TABLE I: Classification results of Amazon Rekognition over KDEF (A – anger, Cf – confusion, D - disgust, F – fear, H – happiness, N – neutral, Sa – sadness, Su – surprise)

		Actual class								Precision (%)	F1	MCC
		A	Cf	D	F	H	N	Sa	Su			
Predicted class	A	71	0	41	6	0	5	2	0	56.800	0.538	0.466
	Cf	28	0	11	36	0	1	3	0	0.000	NaN	NaN
	D	7	0	67	7	0	0	5	0	77.907	0.596	0.566
	F	0	0	0	0	0	0	0	0	NaN	NaN	NaN
	H	2	0	6	8	136	0	1	0	88.889	0.932	0.921
	N	17	0	6	21	1	125	30	17	57.604	0.702	0.663
	Sa	12	0	8	13	0	6	98	0	71.533	0.710	0.662
	Su	2	0	0	48	2	2	0	122	69.318	0.775	0.739
Recall (%)		51.079	NaN	48.201	0.000	97.842	89.928	70.504	87.770	Accuracy (%):		63.618

TABLE II: Classification results of Face++ over KDEF (A – anger, D - disgust, F – fear, H – happiness, N – neutral, Sa – sadness, Su – surprise)

		Actual class							Precision (%)	F1	MCC
		A	D	F	H	N	Sa	Su			
Predicted class	A	78	5	1	0	1	1	0	90.698	0.693	0.680
	D	23	121	24	1	1	8	0	67.978	0.763	0.726
	F	1	0	30	0	0	3	0	88.235	0.347	0.402
	H	2	2	7	138	2	4	1	88.462	0.936	0.926
	N	23	1	7	0	129	9	4	74.566	0.827	0.801
	Sa	10	10	27	0	4	111	0	68.519	0.738	0.693
	Su	2	0	43	0	2	3	134	72.826	0.830	0.808
Recall (%)		56.115	87.050	21.583	99.281	92.806	79.856	96.403	Accuracy (%):		76.156

TABLE III: Classification results of Google Vision AI over KDEF (A – anger, D - disgust, F – fear, H – happiness, N – neutral, No – none, Sa – sadness, Su – surprise)

		Actual class								Precision (%)	F1	MCC
		A	D	F	H	N	No	Sa	Su			
Predicted class	A	24	59	0	0	0	0	0	0	28.916	0.216	0.128
	D	0	0	0	0	0	0	0	0	NaN	NaN	NaN
	F	0	0	0	0	0	0	0	0	NaN	NaN	NaN
	H	2	13	15	139	0	0	5	1	79.429	0.885	0.872
	N	0	0	0	0	0	0	0	0	NaN	NaN	NaN
	No	39	38	23	0	109	0	9	2	0.000	NaN	NaN
	Sa	74	29	65	0	30	0	123	0	38.318	0.535	0.482
	Su	0	0	36	0	0	0	2	136	78.161	0.869	0.852
Recall (%)		17.266	0.000	0.000	100.000	0.000	NaN	88.489	97.842	Accuracy (%):		43.371

TABLE IV: Classification results of Microsoft Face API over KDEF (A – anger, Co – contempt, D - disgust, F – fear, H – happiness, N – neutral, No – none, Sa – sadness, Su – surprise)

		Actual class									Precision (%)	F1	MCC
		A	Co	D	F	H	N	No	Sa	Su			
Predicted class	A	75	0	6	0	0	0	0	0	0	92.593	0.682	0.674
	Co	0	0	0	1	0	0	0	0	0	0.000	NaN	NaN
	D	6	0	102	2	0	0	0	0	0	92.727	0.819	0.800
	F	1	0	0	29	0	0	0	0	0	96.667	0.343	0.420
	H	2	0	0	3	139	0	0	1	1	95.205	0.975	0.972
	N	48	0	5	13	0	139	0	12	6	62.332	0.768	0.749
	No	0	0	1	0	0	0	0	0	0	0.000	NaN	NaN
	Sa	6	0	25	39	0	0	0	125	0	64.103	0.749	0.713
	Su	1	0	0	52	0	0	0	1	132	70.968	0.812	0.787
Recall (%)		53.957	NaN	73.381	20.863	100.000	100.000	NaN	89.928	94.964	Accuracy (%):		76.156

TABLE V: Classification results of Sightcorp F.A.C.E. API over KDEF (A – anger, D - disgust, F – fear, H – happiness, N – neutral, No – none, Sa – sadness, Su – surprise)

		Actual class								Precision (%)	F1	MCC
		A	D	F	H	N	No	Sa	Su			
Predicted class	A	92	21	2	1	30	0	6	1	60.131	0.630	0.566
	D	8	88	2	0	1	0	0	0	88.889	0.739	0.718
	F	2	5	66	6	12	0	8	14	58.407	0.524	0.457
	H	1	12	6	131	0	0	9	1	81.875	0.876	0.857
	N	0	0	0	0	0	0	0	0	NaN	NaN	NaN
	No	2	2	1	0	3	0	1	2	0.000	NaN	NaN
	Sa	34	10	32	0	65	0	113	5	43.629	0.568	0.505
	Su	0	1	30	1	28	0	2	116	65.169	0.732	0.688
Recall (%)		66.187	63.309	47.482	94.245	0.000	NaN	81.295	83.453	Accuracy (%):		62.282

TABLE VI: Classification results of Sighthound Cloud API over KDEF (A – anger, D - disgust, F – fear, H – happiness, N – neutral, Sa – sadness, Su – surprise)

		Actual class							Precision (%)	F1	MCC
		A	D	F	H	N	Sa	Su			
Predicted class	A	78	5	1	0	1	1	0	90.698	0.693	0.680
	D	23	121	24	1	1	8	0	67.978	0.763	0.726
	F	1	0	30	0	0	3	0	88.235	0.347	0.402
	H	2	2	7	138	2	4	1	88.462	0.936	0.926
	N	23	1	7	0	129	9	4	74.566	0.827	0.801
	Sa	10	10	27	0	4	111	0	68.519	0.738	0.693
	Su	2	0	43	0	2	3	134	72.826	0.830	0.808
Recall (%)		56.115	87.050	21.583	99.281	92.806	79.856	96.403	Accuracy (%):		76.156

TABLE VII: Classification results of Amazon Rekognition over RaFD (A – anger, Cf – confusion, D - disgust, F – fear, H – happiness, N – neutral, Sa – sadness, Su – surprise)

		Actual class								Precision (%)	F1	MCC
		A	Cf	D	F	H	N	Sa	Su			
Predicted class	A	92	0	62	0	0	0	1	0	59.355	0.517	0.453
	Cf	53	0	35	17	0	4	31	0	0.000	NaN	NaN
	D	0	0	97	20	0	0	3	0	80.833	0.604	0.581
	F	0	0	0	0	0	0	0	0	NaN	NaN	NaN
	H	0	0	4	0	201	0	0	0	98.049	0.990	0.989
	N	35	0	3	19	0	185	13	1	72.266	0.810	0.781
	Sa	21	0	0	14	0	5	150	0	78.947	0.767	0.730
	Su	0	0	0	131	0	7	3	200	58.651	0.738	0.717
Recall (%)		45.771	NaN	48.259	0.000	100.000	92.040	74.627	99.502	Accuracy (%):		65.743

TABLE VIII: Classification results of Face++ over RaFD (A – anger, D - disgust, F – fear, H – happiness, N – neutral, Sa – sadness, Su – surprise)

		Actual class							Precision (%)	F1	MCC
		A	D	F	H	N	Sa	Su			
Predicted class	A	90	6	1	0	2	3	0	88.235	0.594	0.591
	D	25	195	3	2	0	1	1	85.903	0.911	0.898
	F	2	0	94	0	1	9	0	88.679	0.612	0.607
	H	1	0	0	199	1	0	0	99.005	0.990	0.988
	N	57	0	3	0	194	20	0	70.803	0.817	0.794
	Sa	26	0	34	0	3	168	0	72.727	0.778	0.740
	Su	0	0	66	0	0	0	200	75.188	0.857	0.840
Recall (%)		44.776	97.015	46.766	99.005	96.517	83.582	99.502	Accuracy (%):		81.023

TABLE IX: Classification results of Google Vision AI over RaFD (A – anger, D - disgust, F – fear, H – happiness, N – neutral, No – none, Sa – sadness, Su – surprise)

		Actual class								Precision (%)	F1	MCC
		A	D	F	H	N	No	Sa	Su			
Predicted class	A	8	146	0	0	0	0	0	0	5.195	0.045	-0.091
	D	0	0	0	0	0	0	0	0	NaN	NaN	NaN
	F	0	0	0	0	0	0	0	0	NaN	NaN	NaN
	H	0	8	1	201	0	0	0	0	95.714	0.978	0.975
	N	0	0	0	0	0	0	0	0	NaN	NaN	NaN
	No	98	39	24	0	169	0	20	0	0.000	NaN	NaN
	Sa	95	8	67	0	32	0	179	0	46.982	0.615	0.569
	Su	0	0	109	0	0	0	2	201	64.423	0.784	0.765
Recall (%)		3.980	0.000	0.000	100.000	0.000	NaN	89.055	100.000	Accuracy (%):		41.862

TABLE X: Classification results of Microsoft Face API over RaFD (A – anger, Co – contempt, D - disgust, F – fear, H – happiness, N – neutral, Sa – sadness, Su – surprise)

		Actual class								Precision (%)	F1	MCC
		A	Co	D	F	H	N	Sa	Su			
Predicted class	A	64	0	9	0	0	0	0	0	87.671	0.467	0.491
	Co	4	0	0	0	0	0	0	0	0.000	NaN	NaN
	D	1	0	190	0	0	0	0	0	99.476	0.969	0.965
	F	0	0	0	149	0	0	0	0	100.000	0.851	0.843
	H	0	0	0	0	201	0	0	0	100.000	1.000	1.000
	N	114	0	2	4	0	201	19	0	59.118	0.743	0.723
	Sa	18	0	0	4	0	0	182	0	89.216	0.899	0.882
	Su	0	0	0	44	0	0	0	201	82.041	0.901	0.889
Recall (%)		31.841	NaN	94.527	74.129	100.000	100.000	90.547	100.000	Accuracy (%):		84.435

TABLE XI: Classification results of Sightcorp F.A.C.E. API over RaFD (A – anger, D - disgust, F – fear, H – happiness, N – neutral, No – none, Sa – sadness, Su – surprise)

		Actual class								Precision (%)	F1	MCC
		A	D	F	H	N	No	Sa	Su			
Predicted class	A	156	18	0	0	34	0	7	0	72.558	0.750	0.707
	D	8	157	0	0	4	0	0	0	92.899	0.849	0.830
	F	3	9	101	1	24	0	15	4	64.331	0.564	0.507
	H	0	7	2	200	2	0	0	2	93.897	0.966	0.961
	N	0	0	0	0	0	0	0	0	NaN	NaN	NaN
	No	2	0	1	0	11	0	3	0	0.000	NaN	NaN
	Sa	32	1	66	0	113	0	175	3	44.872	0.592	0.541
	Su	0	9	31	0	13	0	1	192	78.049	0.859	0.839
Recall (%)		77.612	78.109	50.249	99.502	0.000	NaN	87.065	95.522	Accuracy (%):		69.723

TABLE XII: Classification results of Sighthound Cloud API over RaFD (A – anger, D - disgust, F – fear, H – happiness, N – neutral, Sa – sadness, Su – surprise)

		Actual class							Precision (%)	F1	MCC
		A	D	F	H	N	Sa	Su			
Predicted class	A	90	6	1	0	2	3	0	88.235	0.594	0.591
	D	25	195	3	2	0	1	1	85.903	0.911	0.898
	F	2	0	94	0	1	9	0	88.679	0.612	0.607
	H	1	0	0	199	1	0	0	99.005	0.990	0.988
	N	57	0	3	0	194	20	0	70.803	0.817	0.794
	Sa	26	0	34	0	3	168	0	72.727	0.778	0.740
	Su	0	0	66	0	0	0	200	75.188	0.857	0.840
Recall (%)		44.776	97.015	46.766	99.005	96.517	83.582	99.502	Accuracy (%):		81.023

TABLE XIII: Classification results of Amazon Rekognition over AffectNet (A – anger, Cf – confusion, Co – contempt, D - disgust, F – fear, H – happiness, N – neutral, No – none, Sa – sadness, Su – surprise)

		Actual class										Precision (%)	F1	MCC
		A	Cf	Co	D	F	H	N	No	Sa	Su			
Predicted class	A	1053	0	90	569	233	17	75	0	111	79	47.283	0.343	0.291
	Cf	232	0	67	336	268	29	85	0	132	186	0.000	NaN	NaN
	Co	0	0	0	0	0	0	0	0	0	0	NaN	NaN	NaN
	D	260	0	154	1058	208	103	104	0	192	123	48.047	0.346	0.296
	F	0	0	0	0	0	0	0	0	0	0	NaN	NaN	NaN
	H	113	0	849	321	246	2904	91	0	125	403	57.482	0.648	0.597
	N	1870	0	2561	1180	1260	723	3168	0	1856	1576	22.319	0.350	0.271
	No	2	0	3	2	3	5	6	0	8	5	0.000	NaN	NaN
	Sa	254	0	120	306	454	46	251	0	1397	111	47.533	0.408	0.341
	Su	126	0	66	138	1238	83	130	0	89	1427	43.282	0.396	0.319
Recall (%)		26.931	NaN	0.000	27.059	0.000	74.271	81.023	NaN	35.729	36.496	Accuracy (%):		35.189

TABLE XIV: Classification results of Face++ over AffectNet (A – anger, Co – contempt, D - disgust, F – fear, H – happiness, N – neutral, No – none, Sa – sadness, Su – surprise)

		Actual class									Precision (%)	F1	MCC
		A	Co	D	F	H	N	No	Sa	Su			
Predicted class	A	1011	115	472	230	51	118	0	161	126	44.264	0.326	0.270
	Co	0	0	0	0	0	0	0	0	0	NaN	NaN	NaN
	D	321	114	1063	131	81	91	0	151	89	52.082	0.357	0.316
	F	133	46	200	818	44	78	0	185	224	47.338	0.290	0.255
	H	222	1609	557	250	3118	342	0	286	501	45.287	0.578	0.527
	N	1743	1806	981	847	428	2798	0	1746	1197	24.234	0.362	0.271
	No	4	5	2	5	4	1	0	3	4	0.000	NaN	NaN
	Sa	245	142	429	337	101	276	0	1213	176	41.555	0.355	0.282
	Su	231	73	206	1292	83	206	0	165	1593	41.387	0.411	0.327
Recall (%)		25.857	0.000	27.187	20.921	79.744	71.560	NaN	31.023	40.742	Accuracy (%):		37.129

TABLE XV: Classification results of Google Vision AI over AffectNet (A – anger, Co – contempt, D - disgust, F – fear, H – happiness, N – neutral, No – none, Sa – sadness, Su – surprise)

		Actual class									Precision (%)	F1	MCC
		A	Co	D	F	H	N	No	Sa	Su			
Predicted class	A	442	2	554	164	3	4	0	13	11	37.049	0.173	0.148
	Co	0	0	0	0	0	0	0	0	0	NaN	NaN	NaN
	D	0	0	0	0	0	0	0	0	0	NaN	NaN	NaN
	F	0	0	0	0	0	0	0	0	0	NaN	NaN	NaN
	H	340	1661	886	558	3340	326	0	489	583	40.816	0.552	0.510
	N	0	0	0	0	0	0	0	0	0	NaN	NaN	NaN
	No	2538	2146	1772	1457	541	3146	0	1753	1562	0.000	NaN	NaN
	Sa	449	71	550	500	7	335	0	1527	91	43.258	0.410	0.332
	Su	141	30	148	1231	19	99	0	128	1663	48.077	0.451	0.379
Recall (%)		11.304	0.000	0.000	0.000	85.422	0.000	NaN	39.054	42.532	Accuracy (%):		22.289

TABLE XVI: Classification results of Microsoft Face API over AffectNet (A – anger, Co – contempt, D - disgust, F – fear, H – happiness, N – neutral, No – none, Sa – sadness, Su – surprise)

		Actual class									Precision (%)	F1	MCC
		A	Co	D	F	H	N	No	Sa	Su			
Predicted class	A	814	9	411	175	2	2	0	25	32	55.374	0.303	0.288
	Co	24	195	172	14	4	5	0	6	20	44.318	0.090	0.115
	D	33	1	627	15	1	2	0	4	7	90.870	0.273	0.356
	F	15	2	38	734	0	1	0	15	31	87.799	0.309	0.377
	H	137	1562	477	192	3366	174	0	126	604	50.708	0.638	0.600
	N	2647	2102	1632	1186	486	3628	0	2268	1919	22.864	0.367	0.318
	No	61	22	38	89	32	41	0	55	40	0.000	NaN	NaN
	Sa	115	12	412	357	5	28	0	1383	40	58.801	0.442	0.399
	Su	64	5	103	1148	14	29	0	28	1217	46.664	0.373	0.312
Recall (%)		20.818	4.987	16.036	18.772	86.087	92.788	NaN	35.371	31.125	Accuracy (%):		38.248

TABLE XVII: Classification results of Sightcorp F.A.C.E. API over AffectNet (A – anger, Co – contempt, D - disgust, F – fear, H – happiness, N – neutral, No – none, Sa – sadness, Su – surprise)

		Actual class									Precision (%)	F1	MCC
		A	Co	D	F	H	N	No	Sa	Su			
Predicted class	A	1291	688	874	635	295	712	0	563	562	22.972	0.271	0.148
	Co	0	0	0	0	0	0	0	0	0	NaN	NaN	NaN
	D	620	447	830	201	223	337	0	364	221	25.594	0.232	0.135
	F	360	306	405	807	182	530	0	471	655	21.717	0.212	0.102
	H	225	1007	426	311	2391	245	0	342	402	44.700	0.516	0.442
	N	0	0	0	0	0	0	0	0	0	NaN	NaN	NaN
	No	521	365	433	554	302	463	0	534	412	0.000	NaN	NaN
	Sa	728	952	811	981	436	1391	0	1529	1025	19.470	0.260	0.122
	Su	165	145	131	421	81	232	0	107	633	33.055	0.217	0.159
Recall (%)		33.018	0.000	21.228	20.639	61.151	0.000	NaN	39.105	16.189	Accuracy (%):		23.916

TABLE XVIII: Classification results of Sighthound Cloud API over AffectNet (A – anger, Co – contempt, D - disgust, F – fear, H – happiness, N – neutral, No – none, Sa – sadness, Su – surprise)

		Actual class									Precision (%)	F1	MCC
		A	Co	D	F	H	N	No	Sa	Su			
Predicted class	A	1008	116	472	231	51	120	0	163	125	44.094	0.325	0.268
	Co	0	0	0	0	0	0	0	0	0	NaN	NaN	NaN
	D	319	114	1063	131	81	91	0	151	91	52.082	0.357	0.316
	F	133	46	198	817	45	79	0	186	226	47.225	0.290	0.254
	H	227	1609	561	250	3106	341	0	286	501	45.139	0.576	0.524
	N	1740	1806	980	847	433	2795	0	1745	1196	24.216	0.362	0.271
	No	4	5	2	5	4	1	0	3	4	0.000	NaN	NaN
	Sa	247	143	429	338	104	278	0	1210	176	41.368	0.354	0.280
	Su	232	71	205	1291	86	205	0	166	1591	41.357	0.410	0.327
Recall (%)		25.780	0.000	27.187	20.895	79.437	71.483	NaN	30.946	40.691	Accuracy (%):		37.052