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Adaptive Image Transcoding

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Adaptive Image Transcoding

ABSTRACT

Images comprise a substantial portion of network traffic. Reducing the filesize of an image while preserving quality can reduce storage costs and bandwidth usage, as well as reduce latency. This disclosure describes techniques for adaptive transcoding of an image into an appropriate target file format such that file size is reduced while preserving image quality. An input image is processed to remove compression artifacts. An image quality metric is obtained and an image codec is selected. The image is encoded using the selected codec.

KEYWORDS

- Image transcoding
- Adaptive transcoding
- Compression artifact
- Image quality metric
- Image format
- Image codec

BACKGROUND

Images comprise a substantial portion of network traffic. For example, online services such as image sharing, video, maps, advertisements, etc. require serving images to users. A variety of image formats are available that each offer different degrees of compression and output image quality, e.g., JPEG (Joint Photographic Experts Group), PNG (Portable Network Graphics), GIF (Graphics Interchange Format), WebP, etc. Selection of a suitable file format for an image is dependent on the type of image. Reducing the filesize of an image while preserving quality can reduce storage costs and bandwidth usage, as well as reduce latency.

DESCRIPTION

This disclosure describes techniques for adaptive transcoding of an image into an appropriate target file format (e.g., JPEG, PNG, WebP, etc.) such that file size is reduced while preserving image quality. An input image is processed to remove compression artifacts. An image quality metric is obtained to select an image codec. The image is coded with the selected format and transmitted to a recipient device.
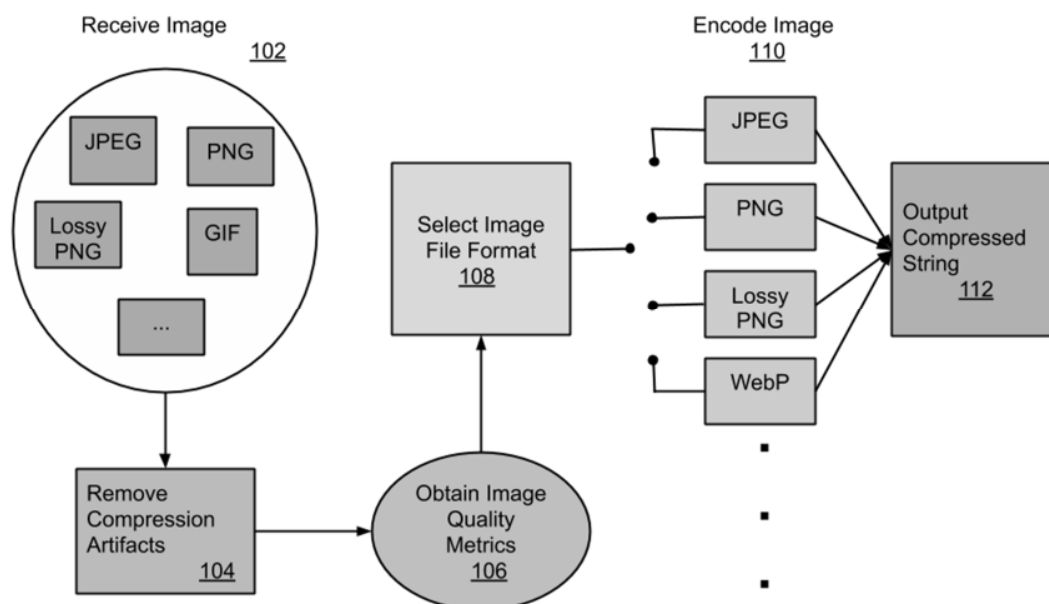

Fig. 1: Adaptive image transcoding

Fig. 1 illustrates an example method to adaptively transcode images, per techniques of this disclosure. An image in a particular format, e.g., JPEG, PNG, Lossy PNG, GIF, etc. is received (102). Compression artifacts such as block and ringing artifacts, color bleeding, etc. are removed (104). For example, a neural network trained for artifacts removal can be used for this purpose. After removal of compression artifacts, image quality metrics are obtained (106).

Image quality metrics can include an assessment of various artifacts, such as compression artifacts, color noise, etc. Based on the image quality metrics, a particular encoder is selected for the image (108). The choice of encoder can be based on various factors, including whether the image has a lot of colors. Encoder parameters can be selected for specific images. For example, adaptive quantization table and/or adaptive Huffman table for individual images can be used when using JPEG format. Further, adaptive chrome sampling can be used in combination with the image quality metrics to estimate quality loss and selectively using chroma downsampling when no substantial quality loss is observed. The image is encoded using the chosen encoder (110) and the output compressed string (112) is provided as the output image.

The described techniques can produce output images that have a lower file size while maintaining adequate image quality and eliminating compression artifacts. Serving adaptively transcoded images can result in substantial cost savings. The adaptive image transcoding technique as described herein can also be provided as a cloud-based application programming interface (API).

CONCLUSION

Images comprise a substantial portion of network traffic. Reducing the filesize of an image while preserving quality can reduce storage costs and bandwidth usage, as well as reduce latency. This disclosure describes techniques for adaptive transcoding of an image into an appropriate target file format such that file size is reduced while preserving image quality. An input image is processed to remove compression artifacts. An image quality metric is obtained and an image codec is selected. The image is encoded using the selected codec.

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