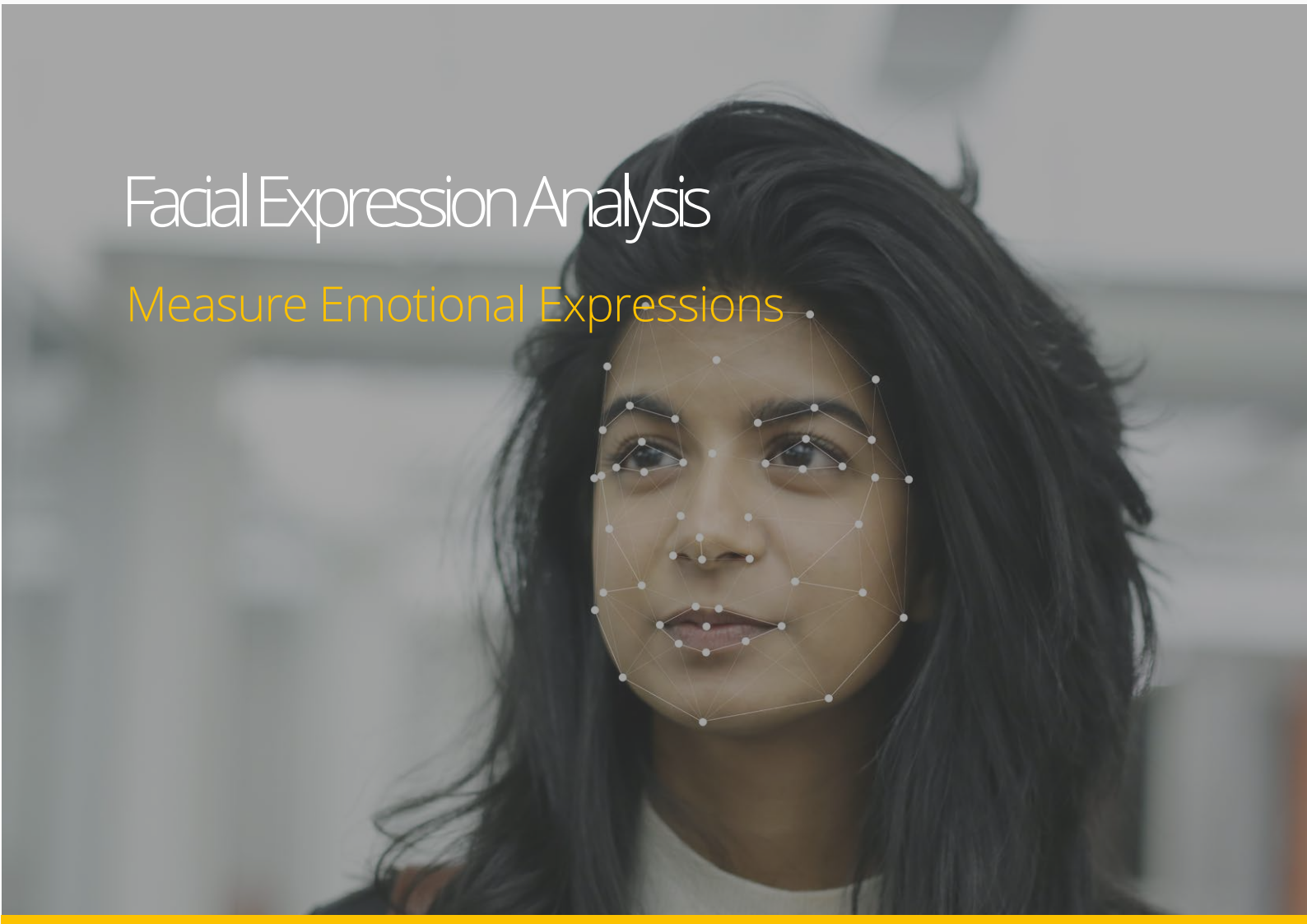
QSS CO. LTD.

شركة جودة حلول المساندة المحدودة

QUALITY SUPPORT SOLUTIONS CO. LTD.

Facial Expression Analysis

Measure Emotional Expressions

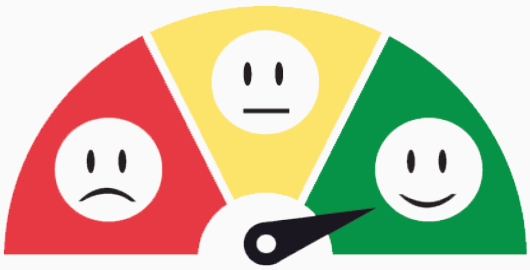


Dr. Elie Metri v1.2

How Emotional Intelligence Works

The leading solution for facial expression analysis

QSS employs the use of an inhouse built algorithms for facial expression analysis. QSS has led the way in the introduction of automated facial expression analysis for research, in both the academic and commercial sphere.



The science of the face

Our algorithms are trained using emotion data repository, that has now grown to over 6 million faces analyzed in 87 countries. They continuously test their algorithms to provide the most reliable and accurate emotion metrics. The data has been gathered representing real-world, spontaneous facial expressions, made under challenging conditions such as changes in lighting and background noise, and variances due to ethnicity, age, and gender.

To solve the task of identifying dynamically changing facial expressions across a range of participants, we deployed the use of convolutional and recurrent neural networks. These methods have been designed with feasible computational consumption in mind, ensuring that the analysis can be delivered quickly.

Advanced methods, advanced metrics

We unobtrusively measures unfiltered and unbiased facial expressions of emotion, using just a standard Camera. The technology first identifies a human face in real time or in a video. Computer vision algorithms identify key landmarks on the face – for example, the corners of your eyebrows, the tip of your nose, the corners of your mouth. Deep learning algorithms then analyze pixels in those regions to classify facial expressions. Combinations of these facial expressions are then mapped to emotions.

We measures 20 facial expression metrics, alongside 33 facial landmarks, as well as interocular distance an head orientation. This information gives rise to probability values that show the likelihood of one of the 7 basic emotions being exhibited: anger, contempt, disgust, fear, joy, sadness or surprise. Summary scores of engagement and valence are also provided, giving you an overview of emotion.

Facial Expression Analysis Metrics

Complete data to further understanding

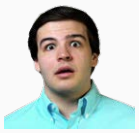
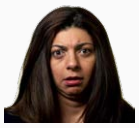
The chart below shows the data that our solution is able to collect from facial expressions. Use facial landmarks for fine-grained data, or assess expressed emotions through AI's calculations. Access other data for determining behavior in response to stimuli.

Metric	Number of components	Description
Valence	3	A measure of the positive or negative nature of the recorded person's experience: positive, negative, neutral
Basic emotions	7	Core emotions based on facial expressions: Joy, Anger, Surprise, Fear, Sadness, Disgust, Contempt
Engagement	1	A measure of facial muscle activation that illustrates the subject's expressiveness.
Facial expressions	20 (+ attention)	Expressions determined by change in facial landmarks: Attention, Brow Furrow, Brow Raise, Inner Brow Raise, Eye Closure, Nose Wrinkle, Upper Lip Raise, Lip Suck, Lip Pucker, Lip Press, Mouth Open, Lip Corner Depressor, Chin Raise, Smirk, Smile
Facial landmarks	33	Geometrical mapping of the face: Right Top Jaw, Right Jaw Angle, Tip of Chin, Left Jaw Angle, Left Top Jaw, Outer Right Brow Corner, Right Brow Center, Inner Right Brow Corner, Inner Left Brow Corner, Left Brow Center, Outer Left Brow Corner, Nose Root, Nose Tip, Nose Lower Right Boundary, Nose Bottom Boundary, Nose Lower Left Boundary, Outer Right Eye, Inner Right Eye, Inner Left Eye, Outer Left Eye, Right Lip Corner, Right Apex Upper Lip, Upper Lip Center, Left Apex Upper Lip, Left Lip Corner, Left Edge Lower Lip, Lower Lip Center, Right Edge Lower Lip, Bottom Upper Lip, Top Lower Lip, Upper Corner Right Eye, Lower Corner Right Eye, Upper Corner Left Eye, Lower Corner Left Eye
Interocular distance	1	Distance between two outer eye corners for estimation of distance from screen
Head orientation	3	Head rotation: yaw, pitch, roll

Facial Expression Analysis Values

How the metrics are calculated

QSS's algorithms compute the likelihood of a facial expression based on the activation of certain facial movements. The chart below shows which facial expressions increase or decrease the likelihood of an emotional expression being detected.

Emotion	Image of emotion	Increases likelihood	Decreases likelihood
Joy		Smile	Brow Raise Brow Furrow
Anger		Brow furrow Lid Tighten Eye Widen Chin Raise Mouth Open Lip Suck	Inner Brow Raise Brow Raise Smile
Disgust		Nose Wrinkle Upper Lip Raise	Lip Suck Smile
Surprise		Inner Brow Raise Brow Raise Eye Widen Jaw Drop	Brow Furrow
Fear		Inner Brow Raise Brow Furrow Eye Widen Lip Stretch	Brow Raise Lip Corner Depressor Jaw Drop Smile
Sadness		Inner Brow Raise Brow Furrow Lip Corner Depressor	Brow Raise Eye Widen Lip Press Mouth Open Lip Suck Smile
Contempt		Brow Furrow Smirk	Smile