Project: Forensic digital image analysis

Date: 12/26/08

Software used:

Adobe Photoshop CS4 (adobe.com)

ClearID V 2.0 (oceansystems.com)

The purpose of this report is to objectively demonstrate anomalies that may be present in digital image files. Using forensic imaging techniques and professional standard tools, this report will offer quantitative scientific analysis. The analyst/author of this report will offer an opinion only when scientific conclusions can not be explicitly drawn from available data.

Methodology:

- Tonal and contrast adjustments using curves
- Color isolation using channel mixing
- Color and tonal inversion
- Pixel tonal averaging using Photoshop CS Extended analysis
- Photoshop CS4 and ClearID High Pass filters

Image Properties

2814199887_67e84850f4_b.jpg

Source:

http://www.flickr.com/photos/30076181@N02/2814199887/sizes/l/
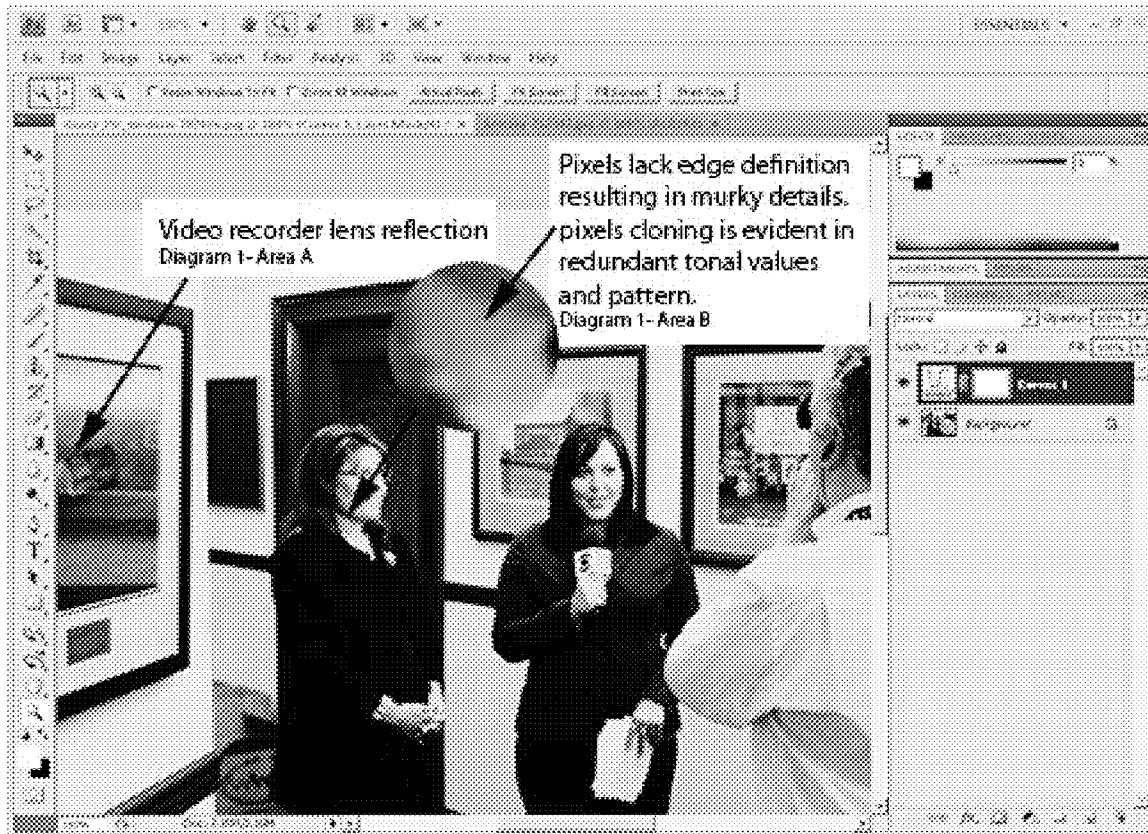
resolution: 1024 x 768 pixels

format: jpeg

Diagram 1

Analysis

Diagram 1 – Curves Adjustment Layer added with strong contrast.

Area A shows what appears to be the reflection of the lens from the video recorder held up by the cameraman. Unless other facts come to surface as to the nature of the picture in the frame, it can be stated without reasonable doubt that

the cameraman was present at the time when this picture was taken. This assumption is supported by the natural (unaltered) appearance of pixel edges all around the subject.

Area B shows pixels around the neck region that clearly appear to have been altered. A redundant pattern of murky pixels are present. This is the result of cloning pixels from another region of the image. Digitally captured "authentic" pixels generally don not appear as a redundant pattern or "blob".
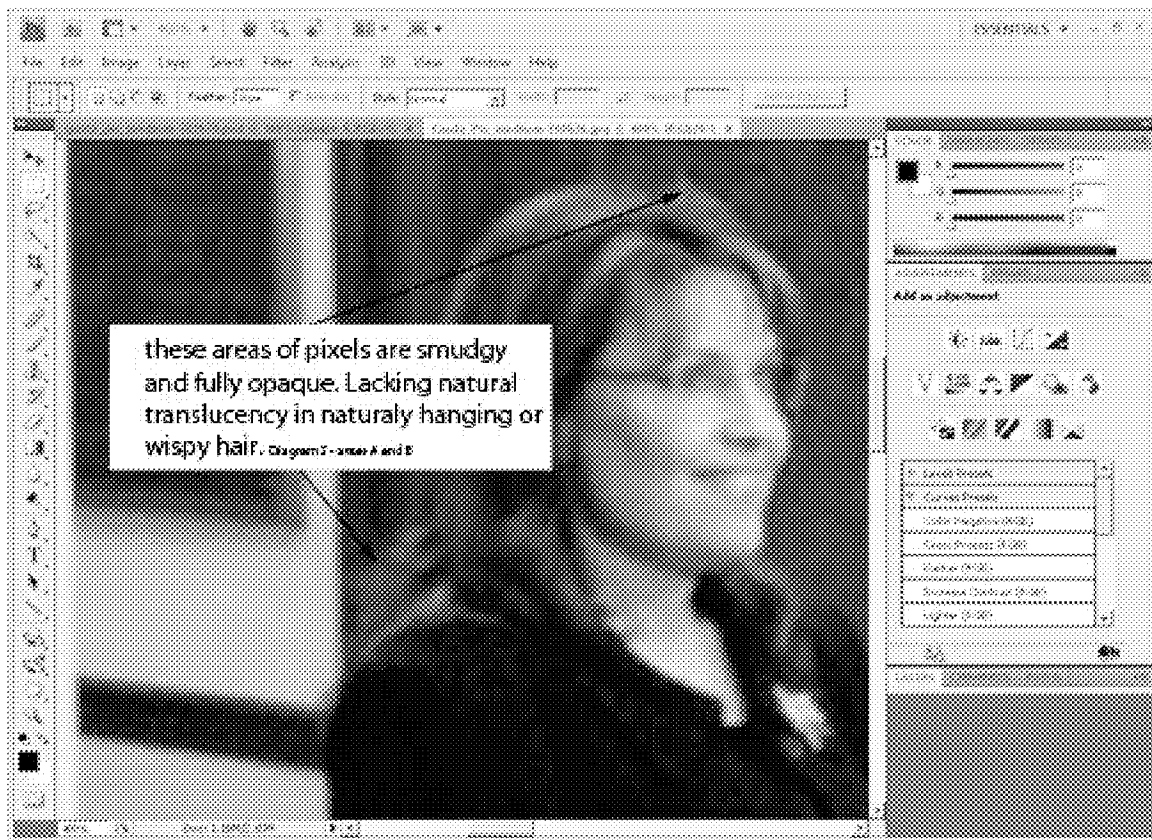

Diagram 2

Areas A and B are two area of pixels that appear unnatural. Especially in images with hanging curly or wispy hair, there is generally more definition to the individual hairs or strands with transparent area in between for which the background would show through. This is not the case in those areas. A conclusion

can be drawn that a masking technique was likely used in the process. Masking is a common technique used in composting images from different sources.
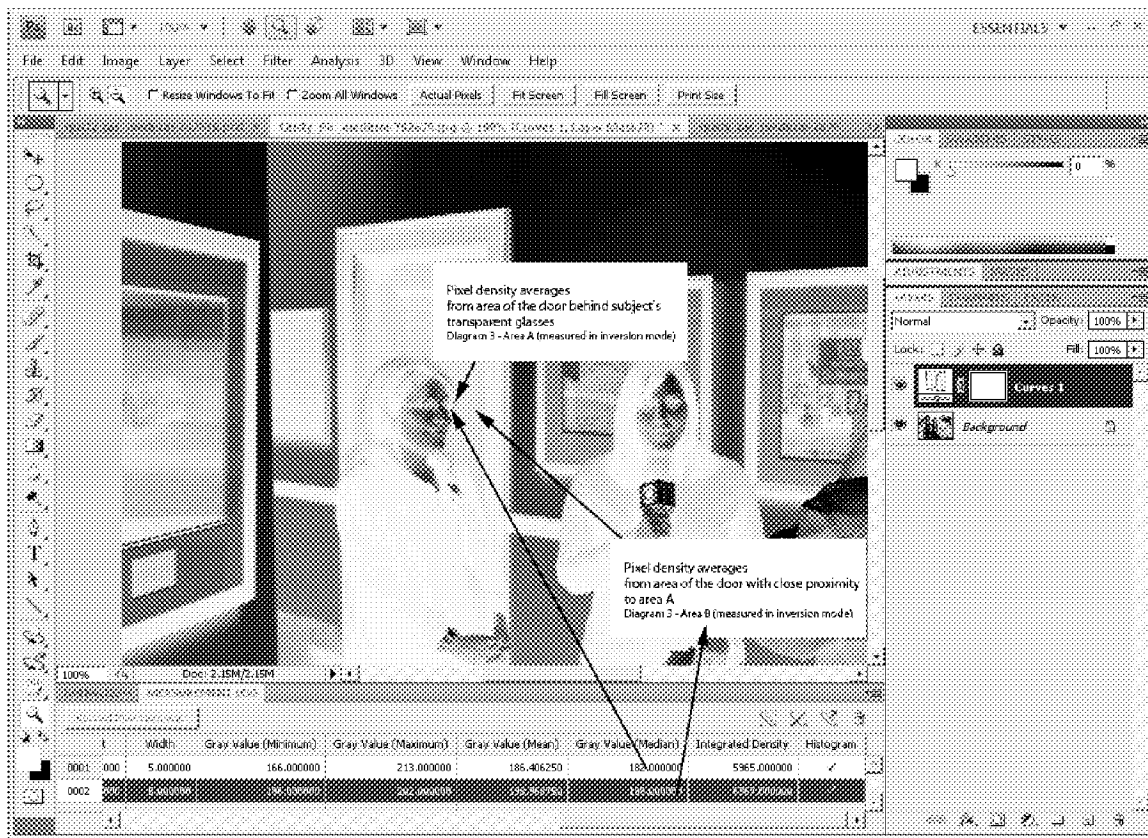

Diagram 3

Diagram 3 – Curves Adjustment Layer with color inversion used.

Area A is the small region in the glasses where one would expect to see the door behind, because the lenses are of the clear type. In the original image, and because of its limited resolution, one can hardly determine with the naked eye the nature of the area that shows through the glasses. However, when a color inversion adjustment is added, a more pronounced difference appears between pixels in **Area A** and **Area B** . (Areas A and B are within close proximity). The difference in appearance is supported by measurements taken of equal size areas (Areas A and B).

Because of the limited resolution and the small area in question, as well as the potential concern that the lenses were not of the clear type or perhaps were

"dirty", no conclusion will be drawn from this analysis. Area A of diagram 3 will be considered a potential area of interest.

Additional observations:

- It's worth noting in this report the peculiar position and angle in which Ms. Palin is facing the camera. It's not possible in a two dimensional image to scientifically derive the directional angle or perspective in relationship to other individuals in the scene. Given the physical attributes of the subjects and the environment in the scence, then such data can be derived. Obtaining the heights of the three people in the picture, as well as the dimensions of the hallway, and with the many vanishing points in the image, the use of Photogrammetry can be used to approximate the right angle in which all individuals are facing in relationship to each other.

Image Properties
Image B: 2814979078_4815e908a9_b.jpg
Source:
http://www.flickr.com/photos/30076181@N02/2814979078/sizes/l/in/photostream/
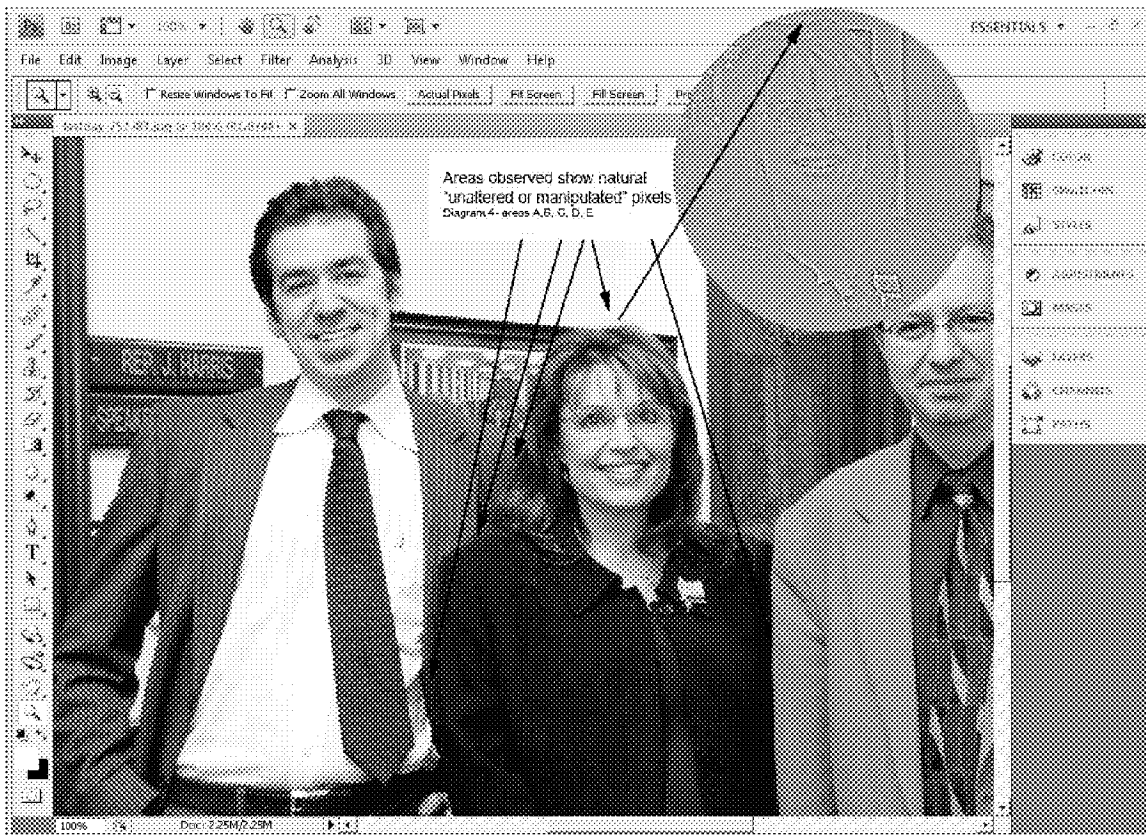resolution: 1024 x 768pixels

Areas observed show natural "unaltered or manipulated" pixels
Diagram 4 - areas A,B, C, D, E

Diagram 4

Analysis

This image was clearly taken by a professional or semi-professional "prosumer" grade camera. This is evident by the fact that the foreground and background areas of the image are in focus. This can only be accomplished by a high aperture (F number) setting available in such cameras.

Running a variety of color isolation techniques, high pass filters, and channels splitting, no pixels in the image appear to have been altered or manipulated.

Because of the limited resolution of the image, the latent reflection in the eye glasses couldn't enhanced to any degree of usability or scientific analysis.

Additional observations

- Original EXIF can be changed or removed by anyone with access to the image and basic knowledge of publicly available software tools.

Conclusion

Image 1 (2814199887_67e84850f4_b.jpg) shows some signs of alterations consistent with an image that has been composited from different sources. However, due to the fact that the image available for analysis is only 1024 x 768, it is not possible to give a conclusive analysis.

Image 2 (2814979078_4815e908a9_b.jpg) shows no signs of alterations.