

Advancing the Arizona State University Knowledge Enterprise

Case ID:M15-011P Published: 7/30/2015

Inventors

Baoxin Li Parag Shridhar Chandakkar Qiongjie Tian

Contact

Shen Yan shen.yan@skysonginnovations. com

Adaptive Content Image Enhancement Algorithm That Learns From High-Quality Online Photos

In today's age of social media, millions of pictures are uploaded daily to websites such as Flickr, Facebook, Google+, Instagram, etc. Given that higher quality images attract larger audiences, image enhancement options, such as brightness, contrast, and other basic photoshopping tools, have become an essential feature for most of these websites. Current methods are based on computer-learning models that rely solely on the user's knowledge and understanding of what constitutes a high-quality image to develop enhancement criteria. Adjustment parameters are pre-stored, learned in advanced, and are only updated after each use. This generates the same effects for different images and leaves the model vulnerable to learning inaccurate user information, which results in poorly enhanced images and may corrupt enhancement criteria over time. Additionally, current methods overlook any adverse effects of a particular enhancement on the image as a whole, and cannot adjust to latest trends in photography.

Researchers at ASU have developed an image enhancement algorithm that uses high-quality photos from massive online collections to automatically train and adapt itself to the latest photography trends. The algorithm employs content-based image retrieval and generates adjustment parameters for each new image based on content, texture, and color properties of the retrieved photos. Enhancement is region-based so that it can be tailored to what is needed for dissimilar elements within a photo. This is akin to more advanced photoshopping tools such as layer blending and high pass filters. The algorithm does not depend on any user input, but still provides the user with a selection of images whose enhancements differ according to the different parameters found among similar groups of retrieved photos. This ensures adjustment parameters will be relevant to each new image and prevents users from corrupting enhancement criteria with faulty input.

Potential Applications

- Cell Phone Cameras
- Forensic Video Analysis
- Image Enhancement Software
- Social Media

Benefits and Advantages

- Effective Region-based enhancement adjusts multiple dissimilar elements within the same image for better results.
- Flexible Adjustment parameters are always relevant because they are relearned for each new image.
- Robust Resistant to parameter noise from inaccurate user input over time.

• Trendy – Automatically adapts to the latest trends in photography. For more information about the inventor(s) and their research, please see

Dr. Baoxin Li's directory webpage