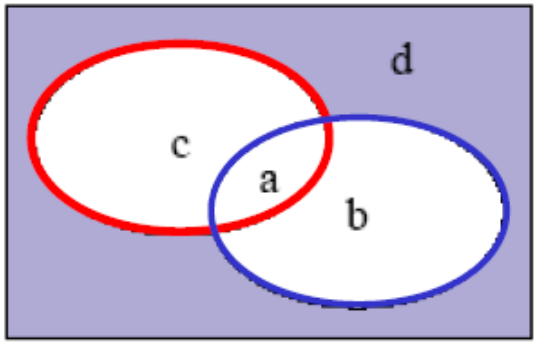
L2
$$\begin{aligned} \mathrm{d}_{L_2}(H_1, H_2) &= 1 - \frac{1}{\sqrt{2}} * \|H_1 - H_2\|_{L_2} \\ &= 1 - \frac{1}{\sqrt{2}} * \sqrt{\sum_{i=1}^{C_p} (H_{1_i} - H_{2_i})^2}. \end{aligned}$$

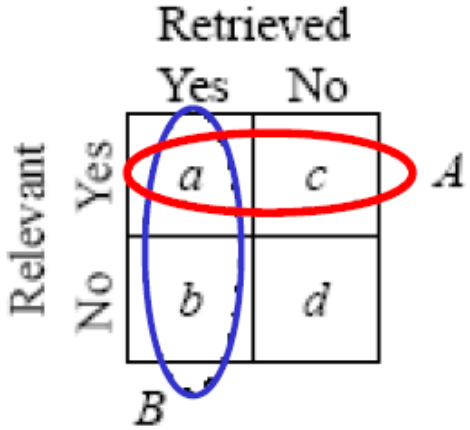
Scaled histogram intersection
$$\mathrm{d}_{HI}(H_1, H_2) = \sum_{i=1}^{C_p} \min(H_{1_i}, H_{2_i}) * (1 - |H_{1_i} - H_{2_i}|).$$

Meranie výkonu

Precision $$P = \frac{r}{n_2} = \frac{\text{number of relevant retrieved images}}{\text{number of retrieved images}}$$

Recall $$R = \frac{r}{n_1} = \frac{\text{number of relevant retrieved images}}{\text{total number of relevant images in DB}}$$





$$recall = \frac{a}{a+c}$$

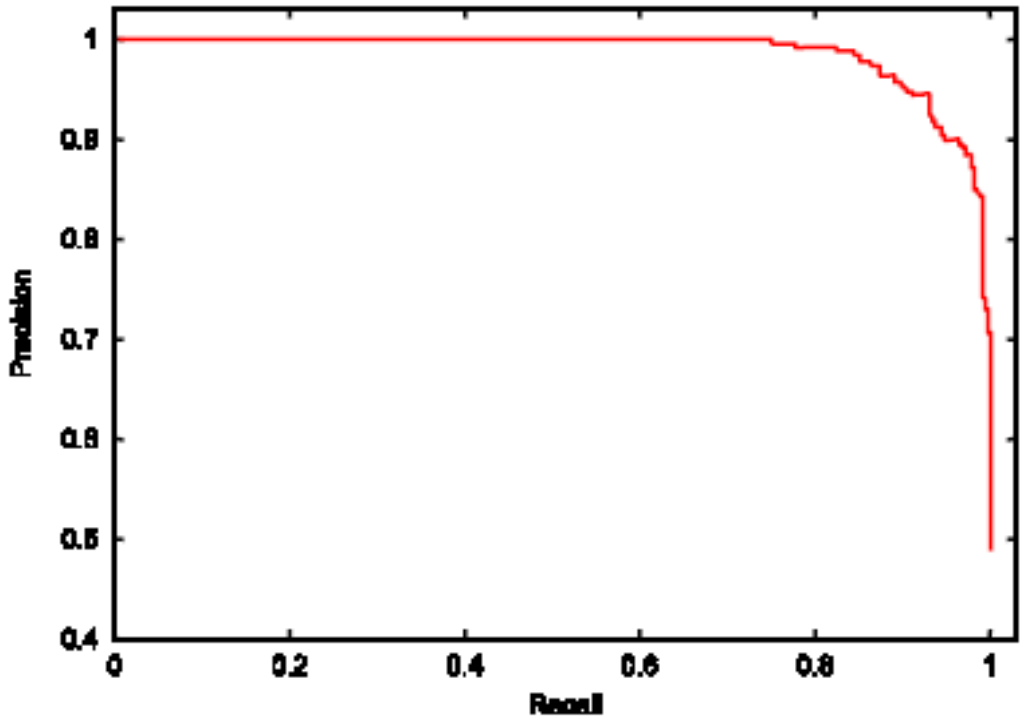
$$precision = \frac{a}{a+b}$$

$$F_1 = 2 \cdot \frac{P \cdot R}{P + R}$$

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
14	0	1	0	0	0	0	0	0	0	0	0	0	0	7	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
16	3	0	1	0	0	6	2	0	2	1	3	3	1	0	2	0

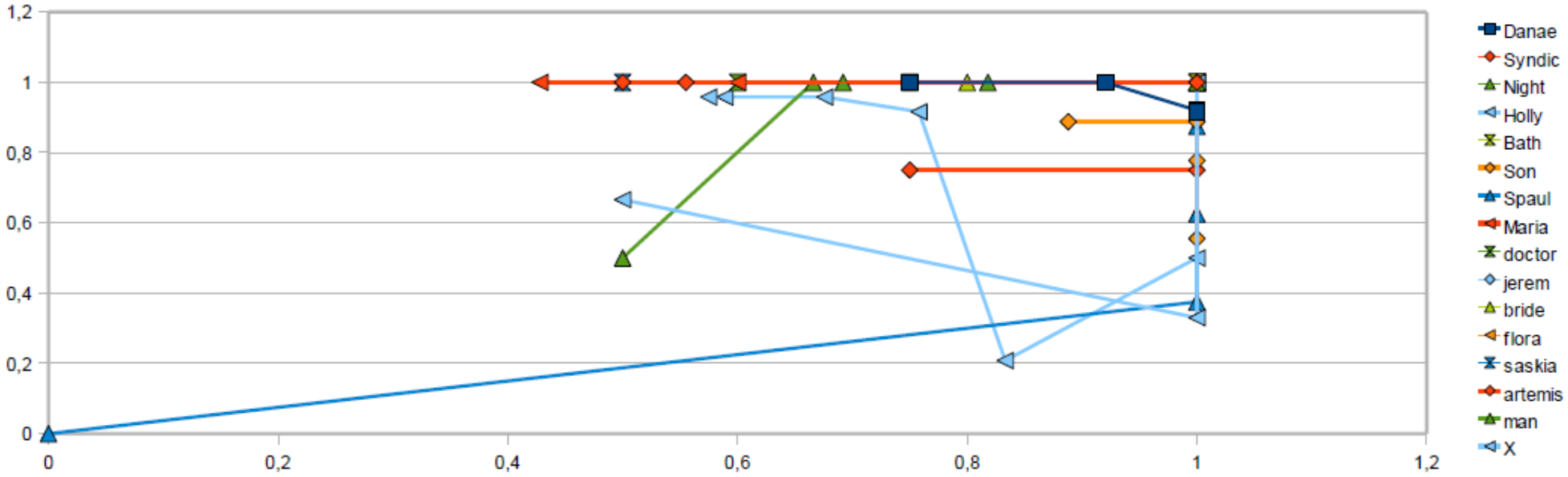
Meranie výkonu

Precision Recall Graf
Zobraz recall na horizontalnu os,
Precision na vertikalnu a sleduj zmenu pre rôzne prahy



Precision/Recall

Ak mate viac ako 2 triedy (Ano/Nie)
Confusion matrix z nej potom Precision/Recall pre vsetky triedy, pre rozne prahy



MDS

Multidemensional Scaling

Ako vizualizovať vzdialenosť obrázkov?

10 000 pixlov – 10 000 dimenzií?
7 príznakov- 7 dimenzií?
7 príznakv => MDS => 2 dimenzie