

Semantic-Rich Facial Emotional Expression Recognition

Supplementary Material

I. FULL NAME LIST OF 135 EMOTION CATEGORIES

We transcribe the full list of the 135 emotion words from *the prototype emotion sorting study* [1]. In the psychological test, 112 participants are required to make their individual prototypical judgments on 213 English words that are collected and processed from an earlier research [2]. The 4-point rating scales offered to each participant are ranging from 1 (representing *I definitely would not call this an emotion*) to 4 (representing *I definitely would call this an emotion*). The mean rating scores are then calculated by averaging the prototypicality ratings that each candidate word gained (the higher the better). We transcribe the emotion names and the originated scores of all the identified emotion concepts in Tab. I.

by our designed data cleaning procedure (Fig. 2-4). We plan to publicly release the full image download links after the publishing of this manuscript.

REFERENCES

- [1] P. Shaver, J. Schwartz, D. Kirson, and C. O’connor, “Emotion knowledge: further exploration of a prototype approach.” *Journal of personality and social psychology*, vol. 52, no. 6, p. 1061, 1987.
- [2] J. R. Averill, “A constructivist view of emotion;” in *Theories of emotion*. Elsevier, 1980, pp. 305–339.
- [3] W. Zhang, X. Ji, K. Chen, Y. Ding, and C. Fan, “Learning a facial expression embedding disentangled from identity;” in *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 2021, pp. 6759–6768.

II. DETAILED NETWORK STRUCTURE

In Fig. 1, we show the network structure parameters of our proposed pipeline. The embedding model is consisting of two parallel branches as in [3]. The pseudo-siamese network structure is designed for extracting the expression-dependent features from global face features. The second part is an interactive MLP module, composed of several vanilla FC layers and our analyzed facial expression correlation matrix layers. The final output is a 135-dimensional logit and then sent for the loss calculation.

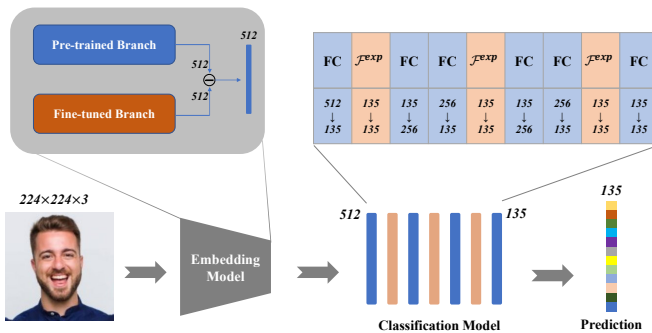


Fig. 1. The detailed network structure of our proposed semantic-rich FEC pipeline.

III. DATASET EXAMPLES

In the supplementary files, we show more image samples that are randomly chosen from our constructed *Emo135* dataset. For each emotion category, we give six images that are automatically downloaded from the internet and filtered

TABLE I

LIST OF THE 135 EMOTION WORDS AND THE CORRESPONDING RATINGS TRANSCRIBED FROM *the emotion sorting study* [1]. THE 4-POINT SCALE RATING SCORES REPRESENT THE EMOTIONAL PROTOTYPICALITY OF EACH WORD, RANGING FROM 1 (*I definitely would not call this an emotion*) TO 4 (*I definitely would call this an emotion*).

<i>Index</i>	<i>Emotion word</i>	<i>Prototypicality rating</i>	<i>Index</i>	<i>Emotion word</i>	<i>Prototypicality rating</i>
1	love	3.94	69	regret	3.16
2	anger	3.9	70	rejection	3.16
3	hate	3.84	71	pride	3.14
4	depression	3.83	72	gaiety	3.13
5	fear	3.83	73	homesickness	3.13
6	jealousy	3.81	74	jolliness	3.12
7	happiness	3.77	75	nervousness	3.12
8	passion	3.75	76	woe	3.12
9	affection	3.72	77	longing	3.11
10	sadness	3.68	78	loathing	3.1
11	grief	3.65	79	satisfaction	3.1
12	rage	3.64	80	hope	3.08
13	aggravation	3.63	81	insecurity	3.06
14	ecstasy	3.63	82	defeat	3.05
15	sorrow	3.62	83	dread	3.05
16	joy	3.61	84	fondness	3.05
17	compassion	3.62	85	enthusiasm	3.05
18	envy	3.58	86	sentimentality	3.05
19	fright	3.58	87	hopelessness	3.04
20	terror	3.57	88	annoyance	3.03
21	elation	3.55	89	cheerfulness	3.03
22	guilt	3.53	90	displeasure	3.03
23	excitement	3.51	91	melancholy	3.02
24	anguish	3.49	92	glumness	3.01
25	embarrassment	3.49	93	shock	3.01
26	worry	3.49	94	spite	3.01
27	panic	3.48	95	suffering	3.01
28	unhappiness	3.48	96	dismay	3
29	anxiety	3.46	97	exasperation	3
30	desire	3.45	98	infatuation	3
31	horror	3.45	99	apprehension	2.99
32	sympathy	3.45	100	caring	2.98
33	shame	3.44	101	isolation	2.98
34	lust	3.43	102	exhilaration	2.96
35	disgust	3.42	103	rapture	2.96
36	hostility	3.41	104	uneasiness	2.96
37	jubilation	3.41	105	grouchiness	2.95
38	loneliness	3.41	106	triumph	2.95
39	delight	3.4	107	joviality	2.94
40	pleasure	3.4	108	wrath	2.93
41	tenderness	3.4	109	arousal	2.92
42	pity	3.39	110	attraction	2.92
43	bitterness	3.38	111	contentment	2.92
44	disappointment	3.38	112	grumpiness	2.92
45	humiliation	3.38	113	irritation	2.92
46	dejection	3.37	114	ferocity	2.91
47	despair	3.37	115	enthralment	2.9
48	frustration	3.37	116	revulsion	2.88
49	hurt	3.37	117	alarm	2.87
50	adoration	3.36	118	eagerness	2.87
51	agony	3.35	119	hysteria	2.87
52	thrill	3.34	120	liking	2.87
53	fury	3.33	121	neglect	2.87
54	remorse	3.3	122	insult	2.86
55	agitation	3.29	123	mortification	2.85
56	outrage	3.28	124	tenseness	2.85
57	resentment	3.28	125	contempt	2.84
58	dislike	3.27	126	amazement	2.83
59	glee	3.24	127	amusement	2.83
60	alienation	3.23	128	zeal	2.83
61	distress	3.23	129	scorn	2.82
62	enjoyment	3.23	130	zest	2.82
63	relief	3.23	131	astonishment	2.8
64	gloom	3.21	132	torment	2.8
65	misery	3.2	133	optimism	2.78
66	euphoria	3.19	134	vengefulness	2.78
67	bliss	3.18	135	surprise	2.69
68	gladness	3.17			



Fig. 2. Image samples from our *Emo135* dataset. (Continue)



Fig. 3. Continues from Figure 2.



Fig. 4. Continues from Figure 2 and Figure 3.