The Evolution of Film Photography to Digital

Roots of Digital Techniques and Functions in Traditional Film Photography

Photography is the result of combining several technical discoveries. Chinese philosopher Mo Di and Greek mathematicians Aristotle and Euclid described a pinhole camera in the 5th and 4th centuries BCE. From rudimentary forms like the pinhole camera and the camera obscura, Film and print photography has transformed with the digital age.

Photography is the art, science and practice of creating images by recording light, either chemically by means of a light-sensitive material such as photographic film, or electronically by means of an image sensor (CCD sensor in digital cameras).

The Process

Typically, a lens is used to focus the light reflected or emitted from objects into a real image on the light-sensitive surface inside a camera during a timed exposure.

The result in an electronic image sensor is an electrical charge at each pixel, which is electronically processed and stored in a digital image file for subsequent display or processing.

The result in a photographic emulsion is an partially invisible latent image, a negative, which is later chemically developed into a visible image.

A negative image on film is traditionally used to photographically create a positive image on a paper base, known as a print, either by using an enlarger or by contact printing.

Black and White Photography

All photography was originally monochrome, or black-and-white. Even after color film was readily available, black-and-white photography continued to dominate for decades, due to its lower cost and its "classic" photographic look.

The tones and contrast between light and dark shadows define black and white photography.

In the chemical darkroom, toned prints were made from black and white negatives—but digital files that are toned, even if they are essentially monochromatic, are naturally color files.

Therefore, “monochrome” is probably a better term than “black and white” to reference an image that displays values in a single color hue going from light to dark.

The absence of color does not mean there is no color. Black and white is a choice—and this choice often calls attention to the color that is not there. A black and white image potentially shows a range from very white white to very black black.

For B/W, there's nothing like a fiber-based print, printed optically from a large-format negative. Digital is great for B/W if you don't demand three-dimensional sharpness in your prints. If you do, you want big film. Digital cameras are great for color, since detail is only secondary in importance to the colors and tones.

Digital photos can be taken by changing your cameras settings or by using a computer program to desaturate the colour. However, quality, detail and texture can be lost.
### Similar Functions/Terms Different Process

<table>
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<th>Control</th>
<th>Description</th>
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<tr>
<td>Focus</td>
<td>The position of a viewed object or the adjustment of an optical device necessary to produce a clear image: in focus; out of focus.[28]</td>
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<tr>
<td>Aperture</td>
<td>Adjustment of the <em>lens opening</em>, measured as <em>f-number</em>, which controls the amount of light passing through the lens. Aperture also has an effect on <em>depth of field</em> and <em>diffraction</em> – the higher the f-number, the smaller the opening, the less light, the greater the depth of field, and the more the diffraction blur. The focal length divided by the f-number gives the effective aperture diameter.</td>
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<tr>
<td>Shutter speed</td>
<td>Adjustment of the speed (often expressed either as fractions of seconds or as an angle, with mechanical shutters) of the shutter to control the amount of time during which the imaging medium is exposed to light for each exposure. Shutter speed may be used to control the amount of light striking the image plane; 'faster' shutter speeds (that is, those of shorter duration) decrease both the amount of light and the amount of image blurring from motion of the subject and/or camera.</td>
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<tr>
<td>White balance</td>
<td>On digital cameras, electronic compensation for the <em>color temperature</em> associated with a given set of lighting conditions, ensuring that white light is registered as such on the imaging chip and therefore that the colors in the frame will appear natural. On mechanical, film-based cameras, this function is served by the operator's choice of <em>film stock</em> or with color correction filters. In addition to using white balance to register natural coloration of the image, photographers may employ white balance to aesthetic end, for example white balancing to a blue object in order to obtain a warm <em>color temperature</em>.</td>
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<tr>
<td>Metering</td>
<td>Measurement of exposure so that highlights and shadows are exposed according to the photographer's wishes. Many modern cameras meter and set exposure automatically. Before automatic exposure, correct exposure was accomplished with the use of a separate <em>light metering device</em> or by the photographer's knowledge and experience of gauging correct settings. To translate the amount of light into a usable aperture and shutter speed, the meter needs to adjust for the sensitivity of the film or sensor to light. This is done by setting the &quot;film speed&quot; or ISO sensitivity into the meter.</td>
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<td>ISO speed</td>
<td>Traditionally used to &quot;tell the camera&quot; the <em>film speed</em> of the selected film on film cameras, ISO speeds are employed on modern digital cameras as an indication of the system's <em>gain</em> from light to numerical output and to control the automatic exposure system. The higher the ISO number the greater the film sensitivity to light, whereas with a lower ISO number, the film is less sensitive to light. A correct combination of ISO speed, aperture, and shutter speed leads to an image that is neither too dark nor too light, hence it is 'correctly exposed', indicated by a centered meter.</td>
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<td>Autofocus point</td>
<td>On some cameras, the selection of a point in the imaging frame upon which the auto-focus system will attempt to focus. Many <em>Single-lens reflex cameras</em> (SLR) feature multiple auto-focus points in the viewfinder.</td>
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Film Based Cameras

- A film camera is made of three basic elements:
  - Optical (the lens)
  - Chemical (the film)
  - Mechanical (the camera body)
  - The three elements combine to create a printable image.

- Two Types: Point and Shoot & Single Lens Reflex
  - **Point and Shoot (P&S)**
    - The viewfinder provides a rough idea of what is in view, but not the real image.
    - It is more likely that photos will turn out because these cameras automatically set the focus and exposure and even advance the film for you.
    - This occurs because you are not looking through the lens.
  - **Single Lens Reflex (SLR)**
    - You see the actual image that will be exposed onto the film.
    - Great for capturing images with real impact.
    - Provides more control and better images than P&S.

Digital Cameras

- A digital camera records images electronically using a built-in processor.
- Has a lens like an analog camera
- BUT, the lens refracts light onto computer chips rather than film.
- Types of Digital Cameras
  - Similar features to film counterparts
  - Rely on electronic processing and storage
  - **Point and Shoot (P&S)**
    - Most feature LCD screens and advanced zoom lenses
  - **SLR**
    - Can switch out lenses like an analog version
    - Allows user an accurate preview
Avoid direct light when loading your film.

1. Open the back by pulling up the rewind knob until the back opens.

2. Place the film cassette in the cassette chamber, and push down the rewind knob. Insert the film leader into the slot of the take-up spool.

3. Advance the film by alternately turning the rapid wind lever and depressing the shutter button until both sprockets engage the film perforations, top and bottom. Close the back by pressing it firmly.

4. Cock the rapid-wind lever, and confirm that the film rewind knob turns counter-clockwise, indicating that the film is being properly loaded and is moving from cassette to take-up spool. Trip the shutter. Advance the film until the exposure counter turns to "1", indicating that the first picture is ready to be taken.

SETTING ASA FILM SPEED

The ASA film speed rating of all 35mm films is given in the data sheet packed with each roll of film. The higher the ASA number, the more sensitive the film is to light. Lift the outer ring of the shutter speed dial and rotate it until the ASA number of your film is opposite the orange dot alongside the figure 1. Be sure to set your film speed on the shutter speed dial because the dial is connected to the exposure meter.
FOCUSING

You can focus in three ways, with the split-image, microprism, and/or matte field. To focus using the split-image, turn the focusing ring until the two images in the split-image circle at the center of the focusing screen are perfectly aligned. When using the microprism collar, focus until the glitter disappears from inside the collar. With the matte field, focus until the image on the matte field appears sharp and crisp.

Note: If the maximum aperture of the attached lens is smaller than f/5.6 (for example, f/8 as in the case of a long telephoto), it is easier to focus on the matte field since the split-image and microprism collar areas become much too dark for satisfactory focusing.

Diopter adjustment for viewfinder eyepiece
People who wear eyeglasses due to myopia, hypermetropia or presbyopia, sometimes find it difficult to focus while wearing their glasses. In this case, use the accessory diopter correction lenses M (See page 41).
Darkroom Techniques and Processes vs Computer Editing (like in PhotoShop)

Dodging and burning are terms used in photography for a technique used during the printing process to manipulate the exposure of a selected area(s) on a photographic print, deviating from the rest of the image's exposure.

A key application of dodging and burning is to improve contrast (tonal reproduction) in film print-making; today this is better known as tone mapping in digital photography.

In a darkroom print from a film negative, dodging decreases the exposure for areas of the print that the photographer wishes to be lighter, while burning increases the exposure to areas of the print that should be darker.

‘Dodging’ a photograph refers to an old darkroom technique in which something was held in the path of the enlarger’s light source – a coin soldered on a length of clothes hanger wire was a common dodge tool—to lessen the amount of light hitting a particular area of the light-sensitive paper.

‘Burning’ was the opposite: darkening part of a photo print, by adding extra light from the enlarger on specific parts of the photo paper.

In the Darkroom

Burning

Burning: a darkroom technique
To burn-in a print, the print is first given normal exposure. Next, extra exposure is given to the area or areas that need to be darkened. A card or other opaque object is held between the enlarger lens and the photographic paper in such a way as to allow light to fall only on the portion of the scene to be darkened.

Dodging

Dodging: also a darkroom technique
A card or other opaque object is held between the enlarger lens and the photographic paper in such a way as to block light from the portion of the scene to be lightened. Since the technique is used with a negative-to-positive process, reducing the amount of light results in a lighter image.

Please Complete Journal #3 Dodge and Burn Your Image

Please Submit a Photo that has been burned and one that has been dodged.
Save as... Journal 3 Burn your name.pdf and Journal 3 Dodge your name.pdf