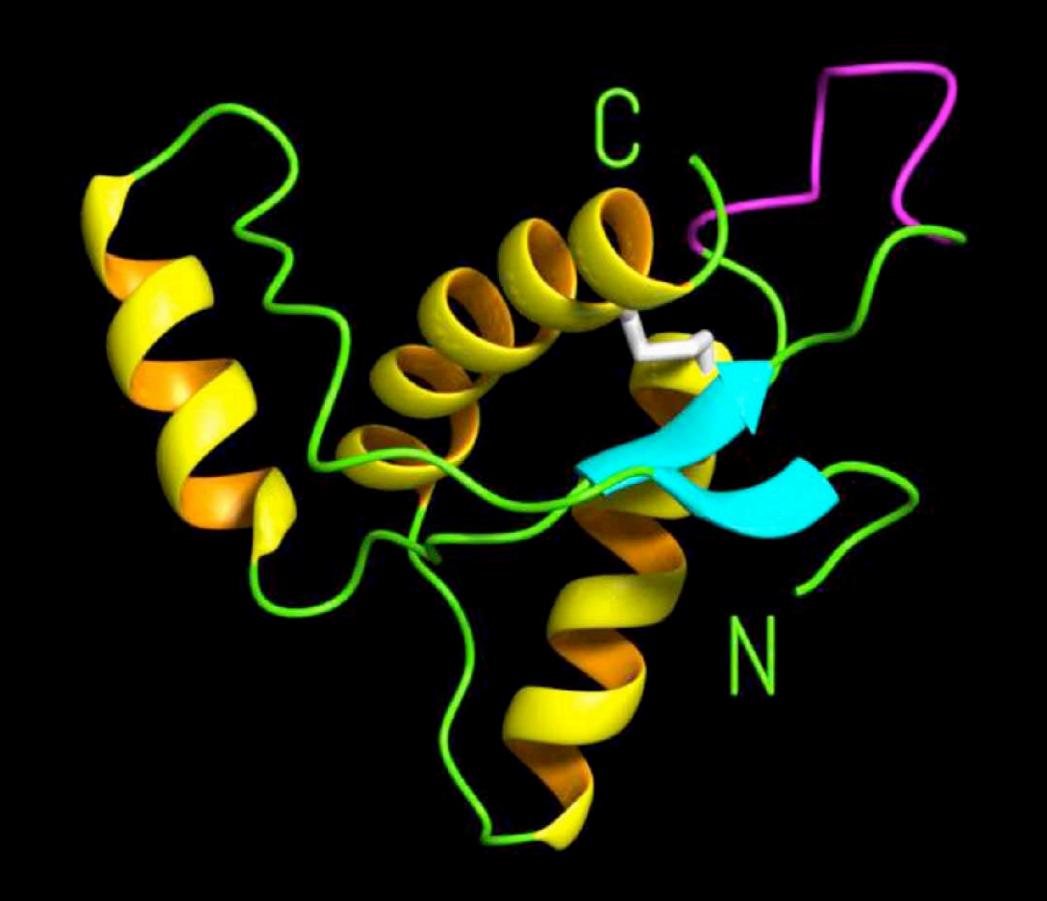
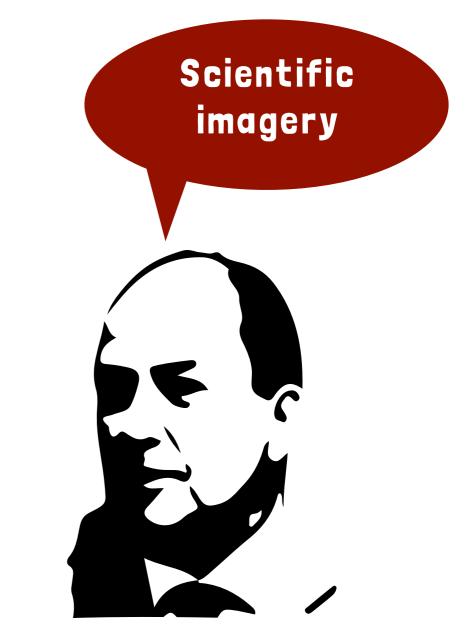
# Semiotics, software and media visualization

E. Reyes Associate Professor, Université de Paris 13 ereyes.net

Conference at Anaglifos Art Factory, Barcelona, Spain, on June 1st. Semiofest 2013 Coordinator: Gabriela Pedranti







### Lev Manovich



# Media visualization?

visualize large amounts of visual media

observe patterns of time

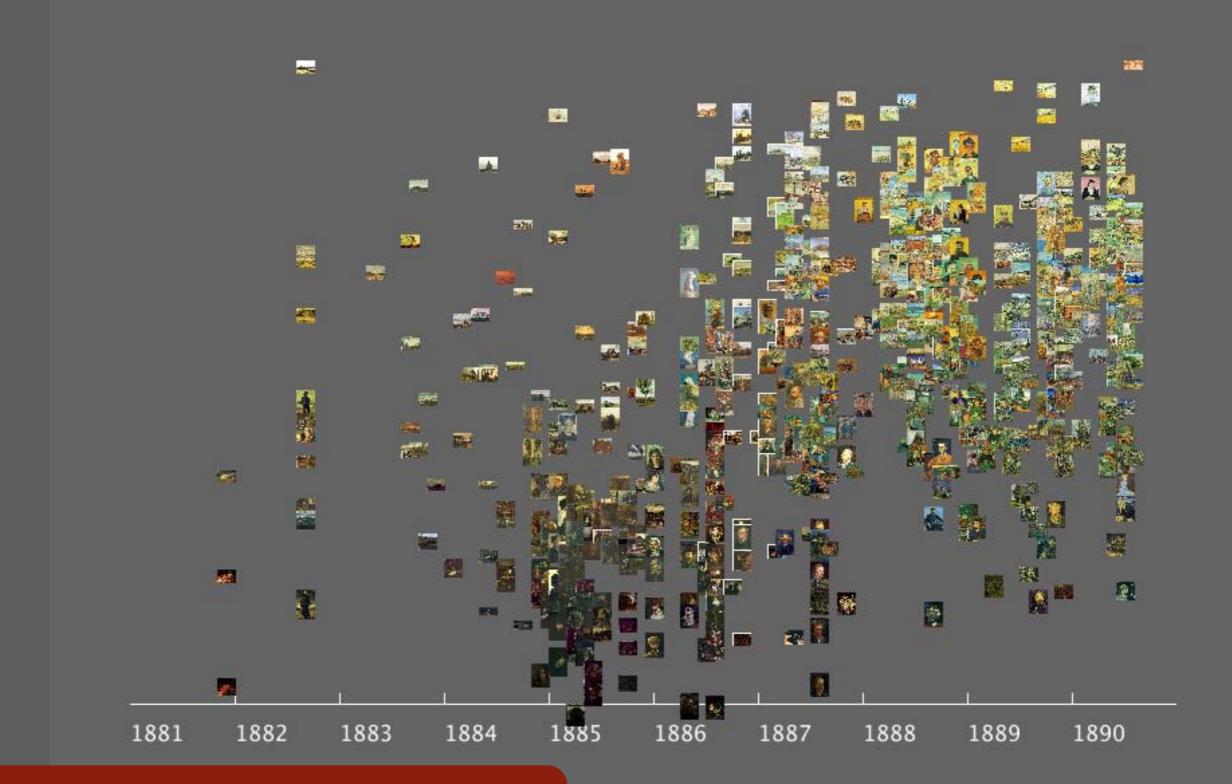
analyze culture



allows to see the invisible

occurs within a scientific argument

requires scientific experience + taking decisions



### Image plot of Van Gogh production

ImagePlot, Lev Manovich, 2009

**Car-Parrinello Simulations of Biological Systems** 

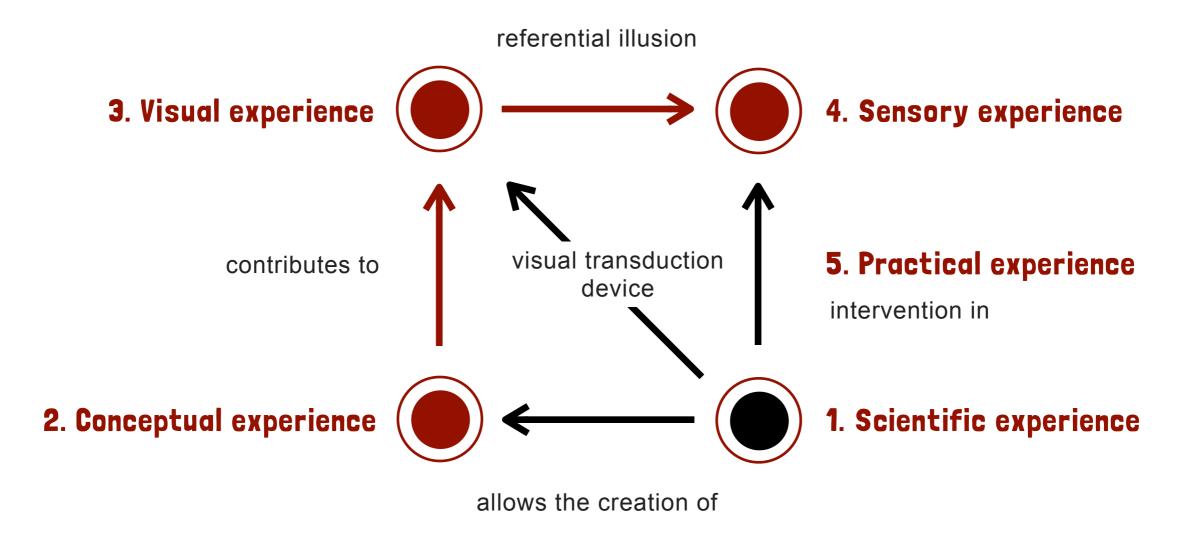
Michele Cascella, c. 2004

### **Expression** plane

transducting measurements of material elements

### **Content plane**

produced by direct interpretation during exploration





- Visual features
- Spatial and temporal patterns
- Software operations

nism\_All\_Features.txt

### 389 types of visual features data

FeatureExtractor, Lev Manovich, 2011

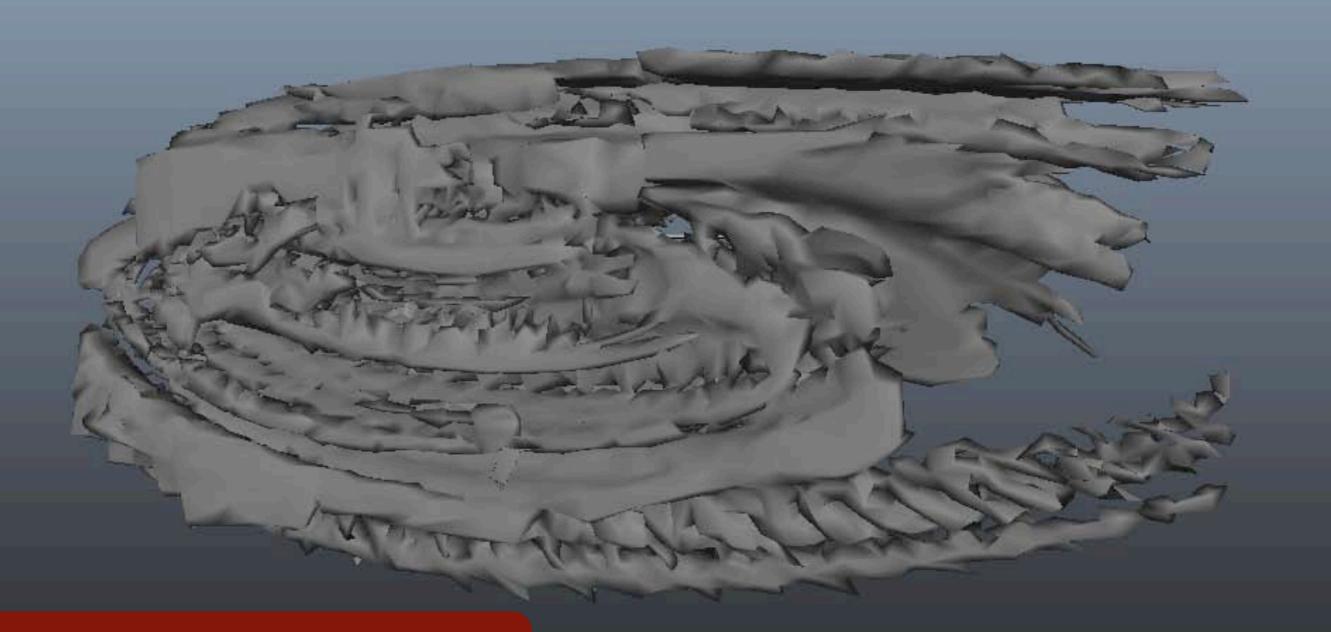
R.	Year	Ar	rtist	Title Filename	File Path	Gabor 1 0	Gabor 1 45	Gabor 1 90	Gabor 1 13	Gabor 2 0	Gabor 2 45	Gabor 2 90	Gabor 2 13	Gabor 3 0	Gabor 3 45	Gabor 3 90	Gabor 3 13	Gabor 4 0	Gabor 4 45	Gabor 4 90	Gabor 4 13	Hue Mean
- 0	-	1881 Vi	and a second	Still Life with 001.jpg	/Users/cultu	90.68064	78.13922	103.3052	77.58307	85.87984	69.35095	109.7452	62.12878	118.4314	89.24543	169.3934	81.9173	155.8032	122.0388	253.6104	83.18318	0.14002
2		1881 Vi 1881 Vi		Still Life with 002.jpg Still Life with 003.jpg	/Users/cultu /Users/cultu	57.06778 78.84572	44.58428 74.02272	62 19038 110.5827	49.17593 73.41237	60.40412 88.37781	49.64728 81.77094	71.77201 157.5932	56.58012	83.96798 129.6269	70.06205	103.2502 250.2784	80.17243	117.2963 202.9461	118.2773 190.3113	145.9228 344.4458	118.2777 138.3469	0.22809
3		1882 V	Second Street Works and a local	Beach at Sch 004.jpg	/Users/cultu	163.3311	125.5681	261.2114	128.7346	192.9979	126.8587	354.2147	133.5046	263.9987	143.3208	576.9542	162.5166	374,1985	157.3658	807.5934	207.3618	0.22300
4		1882 Vi	an Gogh	Cluster of OI 005.jpg	/Users/cultu	112.0593	62.51589	88.35882	60.33443	139.05	54.83809	104.8606	55.45329	188,4341	63.48696	142.3233	67.16486	295.977	94.50501	203.4968	91.27709	0.32045
5		1882 Vi	Provide the second	Dunes 006.jpg	/Users/cultu	145.2701	139.9059	220.3029	160.3988	125.8312	105.902	218.87	121.801	152.1756	122.336	343.5705	141.2909	201.6846	166,6274	546.7799	162.2804	0.13741
5	-	1882 Vi 1882 Vi	the second star of the second	Edge of a Wc 007.jpg Fisherman o 008.jpg	/Users/cultu	135.2862	83.55577	120.6159 171.4992	81.01401 110.6664	177.8811 174.2014	66.42074 92.3047	142.1309	68.33213 90.01354	274.0488 261.4108	74.8337	213.1531 216.6217	81.06543	266,6837 457,3094	92.3715	346.8997 322.2516	102.568	0.21152
8		1882 Vi	and the second	Fisherman's 009.jpg	/Users/cultu /Users/cultu	134.163	109.0077	154.7251	103.6593	128.3168	84.45449	164.7653	82.08178	176.5339	93.64103	214.9011	93.63773	288.2418	140.884	295.5059	131.5274	0.35005
9		1882 Vi	designed on the second	Girl in the St 010.jpg	/Users/cultu	142.8597	107.6849	158.5697	107.171	181.87	103.8203	184.709	108.6103	243.4846	131.3624	283.2197	146.8748	315.8638	181.6515	538.871	168.685	0.12090
10		1882 Va	and the second se	Girl in White 011.jpg	/Users/cultu	180.5282	138.5453	189.1008	128.0631	161.4807	111.5323	187.7212	102.0098	183.2536	109.1304	229.8844	107.7236	196.2844	117.3623	311.5602	117.3327	0.10044
11		1882 Va		Man Stoopin 012.jpg	/Users/cultu	136.3611	112.214	134.5496	114.9231	122.217	83.57057	135.994	77.22487	170.3254	102.9477	201.0239	101.8664	260.7044	117.0212	306.5337	148.1131	0.1179
12		1882 Va 1882 Va	and the second se	Two Women 013.jpg View of the 1 014.jpg	/Users/cultu /Users/cultu	306.0038	205.0814 181.2057	250.6126 387.7816	164.195	295.9847 134.9793	140.809	224.4164 336.2191	119.9537 110.3906	427.7651	145.3337	261.8925 356.3274	139.6294 96.83217	499,9447 230,197	189.572 99.79341	350.8433 468.956	143.1381 96.05131	0.18262
14		1882 Va		Women Mer 015.jpg	/Users/cultu	119.1051	116.7123	221.0899	110 1264	116.3637	105.0697	272.4894	94.54854	149.8155	114,4806	397.2635	101.9918	206.6435	119.0913	542.2153	107.1467	0.42242
15		1883 VI	an Gogh	Bulb Fields 016.jpg	/Users/cultu	153.4797	110.049	152.2513	108.7908	116.4904	80.41004	159.5939	81.56682	129.5899	82.46364	226.5179	79.28302	185.1168	113.1306	379.3201	107.6267	0.12940
16	1	1883 Vi		Farmhouses 017.jpg	/Users/cultu	82.99864	65.01797	108.4589	54.48094	86.22328	57.77604	131.8586	56.12809	122.5125	65.11077	205.1766	64.95209	178.5165	B4.91007	337.7951	84.89385	0.08685
17	· · · · · · · · · · · · · · · · · · ·	1883 Vi	Contract of the local sectors	Landscape w 018.jpg	/Users/cultu	140.3584 242.4154	123.3528	168.5599 206.4272	124.6162	113.3686 189.7121	95.81927 134.7731	182.171 194.2848	99.14198 140.096	130.9458 219.6841	97.61036	250.5613 245.408	104,6004	193.5643 292.2945	112.2719 179.7173	384.281 325.0027	142.3498	0.17637
10	-	1883 Vi 1883 Vi		Lying Cow 019.jpg Marshy Land 020.jpg	/Users/cultu /Users/cultu	100.2341	84.68324	124.6727	88.67992	91.54239	67.1935	126.3685	67.60507	104.94	72.46509	219.2744	65.85488	142.052	77.37822	349.9175	78.46711	0.08072
20		1883 Vi	Artest end of the second	Wind-Beater 021.jpg	/Users/cultu	171.3399	163.3772	244.3291	154.6253	193.2609	164.9554	316.5594	147,2222	235.005	174.5571	445.707	148.8878	325.602	219.5957	674.0487	154,2818	0.13971
21		1883 Va	And the second sec	Cottages 022.jpg	/Users/cultu	98.51168	81.57991	166.255	84.38765	101.1741	70.44537	189.9941	74.21286	145.3716	75.62209	327.1396	84.70972	225.9476	83.3538	535.6056	105.5234	0.23202
22		1883 Va	and the second second	Farmhouses 023.jpg	/Users/cultu	134.9768	83.63738	123.7138	80.06972	142.0693	67.42562	130.6662	64.96549	177.2843	79.11592	185.1463	70.00421	232.9906	107.5137	303.2117	107.5727	0.14879
23		1883 Vi 1883 Vi	and a second second	Peasant Burr 024.jpg Peat Boat wi 025.jpg	/Users/cultu /Users/cultu	62.08977 89.15512	47.85902 73.99224	68.43662 151.6286	48.71696 75.85299	54.71489 87.06878	34.5297 59.61075	69.68351 178.72	34.74212 62.81025	72.27963	32 12795 69.02943	98.4652 282.2939	33.09215 79.15285	116.7221 175.4395	36.96432 93.46386	161.5422 448.8587	43.22385	0.11959
25	-	1883 Vi	and the second	Two Women 025.jpg	/Users/cultu	139.0749	140.2913	228.7463	127.8939	112.9334	99.82898	218.922	86.98317	146.3298	96.47105	284.6574	92.51173	208.6285	108.8605	437.6964	102.3661	0.1885
26		1883 Vi	and the second sec	Farm with St 027.jpg	/Users/cultu	75.96546	64.30652	127.4023	61.54812	64.69623	43.76397	122.108	41.27111	79.39095	42.03514	169.1161	41 74033	122.8469	52.72583	213.2044	53.6207	0.49896
27		1884 Va	and the second difference of	Weaver Faci 028.jpg	/Users/cultu	82.66046	79.77385	77.54814	57.06818	113.8931	111.3923	104.6361	70.87246	161.1465	175.902	160.7458	96.22937	221.144	247.2528	242.8907	125.5119	0.52764
28		1884 VI	and a second	Old Tower at 029.jpg	/Users/cultu	112.1247	84.9344	153,624	84.76222	135.0339	87.72457	207.3041	85.65754	173.2122	97.357	307.5263	90.79136	258.7445	124.5978	444,769	121.4058	0.16468
29	-	1884 Vi 1884 Vi		Weaver Faci 030.jpg Weaver Faci 031.jpg	/Users/cultu /Users/cultu	122.3969	93.6958 85.48748	169.3717 173.2018	87.91474 92.59441	137.7658 228.2653	100.0835	230.7704 236.6172	79.49283	198.7482 355.1588	140.9361 149.1897	339.9454 360.0048	102.7624	247.1085	158.7959 190.3939	505.179 516.9417	122.9975 259.1506	0.11858
31		1884 V	and the second	Landscape w 032.jpg	/Users/cultu	169.7956	131.2291	218.496	139 5226	199.9615	130,1627	244.1877	134.0526	252.6642	150.6632	343.6856	142.4652	348.6879	172.9659	515.6782	191,4243	0.36552
32		1884 Va	an Gogh	Old Church 1 033.jpg	/Users/cultu	104.0717	64.9831	124.1448	62.95723	135.6766	73.20991	181.6953	70.40928	212.924	85.9434	289.4125	88.34178	335,7642	108.7623	491.1541	108.2088	0.19500
33		1884 Vi	Contrast 1.1 Contrast Providence and the	Parsonage G 034.jpg	/Users/cultu	128.9976	82.28285	141.6219	89.98674	131.5854	68.39339	172.9258	74.52206	147.0557	67.8822	277.4956	74.76368	196.6911	73.4979	381.9957	102.445	0.14392
34		1884 Vi 1884 Vi	Construction of the second second	Water Mill a 035.jpg	/Users/cultu	178.1397 154.0438	137.3773	225.0326	130.6759	151.5895	105.922 81.9139	205.4332 145.2981	102.07 69.92081	173.9468	108.2974 82.51073	259.134 209.4513	103.82 66.47508	222.248	129.0223 100.7764	327.8845 276.0212	124,6787 90.65301	0.16805
35		1884 Vi	and the second sec	Weaver Arra 036.jpg Weaver Stan 037.jpg	/Users/cultu /Users/cultu	117.6624	72.43216	141.7256	76.30102	143.5052	70.15086	183.3198	81.45348	201.0453	87.51565	238.84	112.1901	273.5891	114.0608	333.2458	169.8948	0.31954
37	1	1884 Va	the start of the s	Weaver Seer 038.jpg	/Users/cultu	178.4809	94.27144	223.8339	89.26079	232.5004	95.58579	298.9884	95.17262	342.7749	133 2138	479.64	149.3645	543.9268	204.6209	549.8797	198.7915	0.12454
38	1 1	1884 Va	and the second sec	Cart with Rei 039.jpg	/Users/cultu	72.03047	51.26472	68.11649	52.06572	72 17334	45.36681	77.11698	46.90124	100.8624	49.486	104.0325	56.08562	126.3583	60.88408	149.3239	67.53696	0.12491
39	-	1884 Va	and the second sec	Old Tower in 040.jpg	/Users/cultu	62.17794	42.71779	63.09983	42.92953	62.70066	33.62444	68.1096	33.95442	83.5433	32.2536	103.5663	31.74708	131.7822	39.12523	193.7049	38.87818	0.03951
40	1 2	1884 Va 1884 Va	the second second second	Village at Sui 041.jpg Weaver Nea 042.jpg	/Users/cultu /Users/cultu	50.43823 129.9134	38.02633 95.03289	61.56368	37.20641 78.537	44.69937 135.1992	29.09928 89.52994	71.03277 143.6198	29.75525 60.45665	56.56786	29.10477	100.8811 202.1645	31.3246	82,20948	36.16124	155.4854 248.21	36.32341 95.24341	0.12350
42		1884 Va	Sector Se	Weaver Inte 043.jpg	/Users/cultu	132.3806	86.49588	150.446	84.48071	145.9111	69.27839	176.0448	72.14251	192.7975	77.67416	229.052	88.65909	241.143	106.1225	and all all and a second se	105.1748	0.14583
43		1884 Va	an Gogh	Weaver Seer 044.jpg	/Users/cultu	168.3072	111.768	209.6191	108.6389	185.5583	94.44386	229.9636	91.05313	248.535	108.6144	295.3275	100.3029	254.7507	139.1412	355.1129	304,4603	0.08833
44		1884 Vi		Farmers Plar 045.jpg	/Users/cultu	104.2433	76.23696	145.4615	75.43217	112.0453	68.05646	179.6769	69.97666	157.5482	78.49243	288.099	79.36605	228.6135	109.9345	493.3748	99.29759	0.1443
45		1884 Vi 1884 Vi		Potato Plant 046.jpg Shepherd wi 047.jpg	/Users/cultu /Users/cultu	99.80794 131.4015	76.7967	143.0178 161.6843	72.52043	129.7032	91.61354 78.91329	202.9062 192.3567	83.87035 85.59146	188.7972 117.1091	128.7298 79.25805	339.0938 233.6199	104.1293 88.81663	259.6679	130.3923 64.90979	587.5305 410.5963	133.114	0.16133
47		1884 Va	the second s	Wood Gathe 048.jpg	/Users/cultu	146.3258	121,4269	213.2994	151.4783	177.5782	115.9269	254.5465	151.9294	260.6119	139.9564	375.4896	169.9581	414.9965	222,6505	635.9226	251,1453	0.14109
48		1884 Vi	a second s	Avenue of Pr 049.jpg	/Users/cuitu	311.3819	145.0673	143.7892	134.712	393.1087	129.6299	131.5587	117.1155	464.3118	118.21	144.7681	104.1188	542.5834	114.8749	218.5517	106.6927	0.15023
49		1884 Vi	and the second second	Avenue of Pi 050.jpg	/Users/cultu	192.8254	83.49601	111.8866	88.5525	203.2045	76.04265	118.5374	78.38981	217.0562	71.12017	142.8693	85.47767	268.7158	74.54232	179.1674	88.16176	0.13131
50		1884 Vi		Head of a M. 051.jpg	/Users/cultu	69.7631	58.11589	61,82505	55.02348	59.83526	44.87415	53.00435	42.18276	79.03231	45.39897	65.17959	43.4111	110.9202	63.96968	92.44357	47.72759	0.14640
51		1884 Va 1884 Va		Head of a W 052.jpg Head of a W 053.jpg	/Users/cultu /Users/cultu	99.87571 165.4173	86.44471 120.546	91.78872 141.2252	86.76234 125.1663	89.63893 131.3222	70.06652 68.06143	79.55813 105.4434	72.20056 69.49685	114.6076	83.3721 60.50147	109.731	91.93453 61.10179	182.3536 261.292	111.5129 84.24173	129.0597 189.7075	131.1285 92.71655	0.17165
53		1884 Va		Still Life with 054.jpg	/Users/cultu	109.0532	75.49128	121.3796	72.48274	104.4521	56.95249	128.0141	53.37339	136.9775	62.2601	178.4294	60.30275	193,499	81.85253	265.3471	76.81707	0.13093
54		1884 Va	and the state of the	Still Life with 055.jpg	/Users/cultu	75.31588	54.75166	83.49087	55.53618	75.16123	48.20548	94.41795	44.86951	105.8437	58.5855	147.8215	56.143	175.3705	96.58578	186.8735	93.74203	0.10495
55		1854 Vi	the second set where a second set	Still Life with 056.jpg	/Users/cultu	78.64828	61.209	92.87618	61.48695	75.65606	51.41101	95.2536	51.36976	93.2875	59.78156	130.6279	54.58075	134.4754	66.11001	198.3978	77.09636	0.05701
56		1884 Vi 1884 Vi		Still Life with 057.jpg Still Life with 058.jpg	/Users/cultu	176.6157 91.10637	110.8278 68.70778	131.3448 97.35384	103.7192 79.72959	165.8307 95.76901	83.24671 58.92022	130.5671 109.0128	86.13714 71.07911	214.6816 142.5971	95.00457 74.44791	172.4208	104.7623 85.32574	320.7755 215.9787	113.763 115.3814	257.6703 247.22	139.2815	0.1398
58		1884 Vi	and the second se	Still Life with 059.jpg	/Users/cultu /Users/cultu	90.2126	60.79082	83.43226	37.99666	86.96108	39.80316	81.11746	41.8297	116.3605	42.6159	120.3028	42.93741	156.378	55.59167	181.9333	62.1323	0.07217
59	· · · · · · · · · · · · · · · · · · ·	1884 VI	and the second se	Still Life with 060.jpg	/Users/cultu	113.3322	70.27695	99.1105	71.03419	103.3457	53.28653	97.53884	52.85575	134.3953	60.37948	138.5915	60 60211	179.0469	89.42811	180.0804	78.89823	0.1544
60		1884 Va	Concern and the second second second	Still Life with O61.jpg	/Users/cultu	106.7604	79.82203	133.3862	83.45207	105.8356	68.62127	157.7181	73.69258	136.8657	91.47278	207.5737	96.64507	197.5328	130.823	329.7936	152.2477	0.26910
61		1884 Vi	Contract a second difference of the	Still Life with 062.jpg	/Users/cultu	the second s	59.18217	80.87898	68.74218	77.10956	44,1343	83.19739	54 66899	109.5107	49.25514	110.5809	63.00525	150.8311	56.27786	183.48	79.80334	0.13053
62		1884 Vi 1884 Vi	and the second se	Two Rats 063.jpg Vase with Dr 064.jpg	/Users/cultu /Users/cultu	119.8846	116.0397 130.1376	169.4623	116.2336	97.08358 147.7225	93.51632	197.3481 135.3409	91,36681 109,195	109.3999 216.6932	92.33901 151.8284	288.5485 201.4097	91.12136 159.8402	157.3354 261.0384	109.6106 171.189	422.8542 257.4477	125.9554 214.4058	0.36445
64		1884 Vi		Vase with Hc 065.jpg	/Users/cultu	147.5914	115.0128	126.3383	104.7514	135.8947	108.2789	125.063	93.81329	165.1876	143.254	176.5233	119.4357	214.8395	188.2437	243.1772	128.2988	0.52597
65		1884 Va		Water Mill a' 066.jpg	/Users/cultu	102.9491	70.14622	168.8922	73.08418	119.3697	63.89396	210.1551	63.97957	146.7676	77.35542	321.7245	82.57227	205.7976	79.22392	457.2151	93.32483	0.42825
66		1884 Va	an Gogh	Water Mill a' 067.jpg	/Users/cultu	160.269	91.58162	154.8144	100.2444	180.2822	83.06544	171.3908	92.66899	249.7545	104.3034	255.2554	112.5487	305.1725	124.5705	359.0057	118.9621	0.1679
67		1884 Vi	and the second second	Head of a Pe 068.jpg	/Users/cultu	141.5616	116.6566	126.803	123.5044	167.2364	122.8039	172.8878	145.4731	223.2592	169.6311	235.9847	179.9692	317.8548	202.5169	334.6974	250.146	0.32004
68		1884 Va 1884 Va	and shift and share the same to be a set	Head of a Pe 069.jpg Head of a Pe 070.jpg	/Users/cultu	143.8628 102.0467	87.37177 82.56545	107.8775 91.39727	91.71884 80.73233	186.8365 115.9109	95.62836 87.24759	139.393 104.8923	107.855 84.82011	289.0516 171.6782	122 1346 99.80433	205.8633 178.2395	144.0011	368.1123 233.5088	145.1737 142.3802	280.7676 230.4866	202.0563 208.2223	0.16296
70		1864 Va	statistics of the second second	Head of an C 071.jpg	/Users/cultu /Users/cultu	98.45621	81.58273	87.57272	82.19248	87.0769	66.09732	85.96271	69.2027	127.0419	75.07622	124.9302	89.02473	171.0426	110.9366	175.9012	123.0507	0.1144
71		1884 Va	and the second se	Head of an C 072.jpg	/Users/cultu	115.7665	97.4157	108.4045	87.55437	113.478	B5.2044	120.0118	89.90981	159.9779	114.8115	175.553	120.1993	260.9049	158.2732	243.6204	163.8483	0.11661
72		1884 Va		Peasant Wor 073.jpg	/Users/cultu	101.2167	75.88509	100.4741	84.28728	102.6066	61.02669	94.47092	70.60745	139.0185	71.38183	131.7528	85.26555	215.3376	96.34143	203.8785	113.4596	0.22655
73		1885 Vi		Congregation 074.jpg	/Users/cultu	272.6516	144.5291	191.6491	150.7756	295.5116	118.4668	182.9202	132.3688	362.8846	119.1728	219.6777	121.3856	359,4108	102.2536	332.0535	126.1773	0.16896
74	-	1940 VI	an Gogh	Head of a Br 075.jpg	/Users/cultu	107.8052	62.49502	81.56957	67.52073	130.5448	50.94386	91.96287	57.62338	189.3356	58.19878	143.769	77.9977	380.0584	B9.42745	227.6754	108.5157	0.62529



A sequence from Game of Thrones entry titles



Average brightness of 150 frames from the sequence ImageJ, E. Reyes, 2012



**3D motion structure model** *ImageToObject*, E. Reyes, 2013

Motion structure printed

E. Reyes, 2013

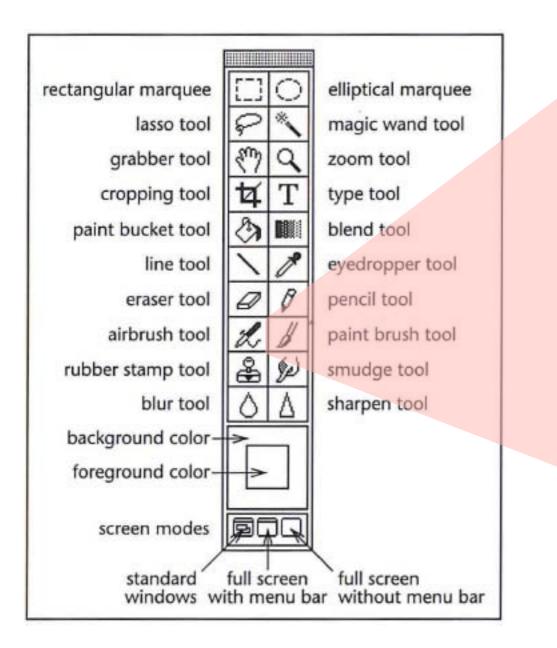
# **Software** operations

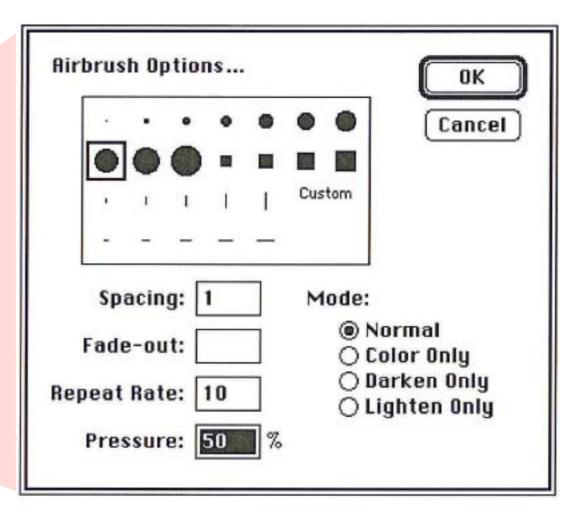
**Expression** plane

Architectonic Space

**Content plane** 

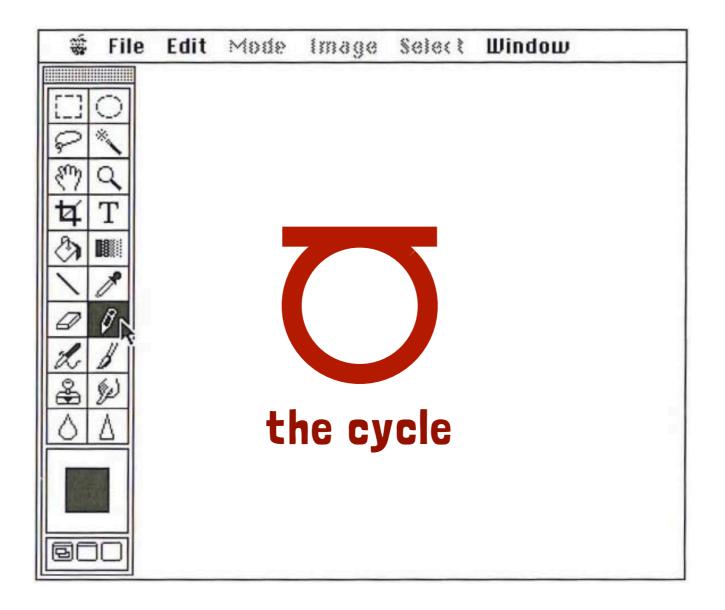
Semantic Space



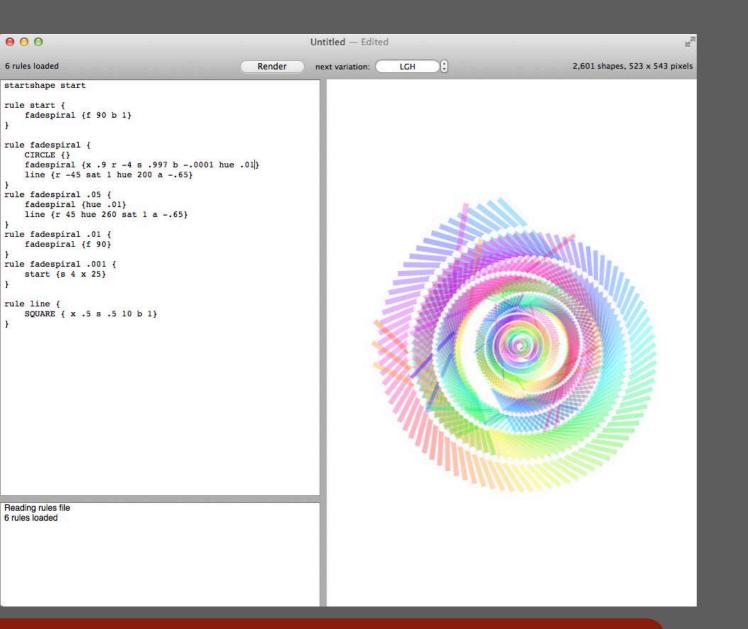


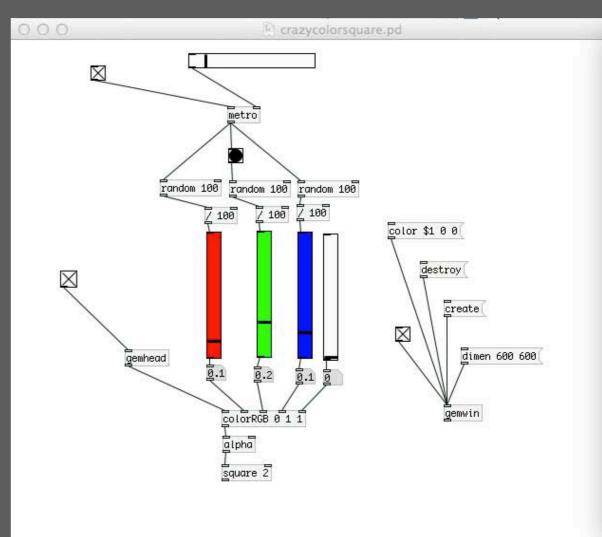
#### Adobe Photoshop 1.0, Thomas & John Knoll, 1990

### What is the structure of retouching a photo?



## ...what if we go **Outside** Photoshop?





#### Context Free, Chris Coyne, 2005-today

Pd, Miller Puckette, 1996-today



### Use legends and other metadata

[layers of interpretative codes]

### Assemble a narrative

[ it's the skeleton of an argument ]

### Don't panic if your images foster "mundane" readings

[ they are useful for scientific dissemination ]

### Search for different visual configurations

[ welcome to the society of software ]

#### **Document** the scientific experience

[it's background for conventions and visual experience]

### Thank you for your attention

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