

Topic 44: Mountains on mainland Australia

Relevant images will show mountains on mainland Australia. Images of mountains of Australian islands (e.g. Tasmania, Kangaroo Island, etc.) are not relevant. Mountains outside Australia are not relevant. Photos from Australia with no mountains are not relevant. The original query in the log file was “mountains in X”, where X is a country or region in South America. We changed “South America” to “mainland Australia” to create a challenging geographic topic.



Figure A.44: Sample images for Topic 44.

Topic 45: South American meat dishes

Relevant images will show a plate with a South American meat dish. Images of a South American dish without meat are not relevant. Seafood (fish, shrimps, lobster, etc.) is not considered as meat and is thus not relevant (note: Ceviche is seafood). Dishes that are not South American are not relevant either. Food is important on *viventura* trips, and *viventura* hence offers traditional South American dishes. Especially “cuy”, a fried guinea pig and the national dish of Ecuador, is popular among tourists. Before a trip, tourists often want to see what kind of food they can expect, or they want to show their friends afterwards what they dared to eat.



Figure A.45: Sample images for Topic 45.

Topic 46: Asian women and/or girls

Relevant images will show one or more women and/or girls with Asian features. Images with Asian men are not relevant. Images of women or girls without Asian features are not relevant unless there is at least one Asian woman or girl in the image. There seems to be a high number of queries for women or girls in any database of realistic images, and the *viventura* log file is hereby not an exception. We narrowed these searches to Asian women to (1) keep the number of relevant images below 100, and (2) because Asian does not only refer to “women in Asia”, but also to women with Asian features outside Asia.



Figure A.46: Sample images for Topic 46.

Topic 47: Photos of heavy traffic in Asia

Relevant images will show roads and streets with heavy traffic (including cars, mopeds, buses, bicycles, etc.) in Asia. Images of empty roads in Asia or of vehicles which are not in streets or on roads are not relevant. Traffic images from other continents are not relevant, however although Russia politically belongs to Europe, images from the Asian part of Russia are relevant. Big cities in South America are quite chaotic when it comes to traffic, especially Lima or Buenos Aires, and although *viventura* attempts to avoid the rush hours or the traffic in general, it can happen that tourist groups get caught up in traffic jams. We changed the topic to Asia, because (1) the collection contains traffic images from Taiwan and Korea and (2) it creates an additional geographic challenge as all images are annotated with the specific countries and not with the continent.



Figure A.47: Sample images for Topic 47.

Topic 48: Vehicle in South Korea

Relevant images will show vehicles in South Korea, including cars, trains, buses, forklifts, boats, and so on. Images with vehicles outside of South Korea are not relevant. Images from South Korea without a single vehicle are not relevant either. Car lovers always take photos of cars, and this behaviour does not change on a trip to South America either. Further, there are also other interesting vehicles like the public buses or the tram in Quito (Ecuador) that runs as a left-hand traffic in an otherwise right-hand traffic oriented country. We took such a general general query from the log file and changed it to South Korea to adapt the number of relevant images to below 100.



Figure A.48: Sample images for Topic 48.

Topic 49: Images of typical Australian animals

Relevant images will show an animal that is unique to Australia and lives nowhere else, like kangaroos, wallabies, koalas, wombats, quokkas, platypuses, possums or Tasmanian devils. Images of other animals are not relevant unless there is at least one of the aforementioned animals present in the image too. See also topic 20. The original log file entry was “images of typical Brazilian animals”, which we changed to “Australian” because (1) there are no animals in the collection that would be

specific to Brazil only and (2) the collection contains a good number of such animals for Australia.



Figure A.49: Sample images for Topic 49.

Topic 50: Indoor photos of churches or cathedrals

Relevant images will show an interior view of a church or cathedral. Images showing exterior views of churches or cathedrals are not relevant. Interior views of other buildings than fanes are not relevant. The majority of the population in South America is very religious, which is also reflected in their culture and the interior of churches and cathedrals, which is often stunning. If something is stunning, then photos are taken. And if photos are stunning, people subsequently look them up to show them to friends.



Figure A.50: Sample images for Topic 50.

Topic 51: Photos of goddaughters from Brazil

Relevant images will show female godchildren from Brazil. Godchildren from other countries or male godchildren from Brazil are not relevant. The *viventura* sponsor-

ship program has recently started to support godchildren in Brazil. Thus, anyone who was wanting to sponsor a girl in Brazil could have written such a query.



Figure A.51: Sample images for Topic 51.

Topic 52: Sports people with prizes

Relevant images will show sports people with medals, trophies, cups or other types of sports prizes. Images of sportsmen or women without a prize are not relevant. This topic represents a request for general sports photos, plus an additional text retrieval challenge (specific *vs.* general concept). The image collection contains many sports photos, thus, this topic was also created to satisfy the criterion to cover a good cross-section of the images in the collection (see also Topic 22).



Figure A.52: Sample images for Topic 52.

Topic 53: Views of walls with asymmetric stones

Relevant images will show a wall made of asymmetric stones or bricks. A wall with regular, cuboid, cubic or round bricks or stones is not relevant. An asymmetric stone or brick which is not part of a wall is not relevant either. One of Cuzco's main attraction is "Calle Hatunrumiyoc", which is a street famous for walls with asymmetric stones. "Hatunrumiyoc" is often also spelled as "Jatun Rumiyoc", with

other versions existing as well, and since it is not the most memorable name, tourists often rather look for “the wall with asymmetric stones”.



Figure A.53: Sample images for Topic 53.

Topic 54: Famous television (and telecommunication) towers

Relevant images will show famous television and telecommunication towers (like the Eiffel Tower, the Seoul Tower, the Stratosphere Tower, the Sydney Sky Tower etc). Skyscrapers are not towers (although they are often wrongly named “tower”, like the Rialto Towers, Petronas Towers, Twin Towers, etc.) and are therefore not relevant. This topic was created as an attempt to include photos of famous towers, together with the additional challenge that many high-rise buildings are wrongly named towers (*e.g.* Rialto Towers, Petronas Towers, Twin Towers) although they are (or were) buildings.

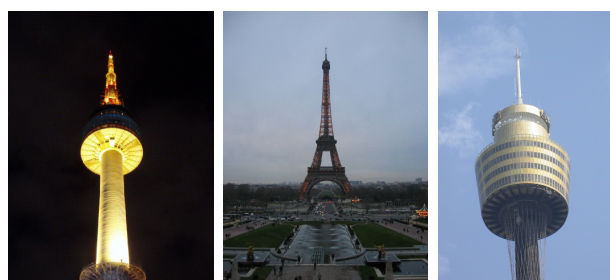


Figure A.54: Sample images for Topic 54.

Topic 55: Drawings in Peruvian deserts

Relevant images will show drawings that were found in deserts in Peru. This includes the Nazca-Lines near Nazca, the Candelabro in Paracas or the petroglyphs

of Toro Muerto near Corire. Images in which the drawings are clearly visible are relevant. Images of drawings that are not in Peruvian deserts are not relevant, and images of drawings that are not visible in the image are not relevant either. Peruvian deserts show some mysterious lines and drawings like the Nazca Lines, the petroglyphs of Toro Muerto or the Candelabro in Paracas. Most *viventura* tours in Peru visit all three and they are one of the highlights of the trip.



Figure A.55: Sample images for Topic 55.

Topic 56: Photos of oxidised vehicles

Relevant images will show one or more oxidised (rusty) vehicles. Images of new vehicles or vehicles with no rust are not relevant. Images of rusty objects that are not vehicles are not relevant either. Some tours travel past rusty tourist attractions like the wreck of the “Capitán Leonidas” in the Patagonian fjords, or the “Train Cemetery” in Uyuni. Tourists often query general terms to find specific attractions again (because not all the tourists write diaries and often forget proper names).



Figure A.56: Sample images for Topic 56.

Topic 57: Photos of radio telescopes

Relevant images will show a radio telescope in the foreground or background. Images without a radio telescope are not relevant. This topic was meant to be a visual topic

at first (shape of the radio telescope), but there were other images of radio telescopes that were visually not that similar. We dropped the idea, but kept the topic.



Figure A.57: Sample images for Topic 57.

Topic 58: Seals near water

Relevant images will show seals (or more specific: fur seals, ear seals and sea lions) at a body of water (sea, lake, etc.). The water has to be visible for an image to be relevant. Images of seals with no water visible in the image are not relevant. Images of water but without seals are not relevant either. Some tours include boat trips to islands that provide a habitat to many sea lions, for example the Ballestas Islands near Paracas in Peru. Tourists often refer to sea lions as seals (which is not wrong, because sea lions are part of the seal family), so this topic was automatically created as a nice text retrieval challenge to investigate specific *vs.* general concepts.

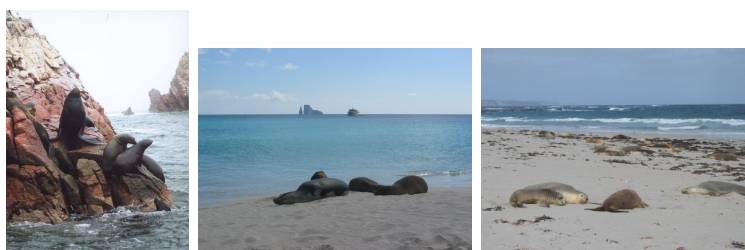


Figure A.58: Sample images for Topic 58.

Topic 59: Creative group pictures in Uyuni

Relevant images will show tourist groups of at least three people in an unconventional, creative, even funny pose in Uyuni. These poses include creative formations, experiments with perspectives, tourists dancing, handstanding and so on. Images with tourists just standing in a conventional way or posing like a soccer team are

not relevant. Images of just one or two persons are not considered as a group and are not relevant either. Images with groups that are not posing in Uyuni are not relevant. The Salar of Uyuni is a (mostly dried-up) salt pan in Bolivia, which is completely white and provides a nice background for group photos. Tourists often take funny and creative group shots there and, motivated by the guides, try to outperform former groups in style, creativity and craziness. Not surprisingly, there are always many requests after each tour to see what other groups came up with.

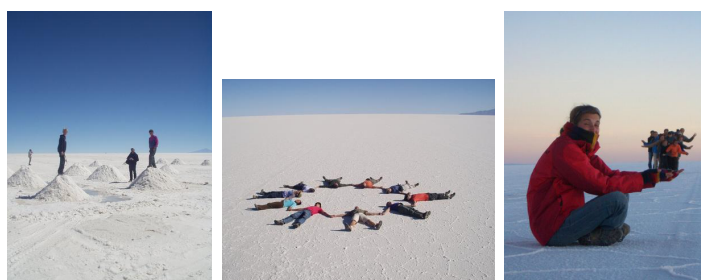


Figure A.59: Sample images for Topic 59.

Topic 60: Salt heaps in salt pan

Relevant images will show one or more salt piles in a salt pan. Images of a salt pan without salt piles are not relevant. The majority of Bolivia’s salt is extracted from the Salar de Uyuni, and this salt extraction process creates many salt piles. There is one salt pile with a Bolivian flag next to a hotel made of salt, and tourists often pose with that pile. To test vocabulary mismatches, we changed “piles” to “heaps”.

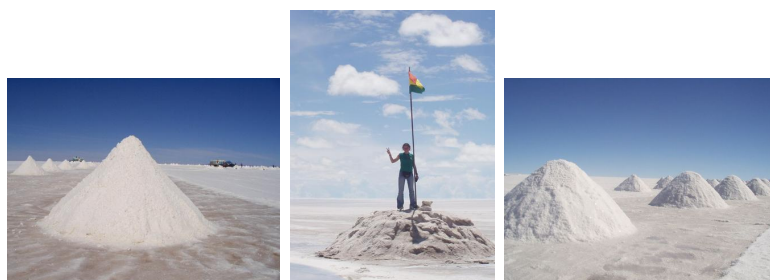


Figure A.60: Sample images for Topic 60.

A.2 Topic Relevance Assessments

This section provides further information on the relevance assessments of the IAPR TC-12 Benchmark. For each topic, the total number of images in the relevance pool, the number of relevant images within that pool, the number of additionally found images using ISJ, and the total number of relevant images are given. In particular, Table A.1 provides information on the relevance assessments of the topics used in the *ImageCLEFphoto 2006* ad-hoc retrieval task (ID between 1 and 60).

ID	#Total (Pool)	#Rel. (Pool)	#Rel. (ISJ)	#Rel. (Total)	ID	#Total (Pool)	#Rel. (Pool)	#Rel. (ISJ)	#Rel. (Total)
1	889	28	9	37	31	789	40	21	61
2	884	27	3	30	32	1355	19	10	29
3	1142	23	11	34	33	893	47	6	53
4	1328	30	41	71	34	1204	47	33	80
5	780	48	19	67	35	775	74	17	91
6	1181	74	13	87	36	847	84	24	108
7	1098	42	10	52	37	1149	75	20	95
8	1068	50	27	77	38	743	23	3	26
9	1215	8	7	15	39	1380	28	47	75
10	916	37	2	39	40	1468	55	52	107
11	1255	65	3	68	41	1121	36	102	138
12	1168	30	4	34	42	1008	44	4	48
13	1128	35	39	74	43	922	35	8	43
14	877	34	3	37	44	1253	102	61	163
15	1025	19	7	26	45	981	41	3	44
16	829	40	17	57	46	1020	21	23	44
17	1011	25	5	30	47	1265	35	3	38
18	1246	38	14	52	48	1076	36	0	36
19	1222	39	21	60	49	1001	57	45	102
20	983	19	57	76	50	933	35	4	39
21	1058	46	27	73	51	1357	31	1	32
22	575	86	9	95	52	1118	27	4	31
23	1008	45	33	78	53	965	39	8	47
24	1043	61	4	65	54	1061	21	0	21
25	1020	50	16	66	55	866	63	21	84
26	1015	36	46	82	56	1244	24	7	31
27	919	32	1	33	57	1301	12	0	12
28	1035	36	8	44	58	1002	46	13	59
29	1118	43	0	43	59	941	21	6	27
30	804	14	14	28	60	815	26	5	31

Table A.1: Overview of the ad-hoc topic assessments.

Table A.2 provides information on the relevance assessments of the topics used in the *ImageCLEFphoto 2006* visual subtask (ID between 61 and 90).

ID	#Total (Pool)	#Relevant (Pool)	#Relevant (ISJ)	#Relevant (Total)
61	168	10	20	30
62	196	17	151	168
63	169	6	63	69
64	187	8	184	192
65	183	20	50	70
66	196	36	24	60
67	144	26	12	38
68	163	11	18	29
69	186	5	25	30
70	193	11	57	80
71	83	38	88	126
72	168	16	89	105
73	181	5	95	100
74	150	10	23	33
75	183	14	405	419
76	158	6	53	59
77	196	8	75	83
78	177	9	83	92
79	183	32	85	117
80	175	19	13	32
81	192	16	279	295
82	172	16	30	46
83	159	2	99	101
84	185	4	35	39
85	164	18	360	378
86	171	9	40	49
87	164	11	11	22
88	117	24	60	84
89	180	5	26	31
90	181	7	25	32

Table A.2: Overview of the visual topic assessments.

A.3 Topic Result Overview

This section provides a general overview of the retrieval results for each topic of the *ImageCLEFphoto 2006* ad-hoc retrieval task (topics with an ID between 1 and 30 in Table A.3 and between 31 and 60 in Table A.4) as well as for the visual subtask (topics with an ID between 61 and 90 in Table A.5).

ID	Topic Title	P(20)	MAP
1	accommodation with swimming pool	0.3157	0.2208
2	church with more than two towers	0.0451	0.0550
3	religious statue in the foreground	0.1466	0.0812
4	group standing in front of mountain landscape in Patagonia	0.0136	0.0070
5	animal swimming	0.1340	0.0537
6	straight road in the USA	0.1380	0.1104
7	group standing in salt pan	0.3472	0.2083
8	host families posing for a photo	0.3198	0.2174
9	tourist accommodation near Lake Titicaca	0.0031	0.0027
10	destinations in Venezuela	0.3043	0.3013
11	black and white photos of Russia	0.1386	0.1252
12	people observing football match	0.1201	0.1097
13	exterior view of school building	0.2037	0.0907
14	scenes of footballers in action	0.2929	0.2629
15	night shots of cathedrals	0.3432	0.2924
16	people in San Francisco	0.2235	0.1714
17	lighthouses at the sea	0.3420	0.2751
18	sport stadium outside Australia	0.1870	0.1178
19	exterior view of sport stadia	0.1636	0.0922
20	close-up photograph of an animal	0.0559	0.0115
21	accommodation provided by host families	0.1963	0.1386
22	tennis player during rally	0.4377	0.4589
23	sport photos from California	0.1525	0.0662
24	snowcapped buildings in Europe	0.1068	0.0901
25	people with a flag	0.1861	0.1086
26	godson with baseball cap	0.1256	0.0664
27	motorcyclists racing at the Australian Motorcycle Grand Prix	0.2827	0.3025
28	cathedrals in Ecuador	0.2599	0.1195
29	views of Sydney's world-famous landmarks	0.1741	0.1837
30	room with more than two beds	0.0312	0.0290

Table A.3: Overview of the ad-hoc topic results.

ID	Topic Title	P(20)	MAP
31	volcanos around Quito	0.1491	0.0519
32	photos of female guides	0.1401	0.1065
33	people on surfboards	0.2000	0.1330
34	group pictures on a beach	0.2608	0.1092
35	bird flying	0.5704	0.3001
36	photos with Machu Picchu in the background	0.3765	0.2393
37	sights along the Inka-Trail	0.1910	0.0738
38	Machu Picchu and Huayna Picchu in bad weather	0.1077	0.0852
39	people in bad weather	0.0333	0.0097
40	tourist destinations in bad weather	0.0623	0.0157
41	winter landscape in South America	0.0367	0.0090
42	pictures taken on Ayers Rock	0.2478	0.2622
43	sunset over water	0.2210	0.1472
44	mountains on mainland Australia	0.1750	0.1093
45	South American meat dishes	0.2096	0.1222
46	Asian women and/or girls	0.2710	0.1291
47	photos of heavy traffic in Asia	0.0645	0.0392
48	vehicle in South Korea	0.0750	0.0704
49	images of typical Australian animals	0.1123	0.0810
50	indoor photos of churches or cathedrals	0.2988	0.1866
51	photos of goddaughters from Brazil	0.0355	0.0634
52	sports people with prizes	0.1392	0.0901
53	views of walls with asymmetric stones	0.2941	0.2257
54	famous television (and telecommunication) towers	0.1210	0.1418
55	drawings in Peruvian deserts	0.2361	0.0958
56	photos of oxidised vehicles	0.0877	0.0676
57	photos of radio telescopes	0.3006	0.5161
58	seals near water	0.4216	0.2222
59	creative group pictures in Uyuni	0.0627	0.0532
60	salt heaps in salt pan	0.4040	0.2952

Table A.4: Overview of the ad-hoc topic results (continued).

ID	Topic Title	P(20)	MAP
61	church with more than two towers	0.1000	0.0402
62	group in front of mountain landscape	0.0750	0.0102
63	animal swimming	0.1417	0.0218
64	straight road	0.1417	0.0092
65	group standing in salt pan	0.1667	0.0354
66	black and white photos	0.1667	0.1039
67	scenes of footballers in action	0.2750	0.1446
68	night shots of cathedrals	0.1167	0.0492
69	lighthouses at the sea	0.0667	0.0255
70	close-up photograph of an animal	0.0250	0.0039
71	tennis player on tennis court	0.8333	0.2888
72	snowcapped buildings	0.2667	0.0577
73	child wearing baseball cap	0.1000	0.0114
74	motorcyclists riding on racing track	0.3417	0.2096
75	exterior view of churches or cathedrals	0.1250	0.0087
76	people on surfboards	0.3333	0.1108
77	group pictures on a beach	0.0750	0.0101
78	bird flying	0.2917	0.0485
79	photos with Machu Picchu in the background	0.2667	0.0554
80	Machu Picchu and Huayna Picchu in bad weather	0.1167	0.0605
81	winter landscape	0.0583	0.0076
82	sunset over water	0.1417	0.0537
83	images of typical Australian animals	0.3000	0.0469
84	indoor photos of churches or cathedrals	0.0167	0.0021
85	photos of dark-skinned girls	0.2083	0.0318
86	views of walls with asymmetric stones	0.2000	0.0561
87	television and telecommunication towers	0.1000	0.0473
88	drawings in deserts	0.6000	0.1901
89	photos of oxidised vehicles	0.0583	0.0167
90	salt heaps in salt pan	0.1167	0.0447

Table A.5: Overview of the visual topic results.

A.4 Topic Results by Geographic Constraints

This section provides an overview of the distribution of the query topics with respect to geographic constraints.

A total of 24 topics specified a particular location (Table A.6), 20 topics a general location or a man-made object (Table A.7), and 16 topics did not contain any geography (Table A.8). The topics within each of these three groups are ordered by their average MAP values.

ID	Topic Title	P(20)	MAP
27	motorcyclists racing at the Australian Motorcycle Grand Prix	0.2827	0.3025
10	destinations in Venezuela	0.3043	0.3013
42	pictures taken on Ayers Rock	0.2478	0.2622
36	photos with Machu Picchu in the background	0.3765	0.2393
29	views of Sydney’s world-famous landmarks	0.1741	0.1837
16	people in San Francisco	0.2235	0.1714
11	black and white photos of Russia	0.1386	0.1252
28	cathedrals in Ecuador	0.2599	0.1195
18	sport stadium outside Australia	0.1870	0.1178
6	straight road in the USA	0.1380	0.1104
44	mountains on mainland Australia	0.1750	0.1093
55	drawings in Peruvian deserts	0.2361	0.0958
24	snowcapped buildings in Europe	0.1068	0.0901
38	Machu Picchu and Huayna Picchu in bad weather	0.1077	0.0852
37	sights along the Inka-Trail	0.1910	0.0738
48	vehicle in South Korea	0.0750	0.0704
23	sport photos from California	0.1525	0.0662
51	photos of goddaughters from Brazil	0.0355	0.0634
59	creative group pictures in Uyuni	0.0627	0.0532
31	volcanos around Quito	0.1491	0.0519
47	photos of heavy traffic in Asia	0.0645	0.0392
41	winter landscape in South America	0.0367	0.0090
4	group standing in front of mountain landscape in Patagonia	0.0136	0.0070
9	tourist accommodation near Lake Titicaca	0.0031	0.0027

Table A.6: Topics specifying a particular location.

ID	Topic Title	P(20)	MAP
57	photos of radio telescopes	0.3006	0.5161
60	salt heaps in salt pan	0.4040	0.2952
15	night shots of cathedrals	0.3432	0.2924
17	lighthouses at the sea	0.3420	0.2751
53	views of walls with asymmetric stones	0.2941	0.2257
58	seals near water	0.4216	0.2222
1	accommodation with swimming pool	0.3157	0.2208
7	group standing in salt pan	0.3472	0.2083
50	indoor photos of churches or cathedrals	0.2988	0.1866
43	sunset over water	0.2210	0.1472
54	famous television (and telecommunication) towers	0.1210	0.1418
21	accommodation provided by host families	0.1963	0.1386
33	people on surfboards	0.2000	0.1330
12	people observing football match	0.1201	0.1097
34	group pictures on a beach	0.2608	0.1092
19	exterior view of sport stadia	0.1636	0.0922
13	exterior view of school building	0.2037	0.0907
3	religious statue in the foreground	0.1466	0.0812
2	church with more than two towers	0.0451	0.0550
30	room with more than two beds	0.0312	0.0290

Table A.7: Topics specifying general locations or man-made objects.

ID	Topic Title	P(20)	MAP
22	tennis player during rally	0.4377	0.4589
35	bird flying	0.5704	0.3001
14	scenes of footballers in action	0.2929	0.2629
8	host families posing for a photo	0.3198	0.2174
46	Asian women and/or girls	0.2710	0.1291
45	South American meat dishes	0.2096	0.1222
25	people with a flag	0.1861	0.1086
32	photos of female guides	0.1401	0.1065
52	sports people with prizes	0.1392	0.0901
49	images of typical Australian animals	0.1123	0.0810
56	photos of oxidised vehicles	0.0877	0.0676
26	godson with baseball cap	0.1256	0.0664
5	animal swimming	0.1340	0.0537
40	tourist destinations in bad weather	0.0623	0.0157
20	close-up photograph of an animal	0.0559	0.0115
39	people in bad weather	0.0333	0.0097

Table A.8: Topics with no geography.

A.5 Results by Log File Involvement

This section provides an overview of the distribution of the query topics with respect to their log file involvement.

A total of 10 topics were not taken from the log file (Table A.9), 10 topics were derived from the log file (Table A.10), and 40 topics were directly taken from the log file (Table A.11). The topics within each of these three groups are ordered by their average MAP values.

ID	Topic Title	P(20)	MAP
57	photos of radio telescopes	0.3006	0.5161
22	tennis player during rally	0.4377	0.4589
27	motorcyclists racing at the Australian Motorcycle Grand Prix	0.2827	0.3025
14	scenes of footballers in action	0.2929	0.2629
54	famous television (and telecommunication) towers	0.1210	0.1418
11	black and white photos of Russia	0.1386	0.1252
18	sport stadium outside Australia	0.1870	0.1178
12	people observing football match	0.1201	0.1097
52	sports people with prizes	0.1392	0.0901
23	sport photos from California	0.1525	0.0662

Table A.9: Topics not taken from the log file.

ID	Topic Title	P(20)	MAP
42	pictures taken on Ayers Rock	0.2478	0.2622
16	people in San Francisco	0.2235	0.1714
46	Asian women and/or girls	0.2710	0.1291
6	straight road in the USA	0.1380	0.1104
44	mountains on mainland Australia	0.1750	0.1093
19	exterior view of sport stadia	0.1636	0.0922
24	snowcapped buildings in Europe	0.1068	0.0901
49	images of typical Australian animals	0.1123	0.0810
48	vehicle in South Korea	0.0750	0.0704
47	photos of heavy traffic in Asia	0.0645	0.0392

Table A.10: Topics derived from the log file.

ID	Topic Title	P(20)	MAP
10	destinations in Venezuela	0.3043	0.3013
35	bird flying	0.5704	0.3001
60	salt heaps in salt pan	0.4040	0.2952
15	night shots of cathedrals	0.3432	0.2924
17	lighthouses at the sea	0.3420	0.2751
36	photos with Machu Picchu in the background	0.3765	0.2393
53	views of walls with asymmetric stones	0.2941	0.2257
58	seals near water	0.4216	0.2222
1	accommodation with swimming pool	0.3157	0.2208
8	host families posing for a photo	0.3198	0.2174
7	group standing in salt pan	0.3472	0.2083
50	indoor photos of churches or cathedrals	0.2988	0.1866
29	views of Sydney's world-famous landmarks	0.1741	0.1837
43	sunset over water	0.2210	0.1472
21	accommodation provided by host families	0.1963	0.1386
33	people on surfboards	0.2000	0.1330
45	South American meat dishes	0.2096	0.1222
28	cathedrals in Ecuador	0.2599	0.1195
34	group pictures on a beach	0.2608	0.1092
25	people with a flag	0.1861	0.1086
32	photos of female guides	0.1401	0.1065
55	drawings in Peruvian deserts	0.2361	0.0958
13	exterior view of school building	0.2037	0.0907
38	Machu Picchu and Huayna Picchu in bad weather	0.1077	0.0852
3	religious statue in the foreground	0.1466	0.0812
37	sights along the Inka-Trail	0.1910	0.0738
56	photos of oxidised vehicles	0.0877	0.0676
26	godson with baseball cap	0.1256	0.0664
51	photos of goddaughters from Brazil	0.0355	0.0634
2	church with more than two towers	0.0451	0.0550
5	animal swimming	0.1340	0.0537
59	creative group pictures in Uyuni	0.0627	0.0532
31	volcanos around Quito	0.1491	0.0519
30	room with more than two beds	0.0312	0.0290
40	tourist destinations in bad weather	0.0623	0.0157
20	close-up photograph of an animal	0.0559	0.0115
39	people in bad weather	0.0333	0.0097
41	winter landscape in South America	0.0367	0.0090
4	group standing in front of mountain landscape in Patagonia	0.0136	0.0070
9	tourist accommodation near Lake Titicaca	0.0031	0.0027

Table A.11: Topics directly taken from the log file.

A.6 Results by Visual Features

This section provides an overview of the distribution of the query topics with respect to their “visuality”.

A total of 30 topics were classified as *semantic*, whereby visual techniques were not expected to improve retrieval results (Table A.12); 10 topics were classified as *visual*, whereby visual techniques were expected to improve retrieval results (Table A.14); and 20 topics were classified in between these two categories (Table A.13). Topics are ordered by their average MAP values.

ID	Topic Title	P(20)	MAP
57	photos of radio telescopes	0.3006	0.5161
10	destinations in Venezuela	0.3043	0.3013
42	pictures taken on Ayers Rock	0.2478	0.2622
8	host families posing for a photo	0.3198	0.2174
50	indoor photos of churches or cathedrals	0.2988	0.1866
29	views of Sydney’s world-famous landmarks	0.1741	0.1837
16	people in San Francisco	0.2235	0.1714
54	famous television (and telecommunication) towers	0.1210	0.1418
21	accommodation provided by host families	0.1963	0.1386
46	Asian women and/or girls	0.2710	0.1291
28	cathedrals in Ecuador	0.2599	0.1195
44	mountains on mainland Australia	0.1750	0.1093
32	photos of female guides	0.1401	0.1065
19	exterior view of sport stadia	0.1636	0.0922
13	exterior view of school building	0.2037	0.0907
52	sports people with prizes	0.1392	0.0901
3	religious statue in the foreground	0.1466	0.0812
37	sights along the Inka-Trail	0.1910	0.0738
48	vehicle in South Korea	0.0750	0.0704
56	photos of oxidised vehicles	0.0877	0.0676
26	godson with baseball cap	0.1256	0.0664
23	sport photos from California	0.1525	0.0662
2	church with more than two towers	0.0451	0.0550
59	creative group pictures in Uyuni	0.0627	0.0532
31	volcanos around Quito	0.1491	0.0519
47	photos of heavy traffic in Asia	0.0645	0.0392
30	room with more than two beds	0.0312	0.0290
40	tourist destinations in bad weather	0.0623	0.0157
4	group standing in front of mountain landscape in Patagonia	0.0136	0.0070
9	tourist accommodation near Lake Titicaca	0.0031	0.0027

Table A.12: Semantic topics.

ID	Topic Title	P(20)	MAP
27	motorcyclists racing at the Australian Motorcycle Grand Prix	0.2827	0.3025
60	salt heaps in salt pan	0.4040	0.2952
17	lighthouses at the sea	0.3420	0.2751
36	photos with Machu Picchu in the background	0.3765	0.2393
58	seals near water	0.4216	0.2222
1	accommodation with swimming pool	0.3157	0.2208
45	South American meat dishes	0.2096	0.1222
18	sport stadium outside Australia	0.1870	0.1178
6	straight road in the USA	0.1380	0.1104
12	people observing football match	0.1201	0.1097
34	group pictures on a beach	0.2608	0.1092
25	people with a flag	0.1861	0.1086
24	snowcapped buildings in Europe	0.1068	0.0901
38	Machu Picchu and Huayna Picchu in bad weather	0.1077	0.0852
49	images of typical Australian animals	0.1123	0.0810
51	photos of goddaughters from Brazil	0.0355	0.0634
5	animal swimming	0.1340	0.0537
20	close-up photograph of an animal	0.0559	0.0115
39	people in bad weather	0.0333	0.0097
41	winter landscape in South America	0.0367	0.0090

Table A.13: Topics with a medium level of visuality.

ID	Topic Title	P(20)	MAP
22	tennis player during rally	0.4377	0.4589
35	bird flying	0.5704	0.3001
15	night shots of cathedrals	0.3432	0.2924
14	scenes of footballers in action	0.2929	0.2629
53	views of walls with asymmetric stones	0.2941	0.2257
7	group standing in salt pan	0.3472	0.2083
43	sunset over water	0.2210	0.1472
33	people on surfboards	0.2000	0.1330
11	black and white photos of Russia	0.1386	0.1252
55	drawings in Peruvian deserts	0.2361	0.0958

Table A.14: Visual topics.

Table A.15 displays the visual topics ordered by their level of “visuality”. A total of 10 topics were classified as *semantic*, whereby visual techniques were not expected to produce good retrieval results; 10 topics were classified as *visual*, whereby visual techniques were expected to produce good retrieval results; and 10 topics were classified in between these two categories. Topics are ordered by their average visuality values.

ID	Topic Title	Level	P(20)	MAP
66	black and white photos	4.75	0.1667	0.1039
82	sunset over water	4.75	0.1417	0.0537
88	drawings in deserts	4.25	0.6000	0.1901
71	tennis player on tennis court	3.75	0.8333	0.2888
64	straight road	3.25	0.1417	0.0092
68	night shots of cathedrals	3.25	0.1167	0.0492
72	snowcapped buildings	3.25	0.2667	0.0577
78	bird flying	3.25	0.2917	0.0485
85	photos of dark-skinned girls	3.25	0.2083	0.0318
86	views of walls with asymmetric stones	3.25	0.2000	0.0561
67	scenes of footballers in action	3.00	0.2750	0.1446
74	motorcyclists riding on racing track	3.00	0.3417	0.2096
76	people on surfboards	3.00	0.3333	0.1108
63	animal swimming	2.75	0.1417	0.0218
69	lighthouses at the sea	2.75	0.0667	0.0255
77	group pictures on a beach	2.75	0.0750	0.0101
81	winter landscape	2.75	0.0583	0.0076
90	salt heaps in salt pan	2.75	0.1167	0.0447
65	group standing in salt pan	2.50	0.1667	0.0354
84	indoor photos of churches or cathedrals	2.25	0.0167	0.0021
62	group in front of mountain landscape	2.00	0.0750	0.0102
70	close-up photograph of an animal	2.00	0.0250	0.0039
79	photos with Machu Picchu in the background	2.00	0.2667	0.0554
80	Machu Picchu and Huayna Picchu in bad weather	2.00	0.1167	0.0605
83	images of typical Australian animals	1.75	0.3000	0.0469
87	television and telecommunication towers	1.75	0.1000	0.0473
89	photos of oxidised vehicles	1.75	0.0583	0.0167
73	child wearing baseball cap	1.50	0.1000	0.0114
75	exterior view of churches or cathedrals	1.50	0.1250	0.0087
61	church with more than two towers	1.25	0.1000	0.0402

Table A.15: Visual topics ordered by their level of visuality.

A.7 Results by Image Caption Completeness

This section provides an overview of the distribution of the query topics with respect to the caption completeness of the corresponding relevant images. The topics within of these groups are ordered by their average MAP values.

ID	Topic Title	P(20)	MAP
57	photos of radio telescopes	0.3006	0.5161
22	tennis player during rally	0.4377	0.4589
27	motorcyclists racing at the Australian Motorcycle Grand Prix	0.2827	0.3025
42	pictures taken on Ayers Rock	0.2478	0.2622
29	views of Sydney's world-famous landmarks	0.1741	0.1837
16	people in San Francisco	0.2235	0.1714
54	famous television (and telecommunication) towers	0.1210	0.1418
46	Asian women and/or girls	0.2710	0.1291
11	black and white photos of Russia	0.1386	0.1252
6	straight road in the USA	0.1380	0.1104
44	mountains on mainland Australia	0.1750	0.1093
24	snowcapped buildings in Europe	0.1068	0.0901
52	sports people with prizes	0.1392	0.0901
49	images of typical Australian animals	0.1123	0.0810
48	vehicle in South Korea	0.0750	0.0704
23	sport photos from California	0.1525	0.0662
2	church with more than two towers	0.0451	0.0550
47	photos of heavy traffic in Asia	0.0645	0.0392

Table A.16: Topics with all relevant images having complete captions.

ID	Topic Title	P(20)	MAP
14	scenes of footballers in action	0.2929	0.2629
58	seals near water	0.4216	0.2222
33	people on surfboards	0.2000	0.1330
45	South American meat dishes	0.2096	0.1222
18	sport stadium outside Australia	0.1870	0.1178
12	people observing football match	0.1201	0.1097
25	people with a flag	0.1861	0.1086
19	exterior view of sport stadia	0.1636	0.0922
56	photos of oxidised vehicles	0.0877	0.0676
5	animal swimming	0.1340	0.0537

Table A.17: Topics with 80% to 99% of relevant images having complete captions.

ID	Topic Title	P(20)	MAP
35	bird flying	0.5704	0.3001
60	salt heaps in salt pan	0.4040	0.2952
17	lighthouses at the sea	0.3420	0.2751
36	photos with Machu Picchu in the background	0.3765	0.2393
53	views of walls with asymmetric stones	0.2941	0.2257
1	accommodation with swimming pool	0.3157	0.2208
50	indoor photos of churches or cathedrals	0.2988	0.1866
43	sunset over water	0.2210	0.1472
28	cathedrals in Ecuador	0.2599	0.1195
34	group pictures on a beach	0.2608	0.1092
32	photos of female guides	0.1401	0.1065
55	drawings in Peruvian deserts	0.2361	0.0958
38	Machu Picchu and Huayna Picchu in bad weather	0.1077	0.0852
37	sights along the Inka-Trail	0.1910	0.0738
31	volcanos around Quito	0.1491	0.0519
40	tourist destinations in bad weather	0.0623	0.0157
20	close-up photograph of an animal	0.0559	0.0115
39	people in bad weather	0.0333	0.0097
9	tourist accommodation near Lake Titicaca	0.0031	0.0027

Table A.18: Topics with 60% to 79% of relevant images having complete captions.

ID	Topic Title	P(20)	MAP
10	destinations in Venezuela	0.3043	0.3013
15	night shots of cathedrals	0.3432	0.2924
8	host families posing for a photo	0.3198	0.2174
7	group standing in salt pan	0.3472	0.2083
21	accommodation provided by host families	0.1963	0.1386
13	exterior view of school building	0.2037	0.0907
3	religious statue in the foreground	0.1466	0.0812
26	godson with baseball cap	0.1256	0.0664
51	photos of goddaughters from Brazil	0.0355	0.0634
59	creative group pictures in Uyuni	0.0627	0.0532
30	room with more than two beds	0.0312	0.0290
41	winter landscape in South America	0.0367	0.0090
4	group standing in front of mountain landscape in Patagonia	0.0136	0.0070

Table A.19: Topics with less than 60% of relevant images having complete captions.

A.8 Results by Topic Difficulty

This section provides an overview of the distribution of the query topics with respect to their estimated topic difficulty.

A total of 4 topics were classified as *very difficult* (Table A.20), 21 as *difficult* (Table A.21), 31 as *medium-hard* (Table A.22) and 4 as *easy* (Table A.23). The topics within each of these groups are ordered by their difficulty value (d).

ID	Topic Title	d	P(20)	MAP
9	tourist accommodation near Lake Titicaca	4.6963	0.0075	0.0055
39	people in bad weather	4.2132	0.0813	0.0279
4	group in front of mountain landscape in Patagonia	4.1194	0.0275	0.0106
40	tourist destinations in bad weather	4.0843	0.1250	0.0345

Table A.20: Very difficult topics.

ID	Topic Title	d	P(20)	MAP
31	volcanos around Quito	3.9224	0.1838	0.0781
59	creative group pictures in Uyuni	3.8323	0.0638	0.0517
3	religious statue in the foreground	3.8223	0.1463	0.0778
2	church with more than two towers	3.7392	0.0888	0.0912
41	winter landscape in South America	3.7215	0.0688	0.0156
47	photos of heavy traffic in Asia	3.6387	0.0963	0.0601
24	snowcapped buildings in Europe	3.5462	0.0663	0.0677
37	sights along the Inka-Trail	3.5353	0.3250	0.1506
46	Asian women and/or girls	3.4318	0.2438	0.1107
50	indoor photos of churches or cathedrals	3.4109	0.2063	0.1305
51	photos of goddaughters from Brazil	3.3478	0.0625	0.0840
49	images of typical Australian animals	3.3472	0.2400	0.1764
20	close-up photograph of an animal	3.2844	0.0888	0.0150
14	scenes of footballers in action	3.2826	0.4375	0.3490
23	sport photos from California	3.1529	0.1588	0.0728
55	drawings in Peruvian deserts	3.1316	0.3113	0.1464
52	sports people with prizes	3.0839	0.2725	0.1617
26	godson with baseball cap	3.0746	0.1650	0.0859
54	famous television (and telecommunication) towers	3.0455	0.2000	0.2045
45	South American meat dishes	3.0333	0.2075	0.1243
18	sport stadium outside Australia	3.0097	0.1788	0.1145

Table A.21: Difficult topics.

ID	Topic Title	d	P(20)	MAP
53	views of walls with asymmetric stones	2.9894	0.2513	0.1936
25	people with a flag	2.9534	0.2075	0.1133
19	exterior view of sport stadia	2.9194	0.1525	0.0801
30	room with more than two beds	2.8590	0.0413	0.0332
28	cathedrals in Ecuador	2.8349	0.2588	0.1251
5	animal swimming	2.8167	0.2888	0.1120
48	vehicle in South Korea	2.8076	0.1213	0.1030
12	people observing football match	2.8020	0.1563	0.1524
38	Machu Picchu and Huayna Picchu in bad weather	2.7985	0.1363	0.1095
7	group standing in salt pan	2.7856	0.4100	0.2500
43	sunset over water	2.7833	0.2400	0.1530
33	people on surfboards	2.7688	0.1713	0.1056
29	views of Sydney's world-famous landmarks	2.7319	0.3013	0.2751
13	exterior view of school building	2.7003	0.1150	0.0500
44	mountains on mainland Australia	2.6924	0.1075	0.1009
58	seals near water	2.6676	0.4613	0.2572
34	group pictures on a beach	2.6514	0.2475	0.1047
15	night shots of cathedrals	2.6028	0.3563	0.2872
60	salt heaps in salt pan	2.5452	0.4588	0.3375
11	black and white photos of Russia	2.4676	0.1125	0.0936
42	pictures taken on Ayers Rock	2.4330	0.1750	0.2500
21	accommodation provided by host families	2.4063	0.3563	0.2254
32	photos of female guides	2.3925	0.1688	0.1276
8	host families posing for a photo	2.3411	0.3263	0.2326
1	accommodation with swimming pool	2.3377	0.3700	0.2556
56	photos of oxidised vehicles	2.3364	0.0725	0.0679
16	people in San Francisco	2.3070	0.2050	0.1600
6	straight road in the USA	2.2798	0.1900	0.1510
27	motorcyclists racing at the Australian MotoGP	2.2553	0.3525	0.3404
10	destinations in Venezuela	2.1050	0.2950	0.2781
36	photos with Machu Picchu in the background	2.0413	0.5025	0.2745

Table A.22: Medium-hard topics.

ID	Topic Title	d	P(20)	MAP
22	tennis player during rally	1.9362	0.5150	0.4698
17	lighthouses at the sea	1.6312	0.3963	0.3013
35	bird flying	1.2462	0.5738	0.2965
57	photos of radio telescopes	1.1993	0.3263	0.5914

Table A.23: Easy topics.

Appendix B

Benchmark Users

This appendix contains information on the conditions for the redistribution of the benchmark collection to the public. It further lists all the institutions that have officially gained access to the collection by signing an end-user agreement form and thereby agreeing to these conditions.

B.1 End-user Agreement

The *IAPR TC-12 image collection* is available for public use under the conditions of an end-user agreement, whereby it is agreed between the PROVIDER and the END-USER as follows:

1. The object of this agreement is the data set of the *IAPR TC-12 image collection* which consists of 20,000 image files, 20,000 thumbnail files, and captions in English, German and Spanish (hereinafter called RESOURCE).
2. END-USER agrees to use RESOURCE solely in the framework of scientific research.
3. END-USER is neither permitted to reproduce RESOURCE for commercial or redistribution purposes nor to commercialise (or distribute for free) in any form or by any means RESOURCE or any derivative product or services based on all or a substantial part of it.

4. Without prejudice to the other provisions, the rights referred herein shall be non-transferable to any other entity. RESOURCE shall not be transferred to or accessed from any other site.
5. END-USER acquires no ownership, rights or title in all or any parts of RESOURCE.
6. END-USER is permitted to display small excerpts of RESOURCE (images, captions) to others or to publish them in a scientific or technical context, except books, solely for the purpose of describing the research and development and related issues. END-USER agrees to refer to the source of these excerpts either in the figure caption or in the acknowledgements.
7. END-USER shall give the following reference to PROVIDER in scholarly literature when RESOURCE is mentioned: *M. Grubinger, P. D. Clough, H. Müller, T. Deselaers: The IAPR TC-12 Benchmark - A New Evaluation Resource for Visual Information Systems. In the Proceedings of the International Workshop OntoImage'2006 Language Resources for Content-Based Image Retrieval, held in conjunction with LREC'06, Genoa, Italy (2006) 13-23.*
8. END-USER agrees to notify PROVIDER with publication details for any publication based on RESOURCE.
9. END-USER agrees that PROVIDER will maintain records of END-USER for statistical purposes.
10. END-USER agrees to use the whole, original RESOURCE (no particular subsets or altered versions of RESOURCE) for evaluation purposes.
11. PROVIDER grants END-USER the right to reproduce RESOURCE temporarily to translate, adapt and arrange RESOURCE by any means, if one or all these acts are necessary. END-USER is permitted to make a copy of RESOURCE for purposes of archiving only.

12. PROVIDER accepts no responsibility for the accuracy or completeness of the data or for the consequences of their use. PROVIDER gives no warranty for merchantability and/or fitness for a particular purpose of RESOURCE.
13. PROVIDER agrees to provide END-USER with RESOURCE free of charge.

The entire agreement is composed of the thirteen (13) aforementioned articles.

B.2 Benchmark End-users

Tables B.1 and B.2 contain a list of all institutions that have agreed to the aforementioned conditions by signing an end-user agreement. This includes institutions that have registered or participated at *ImageCLEF* as well as institutions that have gained access to the collection outside the *ImageCLEF* evaluation campaigns¹.

Nr	Institute	Contact
1	National Taiwan University, Taiwan	hhchen@csie.ntu.tw
2	University of California Berkeley, USA	ray@sims.berkeley.edu
3	Concordia University, Canada	clef@ideas.concordia.ca
4	Daedalus Consortium, Spain	clef@daedalus.es
5	University of Jaén, Spain	magc@ujaen.es
6	RWTH Aachen University, Germany	deselaers@cs.rwth-aachen.de
7	CELI srl, Torino, Italy	dini@celi.it
8	Dublin City University, Ireland	gareth.jones@computing.dcu.ie
9	National Institute of Informatics, Japan	m-inoue@nii.ac.jp
10	Institute for Infocomm Research, Singapore	Jean-Pierre.Chevallet@imag.fr
11	Technische Universität Chemnitz, Germany	mi-intern@informatik.tu-chemnitz.de
12	Centre CEA Saclay, France	romaric.besancon@cea.fr
13	National Kaohsiung University,	leechung@mail.ee.kuas.edu.tw
14	University of Lisbon, Portugal	ncardoso@xldb.di.fc.ul.pt
15	Universidad de Alicante, Spain	clef@dlsi.ua.es
16	SUNY at Albany, USA	arorissa@albany.edu
17	Oregon Health & Science, Portland, USA	hersh@ohsu.edu
18	University of Hildesheim, Germany	mandl@uni-hildesheim.de
19	Media Analysis Lab - InfoComm, Singapore	qiubo@i2r.a-star.edu.sg
20	University & Hospitals, Geneva, Switzerland	henning.mueller@sim.hcuge.ch
21	Dokuz Eylul University, Izmir, Turkey	alpkocak@cs.deu.edu.tr
22	LSI-UNED, Spain	nlplist@listserv.uned.es
23	National Chiao Tung University, Taiwan	cpc@cis.nctu.edu.tw
24	SUNY at Buffalo, USA	ub-clir-list@listserv.buffalo.edu
25	Hungarian Academy of Science, Hungary	benczur@sztaki.hu

Table B.1: End-users of the IAPR TC-12 Benchmark.

¹As of 27 April 2007.

Nr	Institute	Contact
26	Victoria University, Melbourne, Australia	michael.grubinger@research.vu.edu.au
27	University of Freiburg, Germany	teynor@informatik.uni-freiburg.de
28	Mount Holyoke College, USA	lballest@mtholyoke.edu
29	University of Sheffield, UK	p.d.clough@sheffield.ac.uk
30	IIT Kharagpur - Electronics, India	smukho@ece.iitkgp.ernet.in
31	Chinese University of Hong Kong, China	chhoi@cse.cuhk.edu.hk
32	Huafan University, Taiwan	arthurbian@gmail.com
33	National Institute of Informatics, Japan	eguchi@nii.ac.jp
34	University of Twente, The Netherlands	bosmaw@cs.utwente.nl
35	Multimedia University, Cyberjaya, Malaysia	sharaf@mmu-edu.my
36	UMIT Software Engineering, Austria	michael.springmann@umit.at
37	INAOE Puebla, Mexico	hugo.jair@inaoep.mx
38	Concordia University, Montreal, Canada	osama_el@cse.concordia.ca
39	University of Ulster, UK	nf.rooney@ulster.ac.uk
40	University of Hertfordshire, Hatfield, UK	g.r.saward@herts.ac.uk
41	University of Udine, Italy	mizzaro@dimi.uniud.it
42	National Chi Nan University, Taiwan	jshong@ncnu.edu.tw
43	Rutgers University, New Jersey, USA	vladimir@cs.rutgers.edu
44	University of Sunderland, UK	wei-chao.lin-1@sunderland.ac.uk
45	Vienna University of Technology, Austria	micusik@ripip.tuwien.ac.at
46	Xerox Research Centre, Meylan, France	jean-michel.renders@xrce.xerox.com
47	University of Tampere, Tampere, Finland	anni.jarvelin@uta.fi
48	Dokuz Eylul University, Turkey	atakan@cs.deu.edu.tr
49	INAOE Mnat. Inst. Astrophysics, Mexico	mmontesg@inaoep.mx
50	Dublin City University, Dublin, Ireland	imageclef@computing.dcu.ie
51	SUNY at Buffalo, NY, USA	meruiz@buffalo.edu
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Table B.2: End-users of the IAPR TC-12 Benchmark (continued).