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How will automated image processing change photography?

Automated image processing methods like automatic image cropping, transferring of image style, etc. are being developed fast and implemented in photo editing software like Adobe PhotoShop Elements¹. Similar image automation methods are on their way to becoming reality in digital publishing as enablers of cost-efficient crossmedia products.

At the moment, we rely on image automation to create digital magazines with adaptive layout. Image automation algorithms assume certain types of photographic rules, many based on the main object of the image. Our solution attempts to find the main object with a combination of different methods. Professional photographers emphasize the main object in different ways, e.g. by using shallow depth-of-field, by increasing contrast or by following rules of thirds in composition. These can be computationally addressed by finding the area of the image with most textures, finding the area of the image with highest color contrast, or giving more weight to areas closer to the rule-of-thirds, respectively.

On a higher level, the main objects of the images are dependent on the publication type. Typically images featuring people are important, so we apply face detection as another important method for finding the main objects, while face detection isn't perfect, typically skin color is already a good indicator of an important area.

In our solution, we consider also other composition rules which professional photographers follow. Images with right facing objects are usually framed so that the object is positioned closer to the left third and vice versa (also known as rule-of-space). This can be generalized to a computation using the mass center of the main object. A good indicator of good composition is also human gaze direction. This is hard to analyze, but can be generalized by detecting faces with left- or right-facing pose. Lastly one-point perspective can be analyzed rather easily with perspective line analysis. The methods are utilized in placing images in magazine layouts. In example unique page layouts are created by considering the above-mentioned image characteristics.

Finally, we use computational approaches to select representative images from image sets in order to automate and assist image selection. This can be used for instance in selecting the most interesting images for display, when the number of images is limited.

The question is will this kind of automation change how photographs will be taken in the future. All kinds of restrictions have limited how photographs have been taken with most due to the technical limitations of the camera, but perhaps as often due to the limitations or constraints of the display media. When these kinds of image automation methods are part of publication systems, will photographs be taken with these constraints in mind? For example, by framing the main object more loosely to allow automatic cropping for vertical and horizontal layout, or by carefully using colors close to skin color?

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¹ www.adobe.com/products/photoshop-elements.html