Posed Expressions   **Spontaneous Expressions**

Emotion Recognized (rows) × Emotion Displayed (columns: anger, disgust, fear, happiness, sadness, surprise)

Human Observers

Recognized	Posed anger	disgust	fear	happiness	sadness	surprise	Spont. anger	disgust	fear	happiness	sadness	surprise
surprise	1%	2%	13%	0%	0%	87%	0%	5%	15%	4%	2%	68%
sadness	4%	2%	3%	0%	86%	0%	0%	8%	18%	2%	68%	7%
happiness	0%	0%	6%	97%	1%	1%	0%	3%	2%	83%	1%	2%
fear	2%	8%	52%	0%	1%	9%	2%	9%	26%	2%	9%	9%
disgust	16%	55%	13%	1%	1%	0%	2%	60%	19%	1%	3%	3%
anger	66%	22%	3%	0%	0%	0%	52%	7%	8%	1%	6%	5%
other	11%	11%	10%	2%	5%	2%	43%	9%	12%	7%	11%	6%

Affectiva

Recognized	Posed anger	disgust	fear	happiness	sadness	surprise	Spont. anger	disgust	fear	happiness	sadness	surprise
surprise	4%	5%	26%	6%	1%	57%	0%	8%	8%	0%	5%	43%
sadness	17%	12%	8%	0%	32%	0%	0%	11%	8%	0%	13%	8%
happiness	6%	8%	18%	83%	4%	3%	0%	25%	23%	78%	3%	18%
fear	1%	0%	17%	3%	5%	16%	0%	4%	23%	5%	16%	9%
disgust	49%	67%	28%	8%	55%	25%	100%	44%	38%	15%	55%	22%
anger	23%	9%	4%	0%	3%	0%	0%	8%	0%	1%	8%	0%
undetermined	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%

CrowdEmotion

Recognized	Posed anger	disgust	fear	happiness	sadness	surprise	Spont. anger	disgust	fear	happiness	sadness	surprise
surprise	3%	27%	15%	0%	13%	83%	0%	6%	0%	1%	11%	6%
sadness	8%	0%	13%	0%	31%	0%	67%	15%	8%	3%	42%	25%
happiness	15%	19%	41%	97%	14%	8%	0%	40%	54%	80%	18%	31%
fear	0%	0%	10%	1%	1%	3%	0%	3%	15%	1%	3%	6%
disgust	40%	50%	17%	1%	21%	4%	33%	29%	15%	14%	18%	24%
anger	35%	3%	4%	0%	21%	3%	0%	4%	8%	3%	8%	9%
undetermined	0%	1%	0%	0%	0%	0%	0%	3%	0%	0%	0%	0%

Emotient

Recognized	Posed anger	disgust	fear	happiness	sadness	surprise	Spont. anger	disgust	fear	happiness	sadness	surprise
surprise	3%	0%	21%	0%	3%	86%	0%	2%	8%	1%	5%	10%
sadness	6%	6%	10%	0%	67%	0%	67%	13%	8%	2%	58%	23%
happiness	4%	12%	28%	96%	5%	12%	0%	26%	31%	93%	13%	39%
fear	0%	1%	26%	0%	0%	0%	0%	5%	31%	0%	0%	8%
disgust	32%	77%	14%	4%	10%	1%	0%	38%	0%	2%	3%	4%
anger	55%	4%	1%	0%	15%	1%	33%	16%	23%	2%	21%	17%
undetermined	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Microsoft

Recognized	Posed anger	disgust	fear	happiness	sadness	surprise	Spont. anger	disgust	fear	happiness	sadness	surprise
surprise	0%	4%	29%	0%	0%	88%	0%	2%	15%	0%	3%	5%
sadness	28%	23%	21%	0%	82%	1%	67%	39%	46%	2%	66%	35%
happiness	26%	22%	41%	100%	13%	10%	0%	44%	31%	98%	16%	50%
fear	0%	0%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%
disgust	18%	36%	1%	0%	0%	0%	0%	4%	0%	0%	0%	0%
anger	28%	15%	1%	0%	5%	0%	33%	12%	8%	1%	16%	11%
undetermined	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

MorphCast

Recognized	Posed anger	disgust	fear	happiness	sadness	surprise	Spont. anger	disgust	fear	happiness	sadness	surprise
surprise	8%	4%	18%	5%	5%	74%	0%	0%	8%	2%	8%	11%
sadness	24%	9%	15%	3%	58%	4%	0%	13%	15%	7%	47%	27%
happiness	8%	6%	19%	87%	5%	5%	0%	13%	15%	59%	3%	13%
fear	8%	18%	33%	0%	15%	13%	67%	19%	31%	7%	26%	34%
disgust	27%	45%	8%	1%	4%	0%	0%	46%	8%	20%	11%	8%
anger	26%	18%	6%	4%	13%	4%	33%	8%	23%	6%	5%	8%
undetermined	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Neurodatalab

Recognized	Posed anger	disgust	fear	happiness	sadness	surprise	Spont. anger	disgust	fear	happiness	sadness	surprise
surprise	1%	1%	24%	0%	3%	77%	0%	0%	0%	0%	0%	4%
sadness	31%	18%	28%	3%	79%	3%	0%	32%	38%	11%	76%	44%
happiness	5%	4%	12%	95%	4%	3%	0%	14%	23%	83%	5%	21%
fear	1%	3%	18%	0%	1%	14%	0%	2%	15%	0%	3%	8%
disgust	36%	68%	17%	3%	3%	3%	0%	41%	8%	3%	8%	11%
anger	26%	6%	1%	0%	10%	1%	100%	11%	15%	3%	8%	13%
undetermined	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

VicarVision

Recognized	Posed anger	disgust	fear	happiness	sadness	surprise	Spont. anger	disgust	fear	happiness	sadness	surprise
surprise	0%	1%	14%	0%	0%	84%	0%	1%	0%	2%	3%	11%
sadness	21%	12%	14%	1%	85%	4%	67%	21%	23%	8%	66%	24%
happiness	4%	8%	21%	96%	0%	4%	0%	20%	23%	80%	3%	23%
fear	0%	5%	36%	0%	1%	5%	0%	11%	15%	4%	11%	14%
disgust	32%	65%	12%	1%	1%	0%	0%	19%	0%	2%	0%	2%
anger	44%	9%	4%	1%	13%	3%	33%	28%	38%	6%	18%	27%
undetermined	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

VisageTech.

Recognized	Posed anger	disgust	fear	happiness	sadness	surprise	Spont. anger	disgust	fear	happiness	sadness	surprise
surprise	3%	4%	15%	3%	1%	79%	0%	1%	0%	1%	0%	1%
sadness	18%	10%	17%	1%	76%	5%	0%	27%	38%	9%	61%	37%
happiness	5%	13%	26%	95%	8%	6%	0%	24%	38%	85%	8%	33%
fear	3%	5%	24%	0%	1%	8%	0%	3%	8%	0%	8%	9%
disgust	22%	53%	9%	0%	0%	0%	67%	26%	0%	1%	0%	4%
anger	50%	15%	9%	1%	14%	1%	33%	19%	15%	4%	24%	17%
undetermined	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Emotion Displayed

Recognition Frequency: 0% 25% 50% 75% 100%

S1 Figure. Emotion confusion matrices for human observers and automatic classifiers separately by posed and spontaneous expressions. For cases with 'undetermined' confidence levels, the sum of the marginal proportion of recognized emotions can be higher than 100%.