



IMAGE RECORDING PLATFORMS, AKA CAMERAS

WITH JIM SOTO

Soldiers have their rifles.

Painters have their brushes.

Writers have their laptops...

and Filmmakers have their cameras.



The Camera: Filmmaking's Tool Supreme



Anyone who knows a bit about the history of cinematography, understands that its development couldn't have been possible without the invention of photography. Although, cinema is an art, its existence could not be possible without cameras. That's the reason why a basic mastery of the camera is indispensable for aspiring filmmakers.

DIGITAL



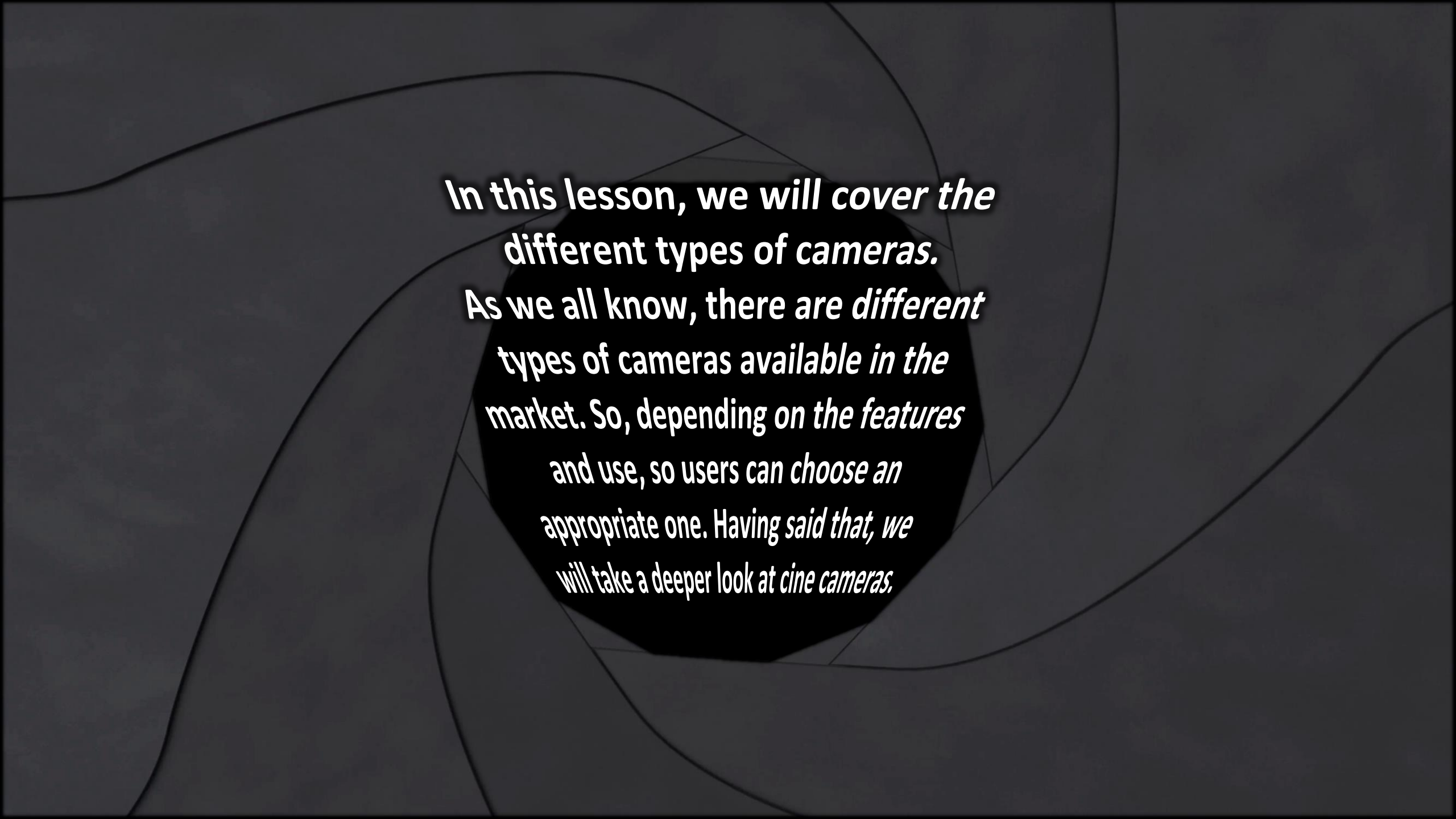
FILM



Early Cameras

CLICK HERE!

The [camera obscura](#) is thought to be the first camera in history. Conceptual descriptions of the camera obscura can be traced in Chinese manuscripts dating back to 400 B.C. and in Aristotle's works around 330 B.C. Ibn Al-Haytham, an Arab scholar, presented the idea of a camera obscura around 1000 A.D. A camera obscura does not take images; instead, it directs light through a lens (technically a tiny hole) and projects it onto a screen. This invention foreshadows everything from still pictures to movie cameras and motion image projectors.



**In this lesson, we will cover the
different types of cameras.**

**As we all know, there are different
types of cameras available in the
market. So, depending on the features
and use, so users can choose an
appropriate one. Having said that, we
will take a deeper look at cine cameras.**

PART 1: TYPES OF CAMERAS

Film Cameras

It all started here. During the early days of photography, **celluloid film** was the medium to record images. Then, film got replaced by the digital camera with its **sensor / memory card**.

The ISO part of the image comes as a film feature. So, film rolls need to be changed according to the ISO needs. Aperture and Shutter speed are controlled from the camera. Makers have rolled back production of these cameras due to lack of demand.



Instant Cameras



Instant cameras are capable of printing photos just after capturing it. It was the Polaroid Corp. who introduced this type of cameras in the 1970s. Hence, these cameras are also known as Polaroid cameras. The earlier generation of Instant cameras used films, but got replaced by paper prints. There are many different models from Polaroid, and other Instant camera manufactures. Kodak and Fujifilm are the other known manufacturers.

Point & Shoot Cameras

Are compact cameras, marketed to people who want to capture vacation pictures or family pictures, who are not interested in photography and just wanted to capture images.

They come with a fixed lens and variable focal length. Most use AA batteries. Among the different types of cameras, point and shoot cameras are lightweight and can easily be carried in a small bag.



DSLR Cameras



The Digital Single Lens Reflex Camera was the most popular camera in the market until recently. It is a combination of a digital imaging sensor with a single lens reflex camera.

DSLR cameras come with a detachable lens, so you can change the lenses based on your needs. The wide variety of lens options also made them popular. Canon and Nikon were its main manufacturers. All the DSLRs also record video.

Bridge Cameras

As the name suggests, it lies between point and shoot cameras and DSLRs. These types of cameras come with a fixed lens, and most of the Bridge cameras cover the telephoto focal range.

So, it is an excellent option if your. Many of the Bridge cameras support the RAW format. It is easier to carry when compared to the DSLRs.



Medium Format Cameras



Few makers still produce medium format film cameras. This is the first choice of camera for fashion photographers... and NASA.

Hasselblad is one of the most popular camera brands. Fuji and Pentax also are. Due to their large sensors, they are heavy and bulky when compared to a DSLR. They come with a bigger sensor and a higher price. For very high-quality images you should go for the medium format cameras.

Mirrorless Cameras

If you remove the optical viewfinder from a DSLR, you get a mirrorless. This removes weight from the camera body. This makes mirrorless cameras lighter and easier to handle.

They come in a variety of sensor sizes and detachable lens options. The lens options are less since they are new to the market. Some brands include adapters, to mount existing DSLR lenses on to these state-of-the-art cameras.



Digital Cine Cameras



Digital Cine cameras are high-end models used for filming movies or documentaries.

They come with interchangeable lens options. Film professionals use these cameras. They are used mainly for video recording, and all the models are capable of supporting resolutions of 4k and more. Some popular models include Blackmagic Design URSA Mini Pro 6K, Canon EOS C100 Mark II and Arri Alexa 35.

Action Cameras (GO-PRO)

Action cameras are known for their miniature size, capable of fitting into many places where it's tough to mount normal cameras. You can use them to capture images, record videos or do time-lapse photography. They come with various mounting options. You can mount it on helmets, vehicles or on clothing. There are camera housings which you can use to record under water. Most action cameras support 4k and 6k resolutions.



Smartphone Cameras

We are getting good cameras in Smartphones! However, Smartphone camera sensor sizes are tiny compared to DSLR and mirrorless cameras. They have virtually replaced point and shoot cameras.

These models are better suited for people who don't want to carry a dedicated camera around. The best models come from Apple, Google, Samsung and Xiaomi.

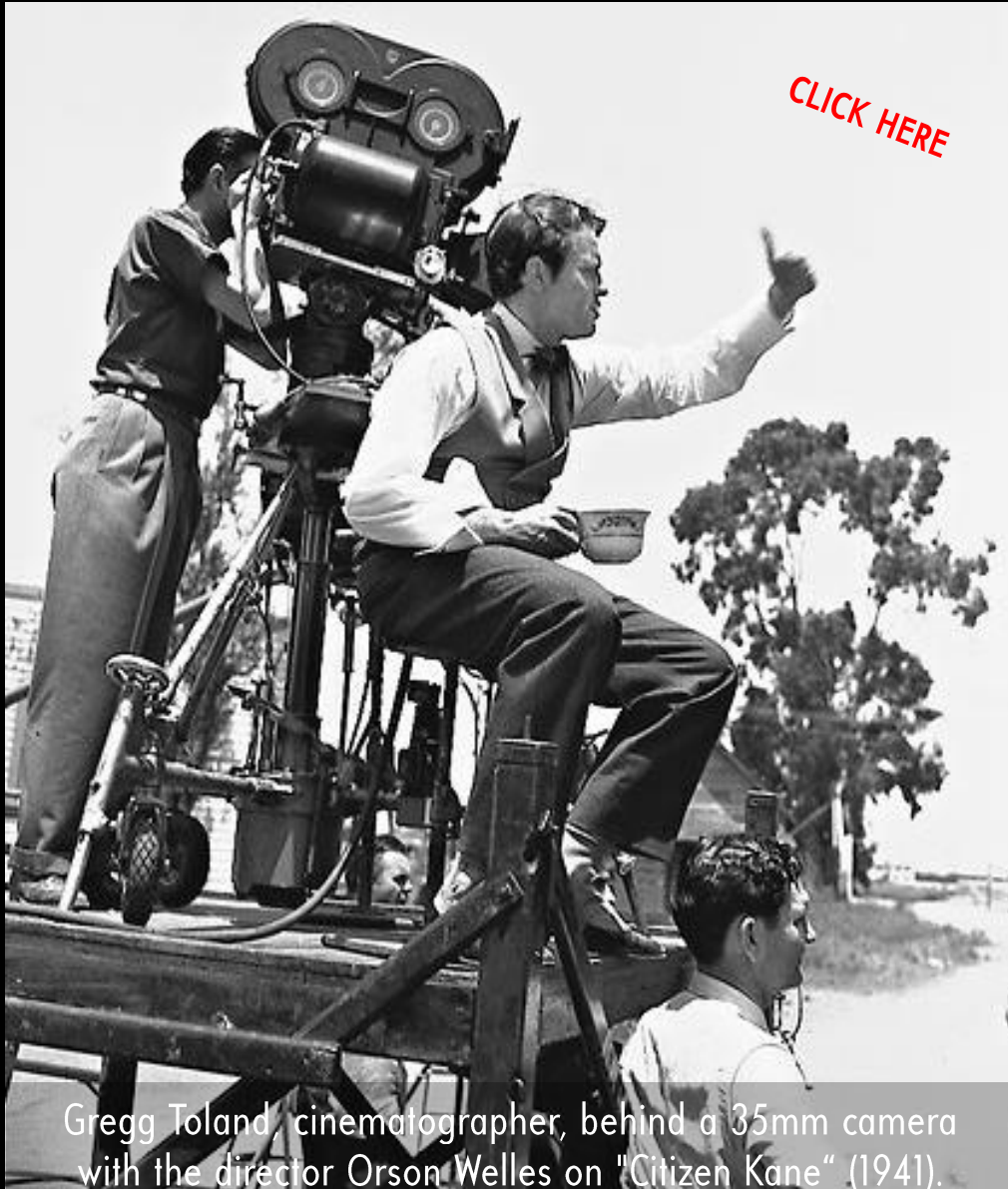


PART 2: CINE CAMERAS



Cinematographer Robert Richardson setting up his 70mm Panavision to shoot "The Hateful Eight" (2015).

Film cine cameras have been and continue being the standard to this day. A cine camera is simply a camera specifically designed for motion picture photography, not for still photography.



Gregg Toland, cinematographer, behind a 35mm camera with the director Orson Welles on "Citizen Kane" (1941).

Film cine cameras operate by passing light through its lens onto a strip of light-sensitive film, which captures individual frames of the moving scene. The camera's precise mechanical movements and synchronization ensure that each frame is exposed accurately, allowing for a seamless motion picture when the film is developed and projected.



Hoyte van Hoytema setting up an IMAX to shoot Chris Nolan's "Oppenheimer" (2023).

However, the film industry always changes. As technology evolves, newer cameras continue changing the filmmaking world. Cine film cameras are still the standard to this day. However, the technological state of the art has enabled the use of digital cine cameras.

Film Cameras

Film cameras (and Celluloid film) have been around for over a century and will still be around for the next one. It is more time consuming to work with than digital, doesn't record sound, and is more expensive to work with partially because it is developed chemically. However, film offers a number of aesthetic advantages over digital cameras, such as better resolution and color; and come in a variety of gauges (sizes).



8mm & Super 8



The Eastman Kodak Co. invented 8mm film in 1932 and it became a popular format for home movies and amateur filmmaking. In 1965, Kodak released super 8mm, which improved over 8mm in both image quality and ease of use. Super 8 quickly displaced 8mm. The larger image area allowed super 8 to capture more detail than 8mm. With the advent of video in the 1980s, however, both formats virtually disappeared.

16mm



Kodak introduced 16mm film in 1923 as a cheaper alternative to 35mm. During the 1920s, it was deemed sub-standard by the film industry. 16mm was initially aimed at the home filmmaker, but by the 1930s it became popular for professional use. 16mm cameras and film was used in early television production and the news media because of its low cost and portability. It also proved effective when shooting in the confined space of a production set.

35mm



It's the most widely used film gauge for motion pictures and photography. Film 35mm became the world standard in 1909, and has remained the dominant film gauge ever since.

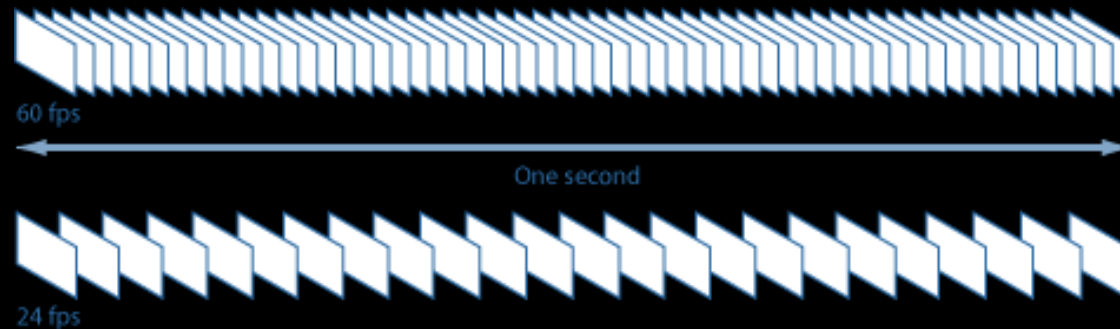
Until recently, 35mm was the only motion picture format which could be played in almost any cinema in the world. However since 2007, the fast conversion of the cinema industry to digital has seen 35mm film projectors replaced by digital projectors in many theaters. By 2017, virtually all of the world's cinema screens were digital (98%).

70mm & IMAX

70mm is a format that uses a larger frame size than 35mm film, resulting in a higher resolution and greater image clarity. Most cinemas are unable to handle 70mm, so original 70mm films are shown using either 35mm prints in the regular CinemaScope/Panavision aspect ratio of 2.35:1, or, in recent years, using digital projectors at these venues. IMAX, on the other hand, uses a format that involves larger film stock and specialized equipment. The IMAX film stock is 70.41mm wide, which is much larger than the standard 35mm. IMAX is a standard of high-resolution cameras, film formats, projectors and cinemas. The name is derived from “Maximum Image”. The IMAX screen provides the highest picture quality on a large screen and the best sound technology.

Frame Rate

By the late 1930s, the default norm for all movies was to project and film at 24 frames per second. The term “frames per second,” refers to how many images flicker across the eye when a movie is playing. In traditional projecting (with 35mm film and other similar formats), the process of 24 frames per second (p) strikes a nice balance. There are enough images here within a second to make sure the footage doesn’t just look like a series of still images. There are more frame rates.



Celluloid vs. Digital



Being very different image recording technologies, celluloid and digital have distinct visual aesthetics. Each medium captures and displays imagery differently. Celluloid captures light waves its creating lines of depth and color, so it looks smooth when projected. Digital has a native resolution and is made up of pixels, so it's sharper and it has a more rigid appearance.

Digital Cameras

In our ever-changing world, digital technology offers the advantage of instant access and ease of use that has made it more appealing to filmmakers than traditional film. The biggest drawback so far has been aesthetic. Its look is considered by some people to not be as pleasant as celluloid. However, advances have made recent models to achieve a much more smoother look.



HD Cameras

Video cameras record motion pictures electronically. Digital and film cameras share an optical system, typically using a lens with a variable diaphragm to focus light onto an image pickup device. The diaphragm/shutter admits light to the imager, just as with film but the image pickup device is a sensor rather than celluloid. Unlike film cameras, digital cameras can display images on a screen soon after recording, and store or delete images. Film's limitations include: difficulty of viewing footage while recording, errors caused by poor film development, or poor monitoring systems. Because of the advantages offered by digital formats that overcome these problems, many directors now shoot their movies using HD video cameras.

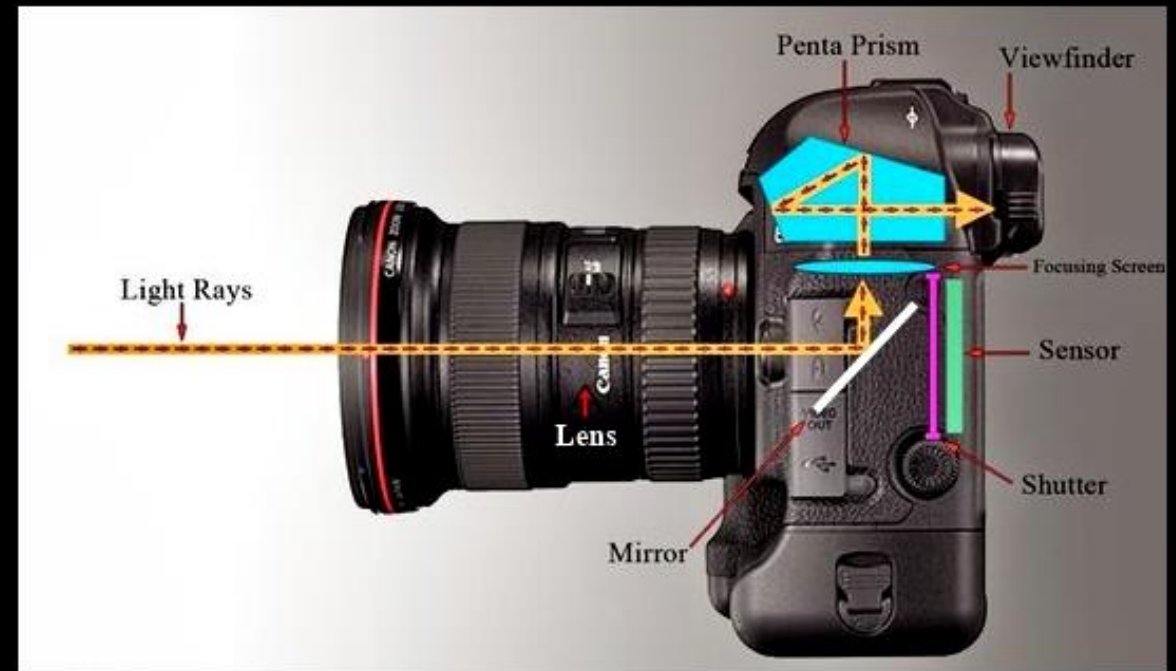
The background of the slide is a composite image. The upper portion shows a deep blue night sky filled with numerous stars of varying brightness. The lower portion shows a dark silhouette of a large, leafy tree on the left, with a bright, glowing horizon line behind it, suggesting a sunrise or sunset. The overall color palette is dominated by dark blues, blacks, and a warm yellow/orange glow from the horizon.

Resolution

Resolution is crucial to understand in digital imaging and photography. The term describes both pixel count and density. Resolution is the detail an image holds. Higher resolution means more image detail. When buying a camera you'll want one with high resolution.

The camera used by the Rubin Observatory's Legacy Survey of Space and Time, to probe the universe has a 3,200 megapixel sensor! The 'Large Synoptic Survey Telescope') digital camera, built at the SLAC National Accelerator Laboratory is the biggest in the world.

In film photography, the image is fixed by a photosensitive material (celluloid), capturing the image on various sized grains of silver. With digital, an electronic sensor reacts to the light, capturing the images on identically sized pixels.



Pixel refers to the smallest building block of your screen. Resolution refers to the size of the pixel. The smaller the pixel, the higher the resolution and better the image.

RESHOOT

1. What's the difference between a film camera and a digital camera?
2. What's a bridge camera?
3. Which is the most popular camera in the market?
4. What is the name of the plastic photosensitive material which acts as the basis of film?
5. Which is an advantage of film cameras over digital? Of digital over film?
6. Which film gauge is the worldwide standard?

FOR YOUR PORTFOLIO

Draw a diagram of the camera labeling the seven parts and showing the path of light through it.

For 20 pts. turn it in two days. It will go in your portfolio after grading.





Next:

PHOTOGRAPHIC COMPOSITION

Jim Soto © 2023