The digital camera essay sample

A film-free camera was patented as early as 1972 by Texas Instruments, but Kodak researcher Steve J. Sasson, built what was to become the first true digital camera in the middle of the 1970s. Weighing over eight pounds, Sasson‘ s device used a number of complex circuit boards to capture one image onto a cassette—taking over twenty seconds (Rosenblum 2007). Kodak released its first megapixel sensor in 1986, a predecessor to its digital camera system (DCS) of the early 1990s. The sensor produced an image from which a good quality 5×7 print could be made. The DCS-100 used the best of available film camera technology, Nikon‘ s professional F-3 series, and equipped it with a Kodak 1. 3 megapixel sensor and a 200 MB hard drive — all for about $13, 000. Early 1+ megapixel cameras pointed to the potential for digital imaging but were often prohibitively expensive, slow in image processing, and lacking in the range of image resolution needed by many professional photographers. The First Digital Camera Used Cassette & Was Slow & Heavy The world‘ s very first digital camera was built in 1975 by Eastman Kodak employee Steven Sasson who was asked to build an electronic camera using a charge coupled device (CCD). Such a device has become an important component in digital imaging and it was the CCD which allowed Sasson to record a 100×100 (. 01 MP) black and white image using his invention.

Using the CCD to capture the image, Sasson‘ s electronic camera then wrote them to cassette. This rather analog process took 23 seconds to complete. The device he had created was indeed just what the brief had stated – an electronic camera which weighed 8lbs (3. 6KG) and was the size of a toaster. Because the device used a solid chip rather than tape or film like

conventional cameras, Sasson had created the world‘ s first digital camera. You can view the patent the device was awarded here.

History Of The Charged Coupled Device

In 1969, George Smith and Willard Boyle invented the first CCDs or Charge Coupled Devices at Bell Labs. A CCD is an electronic memory that can be charged by light. CCDs can hold a charge corresponding to variable shades of light, which makes them useful as imaging devices for cameras, scanners, and fax machines. Because of its superior sensitivity, the CCD has revolutionized the field of astronomy and is found on many scientific space vehicles such as the Hubble Telescope.

Modern Digital Cameras

In the last few years, digital cameras have achieved the range of functionality of their film predecessors, and many believe that they have far surpassed them, as well. Not only have affordable digital single lens reflex (SLR) cameras such as Canon‘ s Rebel series brought high quality photography to the masses, but serious upscale SLRs produced by many of the major reputable film camera companies emerged to fully legitimize digital photography for professional photographers. The Digital Rebel SLR emerged in 2003 w ith 6. 3 megapixels and interchangeable lens, the latter being a key feature for serious photographers. Nikon followed suit the next year with the D70, replacing the more expensive, fewer-featured D100. Soon Olympus, Pentax, and others offered affordable consumer cameras that helped spur the professional digital imaging revolution.

Modern digital cameras use designations such as dynamic range and megapixels to describe the maximum resolution the camera can record images at. A megapixel is one million pixels and, technically speaking, the greater the megapixels, the higher the image resolution—though one New York Times author has a caution for consumers: increased megapixels also translates into increased hard drive space, while —more densely packed pixels on a sensor chip means more heat, which can introduce speckles into low -light shots‖ (Pogue 2007). Dynamic range (range between brightest and darkest pixels represented in an image), among other factors such as bit depth and density, are affected by both camera chip technology and software, since images are often dealt with in the digital realm using image compression algorithms (Milburn 2000). In the end, many other factors also contribute to good photographs, and while technology will advance, every new model of digital camera does not immediately render older models obsolete (Pogue 2007).

The Motion Picture Industry

Since the evolution of digital camera owes something to the television industry, it is worth noting that the medium of the motion picture has also undergone a profound transformation in the last 25 years that coincides with and lends to digital image technology at large. Like still imaging, professionals in the movie industry were hesitant

to make the move into digital movie making, but constantly improving technology combined with the vastly reduced cost of digital film to gradually introduce digital technology into the hands of most professionals—whether for digital films or films that have been touched by digital technologies.

An early touchstone in digital film-making was Lucasfilm, Ltd.‘ s 1979 move to begin research on the development of special effects for their films. The next year, —Steve Job‘ s Pixar and George Lucus‘ Industrial Light and Magic emerge[d] as the most innovative producers of digital imaging for motion pictures‖ (Rodowick 2007). In the 1980s, nonlinear editing emerge to allow filmmakers to begin using computers to edit their films digitally, one of the earliest widely accepted digital tools in the movie industry. In the same decade, cameras were developed that provided digital resolution close to that of 35mm film, an industry film standard. Through the 1990s, computer-generated imagery (CGI, or just CG for computer graphics, both in movies and the video game industry) became increasingly sophisticated, rendering —photographically‘ believable synthesized images‖ (Rodowick 2007).

The Ubiquitous Camera

In the last several years, the cost of consumer digital camera has dropped even as the quality has increased. Each successive generation of cameras has come equipped with a greater array of digital functions, improved optics, and higher image resolution. Digital cameras are available across every price range, and for every level of experience or intent. Yet perhaps the most intriguing application of the digital camera, that has precedent in classic spy films and television, is the cell phone camera. Not only has the technology spurred philosophical inquiries about the nature of photography, but professional photojournalism is being threatened by amateur digital imaging, as cell phones with digital cameras have become seemingly ubiquitous, with ever-improving resolution.

Current trends in news media outlets invariably include amateur imaging and documenting to cover a broader range of stories. In her W orld History of Photography, Naomi Rosenblum points to an incredible example, when a picture taken on a cell phone of Saddam Hussein‘ s hanging was almost immediately picked up and spread across the world via the Internet (Rosenblum 2007). But this trend is true of all digital imaging, generally speaking. Digital technology has allowed for the mass editing and reproduction of images throughout the digital world, from news outlets, to stock photography agencies, to digital image forums such as personal blogs, Facebook, and MySpace or photo-sharing sites such as Picasa and Flickr.

In 2007, Michelle Bates published a book called Plastic Cameras: Toying with Creativity. While at first glance plastic cameras seem like a technological regression, Bates suggests this —reverse technology…has the power to bring people together, almost the opposite of the often competitive world of photography.‖ Plastic cameras have experienced a rebirth in recent years among photographers who appreciate the basic, photographic fundamentals of their simple mechanics. Inexpensive, all-manual plastic film cameras stand in stark contrast to —this climate of…more megapixels and more complexity‖ (Bates 2007).

The book occupies a peculiar slot among the dozens of how -to manuals that are continuously published every year on digital photography, but nevertheless highlights a couple of interesting points. On the one hand, the digital revolution wants to suggest that film is a thing of the past, and Plastic Cameras begs to differ. On the other hand, whether shooting with an $8000 16-megapixel professional digital camera or a $25 —toy,‖ photographers are

all participating in something, vocationally or avocationally, that rests upon human intelligence and technological innovation in pictorial representation. Either way, the future of photography— forever grounded in its humble origins—seems limitless.

INVENTION TIMELINE OF THE FIRST DIGITAL CAMERAS

Kodak Digital Camera (1975)

Resolution: 100 by 100 pixels (0. 01 megapixels).

You’re looking at the world’s first digital camera. It recorded crude images to cassette tape, images that could then be viewed on a special display device hooked to a TV set.

Photo: Kodak

FIRST COMMERCIALLY AVAILABLE CAMERAS

1. Fujix DS-1P (1989). Resolution: 0. 4MP

2. Dycam Model 1 (1990). Resolution: 376 by 240 pixels (0. 09MP), 256 levels of gray.

The Fujix DS-1P was the world’s first commercial digital camera. It wrote digital files to solid-state memory cards, but was available only in Japan for a brief time. The Dycam was the first digital camera sold in the United States.

KODAK AND NIKON

1. Kodak Digital Camera System (1991). Resolution: 1320 by 1035 pixels (1. 3MP). 2. Kodak DCS200 (1992). Resolution: 1524 by 1012 pixels (1. 5MP).

Starting in 1991, Kodak produced camera systems that paired Nikon bodies

with Kodak digital sensors in place of film. The original DCS cost $20, 000 and required a tethered hard-disk system.

FIRST COLOR CAMERAS

1. Apple QuickTake 100 (1994). Resolution: 640 by 480 pixels (0. 3MP). 2. Kodak DC40 (1995). Resolution: 756 by 504 pixels (0. 38MP). These two early digital cameras, both developed by Kodak, were based on the same underlying technology. They captured images in 24-bit color.

LCDs ARRIVE

1. Casio QV-10 (1995). Resolution: 320 by 240 pixels (0. 07MP). 2. Kodak DC25 (1996). Resolution: 493 x 373 pixels (0. 18MP).

The Casio QV-10 was the first consumer digital camera to include a built-in LCD screen. The Kodak DC25 was the first to use Compact Flash media for storage.

NEW DEVELOPMENTS

1. Olympus Deltis VC-1100 (1994). Resolution: 768 by 576 pixels (0. 44MP). 2. Nikon Coolpix 100 (1996). Resolution: 512 by 480 (0. 24MP). 3. Ricoh RDC1 (1995). Resolution: 768 by 576 (0. 44MP).

The Olympus Deltis VC-1100 incorporated a modem for transmission of photos over regular phone lines. The Nikon Coolpix plugged into a laptop’s PC Card

slot to transfer pictures. The Ricoh RDC1 was the first digital still camera to record video.

THE FIRST CAMERAS TO POSSES STORAGE ABILITY

1. Sony Digital Mavica FD5 (1997). Resolution: 640 by 480 pixels (0. 3MP). 2. Sony Mavica CD1000 (2000). Resolution: 1600 by 1200 pixels (1. 92MP).

The FD5 was the first digital camera to write to 3. 5 -inch floppy disks for photo storage. In a later first, the Mavica CD1000 wrote to miniature CD-R discs.

THE FIRST DIGITAL SLRS

1. Nikon D1 (1999). Resolution: 2000 by 1312 pixels (2. 62MP). 2. Canon EOS

D30 (2000). Resolution: 2160 by 1440 (3. 11MP).

These two models were the first fully integrated digital single-lens reflex cameras (SLRs Both were notable for using lenses from their equivalent systems in the 35mm film world.

SMALL BUT POWERFUL

1. Canon PowerShot S100 Digital ELPH (2000). Resolution: 1600 by 1200 pixels (1. 92MP).

2. Casio Exilim EX-S1 (2002). Resolution: 1280 by 960 pixels (1. 22MP).

The Canon S100 pushed digital pocket cameras toward smaller sizes and higher resolutions. The Exilim continued that trend with its tiny, almost credit-card dimensions.

FULL FRAME

1. Contax N Digital (2002). Resolution: 3040 by 2008 pixels (6. 1MP). 2. Canon EOS-1Ds (2002). Resolution: 4064 by 2704 pixels (10. 99MP).

The Contax N Digital was the first camera to include a CCD sensor the size of a full 35mm frame. The EOS-1Ds was Canon’s first full-frame camera.

THE DIGITAL CAMERA EVOLVES

1. Canon EOS Digital Rebel D300 (2003). Resolution: 3072 by 2048 pixels (6. 29MP).

2. Olympus E-1 (2003). Resolution: 2560 by 1920 pixels (4. 91MP). 3. Epson R-D1 (2004). Resolution: 3008 by 2000 pixels (6. 01MP).

The Canon D300 was the first digital SLR under $1000. The Olympus E -1 was the first camera to use the Four-Thirds SLR system. Epson’s R-D1 was the first digital rangefinder camera.

A TOP-OF-THE-LINE DSLR

1. Nikon D3X (2008). Resolution: 6048 by 4032 pixels (24. 38MP).

The D3X is currently Nikon’s top-of-the-line digital SLR, and it’s targeted squarely at professional photographers. Canon’s highest-resolution DSLR is the EOS-1Ds Mark III.

3D CAMERAS

1. Fujifilm FinePix Real 3D W3 (2010). Resolution: 3648 by 2736 (9. 98 MP).

2. Sony Cyber-DSC-TX7 (2010). Resolution: 3648 by 2736 (9. 98 MP).

Fujifilm’s Real 3D W3 is the first consumer digital camera that can shoot 3D photographs (and video). Sony’s DSC-TX7 is a full-featured pocket point-and-shoot with intelligent panorama features.

HIGH-END PRICES DROPPING

Pentax 645D (2010). Resolution: 7264 by 5440 pixels (39. 51MP).

The 645D is the first medium-format DSLR to sell for under $10, 000, potentially opening up the exotic world of high-end, super high-resolution photography to a whole new audience. We've come a long way from the 100-by-100-pixel images of 35 years ago.

TYPES OF CAMERAS

-COMPACT DIGITAL CAMERAS

Sony DSC-W170

Samsung-ST30-Ultra-Compact-Digital-Camera-back

Compact cameras are designed to be tiny and portable and are particularly suitable for casual and " snapshot" uses. Hence, they are also called point-and-shoot cameras. The smallest, generally less than 20 mm thick, are described as subcompacts or " ultra-compacts" and some are nearly credit card size. [7] Most, apart from ruggedized or water-resistant models, incorporate a retractable lens assembly allowing a thin camera to have a moderately long focal length and thus fully exploit an image sensor larger than that on a camera phone, and a mechanized lens cap to cover the lens when retracted. The retracted and capped lens is protected from keys, coins and other hard objects, thus making it a thin, pocketable package. Subcompacts commonly have one lug and a short wrist strap which aids extraction from a pocket, while thicker compacts may have two lugs for attaching a neck strap.

Compact cameras are usually designed to be easy to use, sacrificing advanced features and picture quality for compactness and simplicity; images can usually only be stored using lossy compression (JPEG). Most have a built-in flash usually of low power, sufficient for nearby subjects. Live preview is almost always used to frame the photo. Most have limited motion picture capability. Compacts often have macro capability and zoom lenses but the zoom range is usually less than for bridge and DSLR cameras. Generally a contrast-detect autofocus system, using the image data from the live preview feed of the main imager, focuses the lens. Typically, these cameras incorporate a nearly silent leaf shutter into the lens but play a simulated camera sound [8] for skeuomorphic purposes. For low cost and small size, these cameras typically use image sensors with a diagonal of approximately 6 mm, corresponding to a crop factor around 7. This gives them weaker low -light performance, greater depth of field, generally closer focusing ability, and smaller components than cameras using larger sensors. Some cameras have GPS, compass, barometer and altimeter. [9] and some are rugged and waterproof.

Starting in 2011, some compact digital cameras can take 3D still photos. These 3D compact stereo cameras can capture 3D panoramic photos for play back on a 3D TV.

-BRIDGE DIGITAL CAMERAS

Back View of BenQ-GH-700-Back(Bridge)

Sony_DSC-H2_01

Bridge are higher-end digital cameras that physically and ergonomically resemble DSLRs and share with them some advanced features, but share with compacts the use of a fixed lens and a small sensor. Like compacts, most use live preview to frame the image. Their autofocus uses the same contrast-detect mechanism, but many bridge cameras have a manual focus mode, in some cases using a separate focus ring, for greater control. They originally “ bridged” the gap between affordable point-and-shoot cameras and the then unaffordable earlier digital SLRs. Due to the combination of big physical size but a small sensor, many of these cameras have very highly specified lenses with large zoom range and fast aperture, partially compensating for the inability to change lenses. On some, the lens qualifies as super zoom. To compensate for the lesser sensitivity of their small sensors, these cameras almost always include an image stabilization system to enable longer handheld exposures.

These cameras are sometimes marketed as and confused with digital SLR cameras since the appearance is similar. Bridge cameras lack the reflex viewing system of DSLRs, are usually fitted with fixed (non-interchangeable) lenses (although some have a lens thread to attach accessory wide-angle or telephoto converters), and can usually take movies with sound. The scene is composed by viewing either the liquid crystal display or the electronic viewfinder (EVF). Most have a longer shutter lag than a true dSLR, but they are capable of good image quality (with sufficient light) while being more compact and lighter than DSLRs. High-end models of this type have comparable resolutions to low and mid-range DSLRs. Many of these cameras

can store images in a Raw image format, or processed and JPEG compressed, or both. The majority have a built-in flash similar to those found in DSLRs.

In bright sun, the quality difference between a good compact camera and a digital SLR is minimal but bridgecams are more portable, cost less and have a similar zoom ability to dSLR. Thus a Bridge camera may better suit outdoor daytime activities, except when seeking professional-quality photos.[10] In low light conditions and/or at ISO equivalents above 800, most bridge cameras (or megazooms) lack in image quality when compared to even entry level DSLRs. However, they do have one major advantage: their much larger depth of field due to the small sensor as compared to a DSLR, allowing larger apertures with shorter exposure times.

A 3D Photo Mode was introduced in 2011, whereby the camera automatically

takes a second image from a slightly different perspective and provides a standard . MPO file for stereo display.

-MIRROR LESS SINGLE REFLEX DIGITAL CAMERAS
Fuji mirorless interchangeable lens camera (back)

Fuji mirorless interchangeable lens camera(Front)

In late 2008, a new type of camera emerged, combining the larger sensors and interchangeable lenses of DSLRs with the live-preview viewing system of compact cameras, either through an electronic viewfinder or on the rear LCD. These are simpler and more compact than DSLRs due to the removal of the mirror box, and typically emulate the handling and ergonomics of either

DSLRs or compacts. The system is used by Micro Four Thirds, borrowing components from the Four Thirds DSLR system. Some MILCs use a larger APS-C sensor, such as the Sony NEX series, Pentax K-01, and the upcoming Canon EOS M. In short Mirrorless cameras were built in order to obtain the qualities of the digital single lens reflex cameras but the looks and compactness of the compact camera.

-DIGITAL SINGLE REFLEX LENS CAMERAS (DSLRs)

Canon 4d DSLR (Front)

Back view of the Sony Alpha A900 DSLR

Digital single-lens reflex cameras (DSLRs) are digital cameras based on film singlelens reflex cameras (SLRs). They take their name from their unique viewing system, in which a mirror reflects light from the lens through a separate optical viewfinder. At the moment of exposure the mirror flips out of the way, making a distinctive “ clack” sound and allowing light to fall on the imager.

Since no light reaches the imager during framing, autofocus is accomplished using specialized sensors in the mirror box itself. Most 21st-century DSLRs also have a “ live view” mode that emulates the live preview system of compact cameras, when selected.

These cameras have much larger sensors than the other types, typically 18 mm to 36 mm on the diagonal (crop factor 2, 1. 6, or 1). This gives them superior low -light performance, less depth of field at a given aperture, and a larger size. They make use of interchangeable lenses; each major DSLR

manufacturer also sells a line of lenses specifically intended to be used on their cameras. This allows the user to select a lens designed for the application at hand: wide-angle, telephoto, low -light, etc. So each lens does not require its own shutter, DSLRs use a focalplane shutter in front of the imager, behind the mirror.

PART OF THE VARIOUS TYPES OF CAMERAS

GENERAL PARTS AND FUNCTIONS OF THE CAMERA

1. Shutter button: Press this button all the way to take a picture.

2. Control buttons: Adjust various camera settings.

3. Shooting mode dial: Change among different scene modes, adjust exposure choices, and so on.

4. Microphone: Capture audio for movie clips and voice annotations, or even activate a sound-triggered self-timer.

5. Focus-assist light: Helps the camera focus in dim lighting conditions.

6. Electronic flash: Provides addition light to your scene.

7. Optical viewfinder: To frame and compose your picture.

8. Zoom lens and control: Magnifies or reduces the size of the image.

9. Tripod socket: Allows you to attach the camera to a firm support.

10. Docking port: Can be used to transfer photos, recharge the batteries, make prints, or perform other functions.

11. Battery compartment: Contains the cells that power the camera.

12. Power switch: Turn the camera on or off.

13. Indicator LEDs: Show the camera‘ s status.

14. LCD (liquid crystal display) panel: The camera‘ s display.

15. Display control/Menu button: Controls the amount of information shown in the LCD and menus.

16. Picture review: Press this button to review the pictures you‘ ve already taken.

17. Cursor pad: Navigate menu choices.

18. Set/Execute button: Activate a feature or set a menu choice to the current selection.

19. Memory card slot: Accepts digital memory cards.

20. USB port: Access for a USB cable.

21. File-save LED: This light usually lights up to indicate that an image is being saved to the memory card.

22. An electronic viewfinder (EVF) : is a viewfinder where the image captured by the lens is projected electronically onto a miniature display.

23. Small grip: to prevent slipping and create a solid hold, making your camera more secure in your hand. Onehanded picture taking is easier and safer.

24. The dioptre

adjustment: knob works as a lens switching from near to far focus.

25. Distance scale: markings indicating the distance from the lens where objects will appear, indicating distance from infinity down to a foot or less

26. Flash hot shoe: A hot shoe is actually a mount that physically holds a flash and it’s a connector that connects the firing circuit of the flash to the trigger circuit located in the camera body. This mechanism’s closing in reality connects the flash’s centre (hot) pin to the rest of the foot(ground) to complete the electrical circuit to fire the flash. Cold shoes simple are mounts with no centre connector, its usually an empty hole under the centre pin.

27. Zoom

ring: the user rotates to change the focal length

28. Focus-assist light: Helps the camera focus in dim lighting conditions.

29. Depth of field view: it helps the photographer evaluate which points of the scene will be in sharp focus, which will not,

30. Lens release button: responsible for releasing the lens from the body to facilitate removal

31. Docking port: Can be used to transfer photos, recharge the batteries, make prints, or perform other functions

32. Tripod socket: Allows you to attach the camera to a firm support.

33. Focus -assist light: Helps the camera focus in dim lighting conditions.