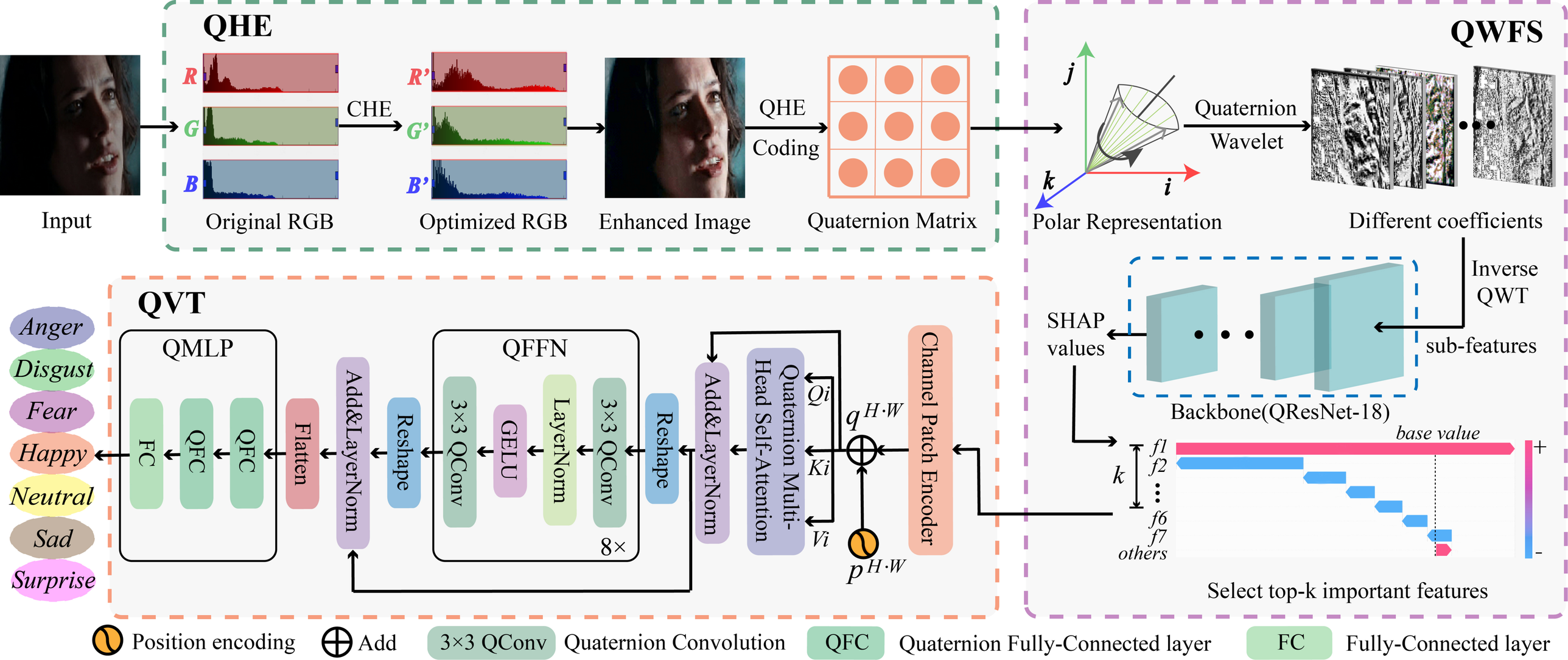
QHE
R
G
B
CHE
R'
G'
B'
Input
Original RGB
Optimized RGB
Enhanced Image
QHE
Coding
Quaternion Matrix
QWFS
j
k
i
Polar Representation
Quaternion
Wavelet
Different coefficients
Inverse
QWT
sub-features
Backbone(QResNet-18)
SHAP
values
base value
f1
f2
f6
f7
others
k
+
-
Select top-k important features
QVT
Anger
Disgust
Fear
Happy
Neutral
Sad
Surprise
QMLP
FC
QFC
QFC
Flatten
Add&LayerNorm
Reshape
QFFN
3×3 QConv
GELU
LayerNorm
3×3 QConv
8×
Reshape
Add&LayerNorm
Quaternion Multi-Head Self-Attention
Qi
Ki
Vi
$q^{H\cdot W}$
$p^{H\cdot W}$
Channel Patch Encoder
Position encoding
Add
3×3 QConv
Quaternion Convolution
QFC
Quaternion Fully-Connected layer
FC
Fully-Connected layer