

Supplementary Material

Egocentric Visitors Localization in Cultural Sites

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1 Introduction

This document is intended for the convenience of the reader and reports additional information on the dataset presented in the paper:

- F. Ragusa, A. Furnari, S. Battiato, G. Signorello, G. M. Farinella, "Egocentric Visitors Localization in Cultural Sites"

The reader is referred to the manuscript and to our web page <http://iplab.dmi.unict.it/VEDI/> for further information.

2 Dataset

The dataset has been acquired using two devices (HoloLens and GoPro) and hence comprises two device-specific training/testing sets. Video frames are labelled according to: 1) the environment of the visitor, 2) the point of interest he is looking at. Figure 1 reports some sample frames related to the different environments, whereas Figure 2 reports some sample frames related to the different points of interest. Table 1 summarizes the number of training videos acquired using HoloLens and GoPro devices. Table 2 summarizes the acquired test videos.

In the following sections, we report additional material related to the data acquired using the HoloLens and GoPro devices.

Table 1: Summary of the collected training videos. On the left, we report the number of videos collected for the points of interest. On the right, we report the informations for the videos of collected for the environments. The values in the *Time (s)* and *MB* columns are related to the average time and occupied memory respectively.

	Points of interest			Environments		
	# Videos	Time (s)	MB	# Videos	Time (s)	MB
HoloLens	68	104	103	12	190	196
GoPro	68	93	233	12	186	455

Table 2: Summary of the acquired test videos . The values on the *Time* and *MB* columns are average values.

	Test Videos		
	Number of videos	Time (s)	Storage (MB)
HoloLens	7	780	730
GoPro	7	828	2062

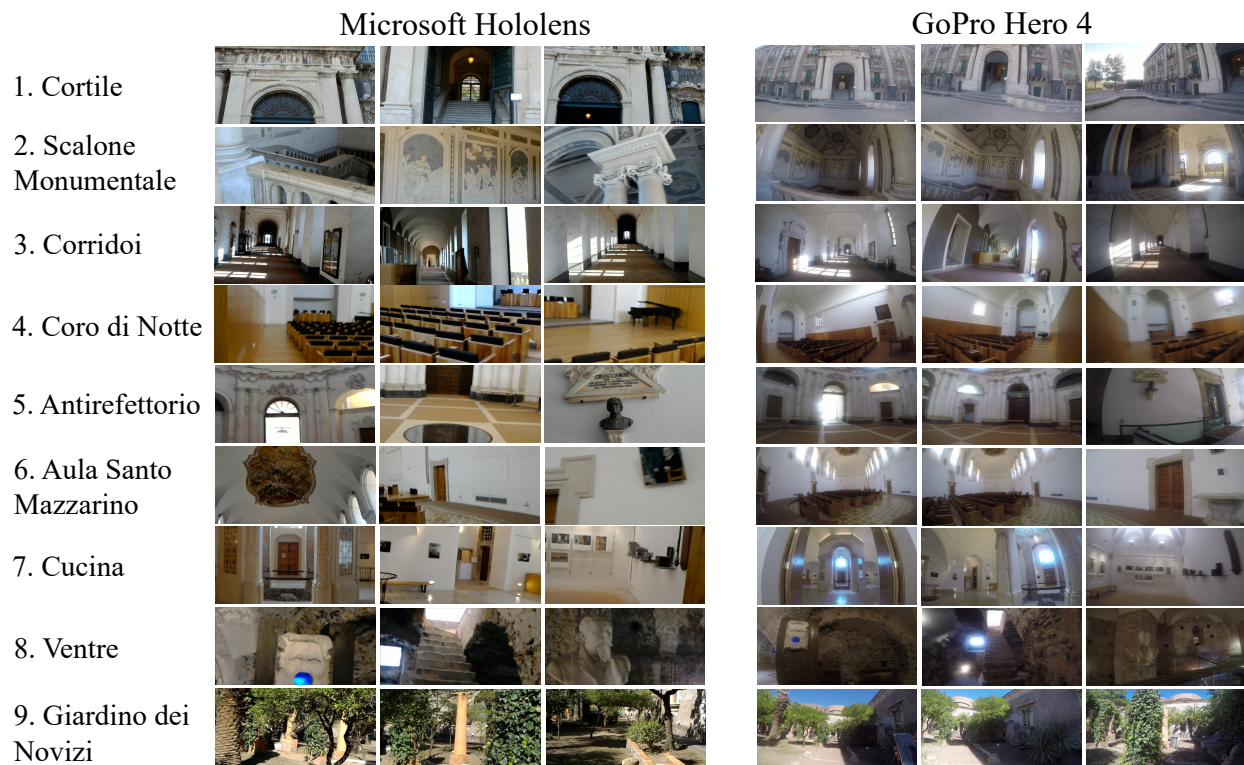


Figure 1: The figure shows some frames for each considered environment, acquired with Microsoft Hololens (left column) and GoPro Hero4 (right column) wearable devices.

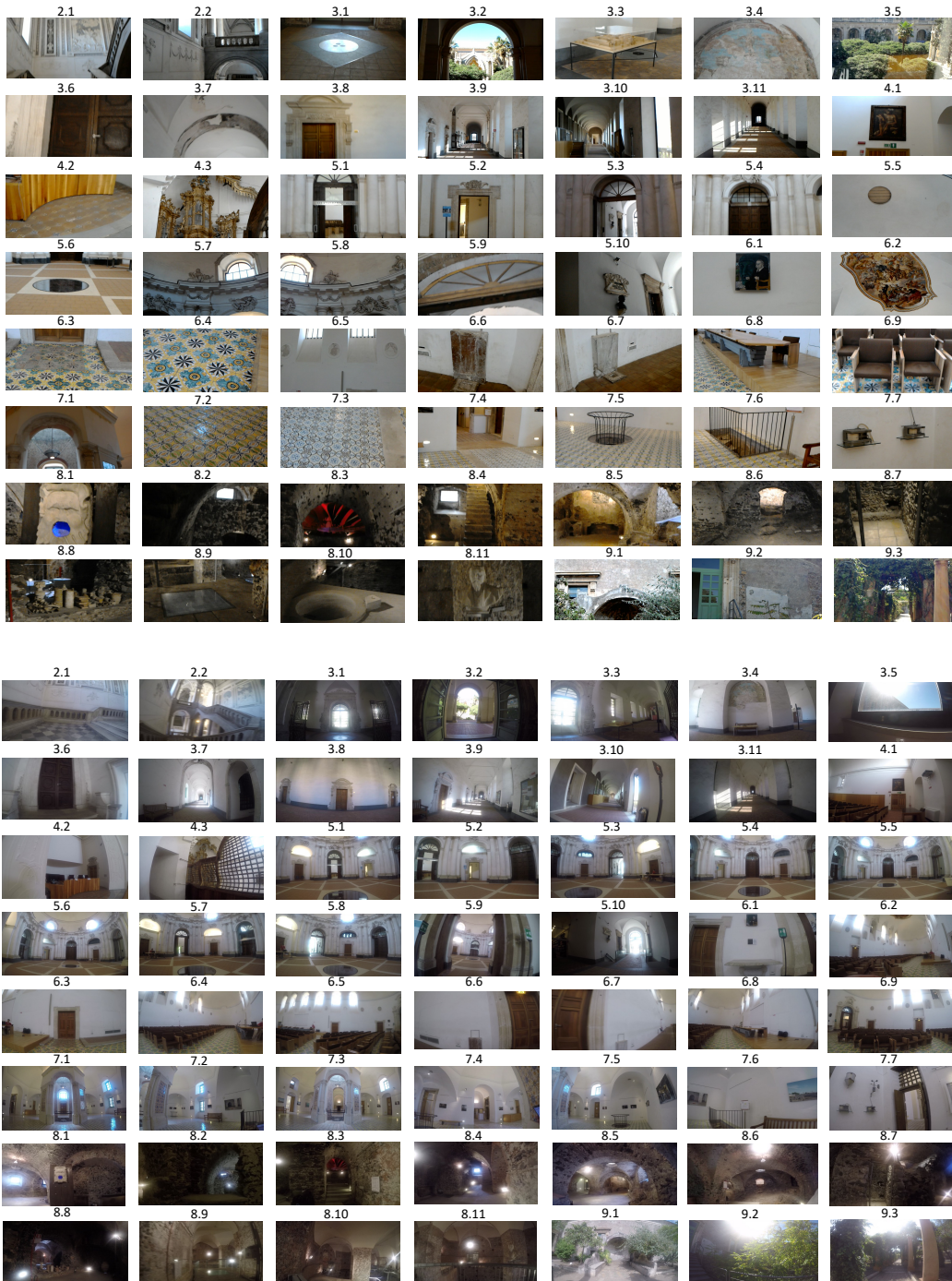


Figure 2: The figure shows a sample frame for each of the 57 points of interest acquired with both Microsoft Hololens (top) and GoPro (bottom).

3 HoloLens

Table 3 details the training videos acquired to represent each of the considered environments. For each class, we report the total duration of the videos, the required storage, the number of frames and the percentage of frames, with respect to the total number of frames in the training set.

Table 4 details the training videos acquired to represent each of the considered points of interest. For each class, we report the total duration of the videos, the required storage, the number of frames and the percentage of frames, with respect to the total number of frames in the training set.

Table 5 reports a list of all test videos acquired using HoloLens. For each video, we report: Time, Storage, number of frames and percentage of frames with respect to the total number of frames of the training dataset.

Table 3: List of training videos of environments acquired using HoloLens. For each video we show: time, amount of occupied memory, number of frames, percentage of frames with respect to the total number of frames of the training set.

Name	Time (s)	Storage (MB)	#frames	%frames
1.0_Cortile	48	48.145	1171	0,24%
2.0_Scalone	81	80.085	1947	0,40%
2.0_Scalone1	116	113.173	2747	0,56%
2.0_Scalone2	38	37.758	917	0,19%
4.0_CoroDiNotte	169	167.614	4068	0,83%
4.0_CoroDiNotte1	44	44.068	1067	0,22%
5.0_Antirefettorio	247	244.500	5933	1,21%
5.0_Antirefettorio1	263	260.395	6315	1,29%
6.0_SantoMazzarino	241	239.007	5800	1,18%
7.0_Cucina	239	237.268	5753	1,17%
8.0_Ventre	679	832.844	20385	4,15%
9.0_GiardinoNovizi	116	113.949	2788	0,57%
AVG	175.46	201.57	4908	1,00%

Table 4: List of training videos of points of interest acquired with HoloLens. For each video we show: Time, Storage, number of frames and percentage of frames with respect to the total number of frames of the training dataset. The table continues in the next page.

Name	Time (s)	Storage (MB)	#frame	%frame
2.1_Scalone_RampaS.Nicola	163	161.776	3926	0,80%
2.2_Scalone_RampaS.Benedetto	14	14.471	354	0,07%
2.2_Scalone_RampaS.Benedetto1	148	147.226	3573	0,73%
3.1_Corridoi_TreBiglie	75	74.261	1804	0,37%
3.2_Corridoi_ChiostroLevante	55	54.500	1328	0,27%
3.3_Corridoi_Plastico	80	79.179	1927	0,39%
3.4_Corridoi_Affresco	74	74.023	1800	0,37%
3.5_Corridoi_Finestra_ChiostroLev.	84	83.102	2035	0,41%
3.6_Corridoi_PortaCoroDiNotte	53	53.255	1291	0,26%
3.6_Corridoi_PortaCoroDiNotte1	60	59.411	1446	0,29%
3.6_Corridoi_PortaCoroDiNotte2	58	57.901	1406	0,29%
3.7_Corridoi_TracciaPortone	53	53.118	1291	0,26%
3.8_Corridoi_StanzaAbate	81	79.773	1948	0,40%
3.9_Corridoi_CorridoioDiLevante	89	88.173	2142	0,44%
3.10_Corridoi_CorridoioCorodiNotte	122	121.321	2945	0,60%
3.10_Corridoi_CorridoioCorodiNotte1	103	101.796	2472	0,50%
3.11_Corridoi_CorridoioOrologio	300	296.488	7202	1,47%
4.1_CoroDiNotte_Quadro	71	70.245	1716	0,35%

4.2_CoroDiNotte_Pav.Orig.Altare	73	72.358	1759	0,36%
4.3_CoroDiNotte_BalconeChiesa	39	39.331	957	0,19%
4.3_CoroDiNotte_BalconeChiesa1	49	48.550	1185	0,24%
4.3_CoroDiNotte_BalconeChiesa2	80	79.861	1935	0,39%
5.1_Antirefettorio_PortaA.S.Mazz.Ap.	67	67.001	1630	0,33%
5.1_Antirefettorio_PortaA.S.Mazz.Ch.	74	73.589	1785	0,36%
5.2_Antirefettorio_PortaMuseoFab.Ap.	50	49.840	1211	0,25%
5.2_Antirefettorio_PortaMuseoFab.Ch.	62	61.846	1503	0,31%
5.3_Antirefettorio_PortaAntiref.	51	58.557	1537	0,31%
5.4_Antirefettorio_PortaRef.Piccolo	54	53.767	1306	0,27%
5.5_Antirefettorio_Cupola	57	56.089	1377	0,28%
5.6_Antirefettorio_AperturaPavimento	55	54.586	1322	0,27%
5.7_Antirefettorio_S.Agata	48	47.820	1165	0,24%
5.8_Antirefettorio_S.Scolastica	58	57.919	1407	0,29%
5.9_Antirefettorio_ArcoconFirma	62	76.700	1864	0,38%
5.10_Antirefettorio_BustoVaccarini	65	64.298	1563	0,32%
6.1_SantoMazzarino_QuadroS.Mazz.	71	70.401	1716	0,35%
6.2_SantoMazzarino_Affresco	213	211.424	5124	1,04%
6.3_SantoMazzarino_PavimentoOr.	99	98.691	2397	0,49%
6.4_SantoMazzarino_PavimentoRes.	69	69.148	1675	0,34%
6.5_SantoMazzarino_BassorilieviManc.	117	115.348	2823	0,57%
6.6_SantoMazzarino_LavamaniSx	151	149.882	3637	0,74%
6.7_SantoMazzarino_LavamaniDx	93	92.928	2256	0,46%
6.8_SantoMazzarino_TavoloRelatori	150	148.661	3603	0,73%
6.9_SantoMazzarino_Poltrone	108	107.374	2604	0,53%
7.1_Cucina_Edicola	369	437.219	11086	2,26%
7.2_Cucina_PavimentoA	52	52.163	1268	0,26%
7.3_Cucina_PavimentoB	52	52.244	1266	0,26%
7.4_Cucina_PassavivandePavim.Orig.	81	80.733	1961	0,40%
7.5_Cucina_AperturaPav.1	57	57.170	1385	0,28%
7.5_Cucina_AperturaPav.2	53	52.875	1280	0,26%
7.5_Cucina_AperturaPav.3	62	62.320	1509	0,31%
7.6_Cucina_Scala	77	76.587	1856	0,38%
7.7_Cucina_SalaMeteoreologica	156	154.394	3748	0,76%
8.1_Ventre_Doccione	103	102.683	2492	0,51%
8.2_Ventre_VanoRacc.Cenere	126	124.837	3026	0,62%
8.3_Ventre_SalaRossa	300	296.792	7202	1,47%
8.4_Ventre_ScalaCucina	214	212.372	5152	1,05%
8.5_Ventre_CucinaProv.	148	146.379	3553	0,72%
8.6_Ventre_Ghiacciaia	69	68.562	1668	0,34%
8.6_Ventre_Ghiacciaia1	266	263.817	6398	1,30%
8.7_Ventre_Latrina	102	100.542	2468	0,50%
8.8_Ventre_OssaScarti	154	152.861	3713	0,76%
8.8_Ventre_OssaScarti1	36	36.345	886	0,18%
8.9_Ventre_Pozzo	300	297.167	7209	1,47%
8.10_Ventre_Cisterna	57	56.572	1384	0,28%
8.11_Ventre_BustoP.Tacchini	110	109.520	2662	0,54%
9.1_GiardinoNovizi_Nicchiaepav.	106	105.004	2555	0,52%
9.2_GiardinoNovizi_TraccePalestra	63	62.464	1525	0,31%
9.3_GiardinoNovizi_Pergolato	166	164.150	3984	0,81%
AVG	102.6	103.26	2517	0,51%

Table 5: List of test videos acquired using HoloLens. For each video we report the length in seconds, the amount of occupied memory, the number of frames, the number of environments included in the video, the number of points of interest included in the video, the sequence of environments as navigated by the visitor, and the sequence of points of interest, as navigated by the visitor.

Video	Time	MB	#frames	%frames	#env.	#p.int.	seq.environments	seq. p.interest
Test1	300	296.896	7202	5,49%	4	10	1->2->3->4	1.1->2.2->3.1->3.9->3.10->3.4->3.6->4.1->4.2->4.3
Test1.1	300	297.031	7202	5,49%	4	11	4->3->5->6	4.3->3.11->5.6->5.7->5.1->6.1->6.4->6.9->6.3->6.6->6.2
Test2.0	300	296.993	7203	5,49%	4	9	1->2->3->4	1.1->2.1->3.9->3.10->3.5->3.10->3.5->3.10->3.6->4.1->4.2->4.3
Test3.0	300	296.959	7202	5,49%	4	8	1->2->3->4	1.1->2.1->3.9->3.10->3.4->3.11->3.6->4.1
Test3.1	300	296.913	7203	5,49%	3	5	4->3->5	4.2->4.3->4.2->3.11->5.5->5.6
Test3.2	300	297.083	7201	5,49%	4	17	5->6->5->7	5.6->5.1->5.3->5.10->5.9->5.1->6.2->6.1->6.4->6.9->6.5->6.4->6.3->6.8->6.5->6.7->6.6->6.5->5.2->7.1
Test3.3	300	297.160	7202	5,49%	2	12	7->8	7.2->7.6->7.5->7.4->7.7->7.1->8.1->8.6->8.2->8.8->8.4->8.10
Test3.4	237	234.744	5694	4,34%	3	5	8->9->3	8.9->8.11->8.3->9.1->9.2
Test4.0	300	296.979	7204	5,49%	4	10	1->2->3->5	1.1->2.2->3.9->3.10->3.4->3.11->->3.7->3.11->5.10->5.9->5.1
Test4.1	300	296.654	7202	5,49%	3	16	5->7->8	5.6->5.5->5.8->5.4->5.2->7.1->7.3->7.2->7.1->7.4->7.1->7.5->7.7->7.1->8.1->8.5->8.2->8.4->8.7
Test4.2	136	135.143	3281	2,50%	1	3	8	8.10->8.9->8.11
Test4.3	300	296.853	7202	5,49%	4	7	8->9->3->4	8.3->9.1->9.3->9.2->3.11->3.6->4.2
Test4.4	201	199.585	4845	3,69%	3	4	4->3->2	4.2->3.10->3.9->2.1
Test5.0	274	271.524	6590	5,02%	4	11	1->2->3->2->3->4	1.1->3.1->3.3->3.2->2.1->3.9->3.10->3.5->3.10->3.5->3.10->3.4->3.7->3.4->3.6
Test5.1	300	296.801	7202	5,49%	4	11	4->3->9->3->5	4.1->4.2->3.6->3.11->9.2->3.11->->5.5->5.3->5.9->5.7->5.8->5.2
Test5.2	300	296.921	7202	5,49%	2	13	7->8	7.1->7.2->7.3->7.1->7.5->7.1->7.1->7.4->7.6->7.7->7.4->7.7->8.1->8.5->8.4->8.5->8.6->8.2->8.8->8.4
Test5.3	300	297.063	7201	5,49%	4	17	8->7->5->6	8.11->8.9->8.3->8.4->8.5->8.6->7.1->7.5->7.2->5.1->6.2->6.4->6.1->6.5->6.3->6.5->6.2->6.7->6.9
Test6.0	300	296.880	7202	5,49%	3	9	1->2->3	1.1->2.2->2.1->3.9->3.10->3.4->3.11->3.6->3.11->3.7->3.11
Test7.0	300	296.945	7202	5,49%	3	7	1->2->3	1.1->2.2->3.9->3.10->3.4->3.6->3.11
Test7.1	113	112.030	2721	2,07%	3	3	3->5->3	3.11->5.9->5.10->3.11

4 GoPro

Table 6 details the training videos acquired to represent each of the considered environments. For each class, we report the total duration of the videos, the required storage, the number of frames and the percentage of frames, with respect to the total number of frames in the training set.

Table 7 details the training videos acquired to represent each of the considered points of interest. For each class, we report the total duration of the videos, the required storage, the number of frames and the percentage of frames, with respect to the total number of frames in the training set.

Table 8 reports a list of all test videos acquired using GoPro. For each video, we report: Time, Storage, number of frames and percentage of frames with respect to the total number of frames of the training dataset.

Table 6: List of training videos of environments acquired using GoPro. For each video we show: time, amount of occupied memory, number of frames, percentage of frames with respect to the total number of frames of the training set.

Name	Time (s)	Storage (MB)	#frames	%frames
1.0_Cortile	47	116.798	1187	0,24%
2.0_Scalone	81	201.194	2044	0,42%
2.0_Scalone1	111	274.094	2785	0,57%
2.0_Scalone2	36	90.250	918	0,19%
4.0_CoroDiNotte	168	413.702	4205	0,86%
4.0_CoroDiNotte1	43	107.968	1097	0,22%
5.0_Antirefettorio	191	471.275	4790	0,97%
5.0_Antirefettorio1	262	644.852	6554	1,33%
6.0_SantoMazzarino	240	591.177	6009	1,22%
7.0_Cucina	241	592.907	6027	1,23%
8.0_Ventre	699	1719.352	17478	3,56%
9.0_GiardinoNovizi	116	427.472	6965	1,42%
AVG	186.25	242.62	5005	1,02%

Table 7: List of training videos of environments acquired using GoPro. For each video we show: time, amount of occupied memory, number of frames, percentage of frames with respect to the total number of frames of the training set.

Name	Time (s)	Storage (MB)	#frame	%frame
2.1_Scalone_RampaS.Nicola	160	394,844	4013	0,82%
2.2_Scalone_RampaS.Benedetto	14	35,758	363	0,07%
2.2_Scalone_RampaS.Benedetto1	147	361,856	3678	0,75%
3.1_Corridoi_TreBiglie	72	178,313	1812	0,37%
3.2_Corridoi_ChiostroLevante	54	202,165	3295	0,67%
3.3_Corridoi_Plastico	79	195,673	1989	0,40%
3.4_Corridoi_Affresco	74	182,106	1850	0,38%
3.5_Corridoi_Finestra_ChiostroLev.	81	300,474	4896	1,00%
3.6_Corridoi_PortaCoroDiNotte	50	123,34	1253	0,26%
3.6_Corridoi_PortaCoroDiNotte1	60	148,97	1514	0,31%
3.6_Corridoi_PortaCoroDiNotte2	58	142,747	1451	0,30%
3.7_Corridoi_TracciaPortone	55	136,484	1387	0,28%
3.8_Corridoi_StanzaAbate	58	122,859	1755	0,36%
3.9_Corridoi_CorridoioDiLevante	85	211,539	2148	0,44%
3.10_Corridoi_CorridoioCorodiNotte	120	297,325	3022	0,62%
3.10_Corridoi_CorridoioCorodiNotte1	100	246,769	2509	0,51%
3.11_Corridoi_CorridoioOrologio	176	434,081	4412	0,90%
4.1_CoroDiNotte_Quadro	69	171,551	1743	0,35%

4.2_CoroDiNotte_Pav.Orig.Altare	72	178,448	1813	0,37%
4.3_CoroDiNotte_BalconeChiesa	39	96,281	978	0,20%
4.3_CoroDiNotte_BalconeChiesa1	48	119,512	1214	0,25%
4.3_CoroDiNotte_BalconeChiesa2	80	197,29	2004	0,41%
5.1_Antirefettorio_PortaA.S.Mazz.Ap.	66	164,644	1673	0,34%
5.1_Antirefettorio_PortaA.S.Mazz.Ch	74	183,481	1864	0,38%
5.2_Antirefettorio_PortaMuseoFab.Ap	50	124,991	1270	0,26%
5.2_Antirefettorio_PortaMuseoFab.Ch	62	154,254	1567	0,32%
5.3_Antirefettorio_PortaAntiref.	52	128,695	1306	0,27%
5.4_Antirefettorio_PortaRef.Piccolo	54	133,494	1356	0,28%
5.5_Antirefettorio_Cupola	55	135,594	1378	0,28%
5.6_Antirefettorio_AperturaPavimento	57	141,647	1439	0,29%
5.7_Antirefettorio_S.Agata	49	120,611	1225	0,25%
5.8_Antirefettorio_S.Scolastica	56	137,79	1400	0,28%
5.9_Antirefettorio_ArcoconFirma	60	149,889	1522	0,31%
5.10_Antirefettorio_BustoVaccarini	66	162,799	1654	0,34%
6.1_SantoMazzarino_QuadroS.Mazz.	72	178,16	1810	0,37%
6.2_SantoMazzarino_Affresco	214	526,612	5353	1,09%
6.3_SantoMazzarino_PavimentoOr.	98	242,332	2462	0,50%
6.4_SantoMazzarino_PavimentoRes.	68	169,524	1722	0,35%
6.5_SantoMazzarino_BassorilieviMan.	116	25,942	2906	0,59%
6.6_SantoMazzarino_LavamaniSx	134	331,517	3369	0,69%
6.7_SantoMazzarino_LavamaniDx	91	225,892	2296	0,47%
6.8_SantoMazzarino_TavoloRelatori	149	366,575	3726	0,76%
6.9_SantoMazzarino_Poltrone	108	266,611	2709	0,55%
7.1_Cucina_Edicola	368	931,368	9467	1,93%
7.2_Cucina_PavimentoA	55	137,197	1394	0,28%
7.3_Cucina_PavimentoB	52	129,601	1316	0,27%
7.4_Cucina_PassavivandePavim.Orig.	84	206,667	2100	0,43%
7.5_Cucina_AperturaPav.1	58	142,7	1450	0,30%
7.5_Cucina_AperturaPav.2	57	142,145	1444	0,29%
7.5_Cucina_AperturaPav.3	65	161,61	1641	0,33%
7.6_Cucina_Scala	79	195,547	1988	0,40%
7.7_Cucina_SalaMeteoreologica	158	390,583	3970	0,81%
8.1_Ventre_Doccione	100	246,353	2503	0,51%
8.2_Ventre_VanoRacc.Cenere	128	315,824	3210	0,65%
8.3_Ventre_SalaRossa	158	388,603	3951	0,80%
8.4_Ventre_ScalaCucina	213	524,06	5327	1,08%
8.5_Ventre_CucinaProv.	151	371,84	3779	0,77%
8.6_Ventre_Ghiacciaia	72	178,295	1811	0,37%
8.6_Ventre_Ghiacciaia1	185	457,1	4646	0,95%
8.7_Ventre_Latrina	80	295,294	4804	0,98%
8.8_Ventre_OssaScarti	150	369,523	3756	0,76%
8.8_Ventre_OssaScarti1	34	86,105	873	0,18%
8.9_Ventre_Pozzo	149	367,713	3737	0,76%
8.10_Ventre_Cisterna	30	114,114	1852	0,38%
8.11_Ventre_BustoP.Tacchini	106	261,822	2661	0,54%
9.1_GiardinoNovizi_Nicchiaepav.	104	256,731	2609	0,53%
9.2_GiardinoNovizi_TraccePalestra	58	216,801	3533	0,72%
9.3_GiardinoNovizi_Pergolato	164	404,893	4115	0,84%
AVG	93.53	232.97	2515	0,51%

Table 8: List of test videos acquired using GoPro. For each video we report the length in seconds, the amount of occupied memory, the number of frames, the number of environments included in the video, the number of points of interest included in the video, the sequence of environments as navigated by the visitor, and the sequence of points of interest, as navigated by the visitor.

Video	Time(s)	MB	#frames	%frames	#env.	#p.int.	sequence environements	sequence points of interest
Test1	397	390.558	14788	5.32%	4	9	1.0->2.0->3.0->4.0->3.0	1.1->2.2->3.9->3.10->3.6->4.1->4.2->4.3->3.11
Test2	420	1033.149	10503	3.78%	4	8	1.0->2.0->3.0->5.0->3.0	1.1->2.1->3.9->3.10->3.4->3.11->3.6->3.11->5.10->3.10
Test3	579	1425.480	14491	5.21%	5	11	1.0->2.0->3.0->9.0->3.0->5.0->3.0	1.1->2.2->2.1->2.2->3.9->3.10->3.6->3.11->9.2->9.1->9.3->9.2->3.11->5.10->3.11
Test4	1472	3620.627	36808	13.24%	9	35	1.0->2.0->3.0->4.0->3.0->5.0->6.0->5.0->7.0->8.0->9.0->3.0	1.1->2.1->2.2->3.9->3.10->3.4->3.11->3.6->4.1->4.3->3.11->5.4->5.2->5.1->5.3->5.10->5.9->5.6->5.1->6.9->6.4->6.9->6.8->5.3->5.6->5.4->5.2->7.1->7.6->7.1->7.5->7.4->7.7->8.1->8.6->8.2->8.8->8.1->8.10->8.9->8.11->8.3->9.1->9.2
Test5	751	1848.142	18788	6.76%	6	26	1.0->2.0->3.0->5.0->7.0->8.0	1.1->2.2->2.1->3.1->3.9->3.10->3.4->3.11->5.10->5.6->5.1->5.3->5.4->5.2->7.1->7.4->7.1->7.5->7.7->8.1->8.5->8.4->8.7->8.10->8.8->8.10->8.11
Test6	506	1245.254	12661	4.56%	5	11	8.0->9.0->3.0->4.0->3.0->2.0	8.3->9.1->9.3->9.2->3.11->3.6->4.2->3.10->3.9->3.1->2.1
Test7	1549	3809.218	38725	13.93%	9	44	1.0->2.0->3.0->2.0->3.0->4.0->3.0->9.0->3.0->5.0->7.0->8.0->7.0->5.0->6.0->5.0->3.0->9.0->3.0->2.0->1.0	1.1->2.1->3.3->3.2->2.1->3.9->3.10->3.5->3.10->3.5->3.10->3.4->3.11->3.7->3.11->3.10->3.4->3.6->4.1->4.3->3.6->3.11->9.2->9.1->9.2->3.11->5.7->5.4->5.3->5.2->7.1->7.5->7.4->7.6->7.1->7.7->7.4->7.7->8.1->8.5->8.4->8.6->8.2->8.8->8.4->8.10->8.11->8.3->8.5->7.1->6.2->6.1->6.5->6.9->6.6->6.5->6.8->6.4->5.3->5.10->3.11->9.1->9.3->9.2->3.11->3.10->3.5->3.10->3.9->2.1->2.2->1.1