Technology Brief of CityU’s IP

Customizable Emotion Modification for Image and Video

(IDF#663, US 16/381,172)
Customizable Emotion Modification for Image and Video

An example of a valence-arousal (VA) emotion model used by the emotion analysis engine

An example of a circumplex model of affect used by the emotion analysis engine
Customizable Emotion Modification for Image and Video

Untrained CNN

\[\text{Images} \rightarrow \text{Known object classification}\]
\[\text{Known emotional rating}\]

\[\text{CNN becomes trained and can perform}\]
\[\begin{align*}
\text{- Object classification} \\
\text{- Emotional rating of input image}
\end{align*}\]

Trained CNN

Object classification feedback

Emotion feedback

Input Image (content)

Preferred style image

Rendering 534

Layer 1

Layer 2

Layer N

Each layer of content / object information 530

Completed Target Image

Object rendered with preferred style
Customizable Emotion Modification for Image and Video

Advantages:

• Flexible for any number of style images and any number of target images
• Can utilize multiple datasets to empirically extract emotion information
• Not limited to a particular model, or even emotion features at all, and can learn individual preferences
• Can extract image features of any category that can be applied to any image or video content
• Images can be both labelled and modified within the system itself
Customizable Emotion Modification for Image and Video

Applications:

• Visual Application
• A tool for content creators
• As a protective device for parents to filter content for their children
• Mental health protection
• Advertising
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Fully Nested Neural Network for Adaptive Compression and Quantization
(IDF# 854, US 17/000,612)
https://www.ijcai.org/Proceedings/2020/288
Fully Nested Neural Network for Adaptive Compression and Quantization

**Background**

- Design → Train → Deploy (pruning, post-quantization, fine-tuning) → Device
- Hardware resources for a neural net → Hardware-aware NAS → Change?

**Solution?**

- Train once
- Search once

- Performance
- Network Capacity
**Ordered Dropout**

*Ordered dropout* - a method to mimic *testing-time blocks removal* in training time.

We show that, *the residual information is learned via ordered dropout.*

\[ C_l(m) \] is a categorical distribution over the block indices \( m \in \{1, \ldots, M\} \) at the \( l \)-th layer.
Fully Nested Neural Network for Adaptive Compression and Quantization

Advantages:

• Applicable to wide range of neural network components
• Better prediction accuracy
• More flexibility for deploying a neural network

Applications:

• Autonomous Self Driving Vehicle
• Video Surveillance & Analytic
• Intellignet IoT Device
• Smart Home Business