

The Transmutation of Camera into Film and Film into Camera

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Kurt Lancaster a motion picture cinematographer refers to his experience with the Canon 5D Mark II as “so liberating that I feel like a five-year-old again-full of possibility and endless creativity (p.xi, Lancaster 2011).” The canon 5D Mark II is a camera built by Canon that has the capacity to capture film, video and audio. It is a prosumer DSLR (digital single-lens reflex) camera capable of recording in HD quality. This product has revolutionized the cinematography industry in a number of ways, but most importantly by reducing the cost of equipment required to produce a professional film by hundreds of percents. This technology has not only created competition with those that previously dominated the market, because of its affordability it has simultaneously opened up the market to a much larger demographic of people who previously would not have been able to break into the industry as a result of upfront costs.

Enabling Technologies

The DSLR separates itself from traditional digital cameras because of its internal structure. The D which stands for digital was developed much later than the core technology of this camera referred to as the SLR, which stands for single lens-reflex. The magic behind an SLR is that the user is actually looking at the world through the lens; the light that shines through the lens is then reflected off of a mirror and into the video finder so that that photographer is able to perceive the object of focus. This direct connection to the world allows the user to perceive subtleties in light and depth that are unperceivable with lower level grade point and shoot cameras (Harris, 2012). SLR technology was developed sometime between the 1500’s and 1600’s, but the logic of is dated back to Aristotle in 330 BC (Naughton, 2012). It is Interesting that the technology that makes photography and videography great today existed before the invention of photography. The reason for this was the need for projecting the world onto a canvas for more accurate representation of form for artists of the time. This SLR technology enabled artists to project an image onto a canvas so that they would then be able to capture

its exact dimensions by tracing the outlines of the image resulting in more articulate representations of proportion and shape. The technology was utilized in this way well into the 1800's. By the late 1800's SLR technology was integrated into the newly formed technology of photography. But in the beginning SLR mechanics proved to be too complex for efficiency in earlier models of the camera, and so it wasn't until the 1960's that SLR technology became a dominant backend infrastructure for the higher end cameras used by semi-professional and professional photographers in the field. It wasn't until 1999 that DSLR cameras began to out-compete SLR cameras in the professional field. "Although various companies such as Canon, Nikon, Fujifilm, Sigma, Kodak, Pentax, Olympus, Panasonic, Samsung, and Minolta released DSLR cameras intended for professional photographers and early adopters, DSLR cameras could not compete with film-based SLR cameras due to their lack of speed and image resolution (p.40, Schaaf 2009)." The first DSLR camera came out in 1991, was produced by Nikon, cost \$25,000 and had resolution capabilities of 1.3 MP (mega pixels) (Shaaf, 2009).

The introduction of the digital camera can be referred to as a process of digitalization, which is "the transformation of existing socio-technical structures that were previously mediated by non-digital artifacts or relationships into ones that are mediated by digitized artifacts and relationships with newly embedded digital capabilities (p. 7 Lyytinen, Thummadi, Weiss, Yoo 2010)." The camera itself is an artifact and has gone through the digitalization process, evolving from an analog process of capturing images into digital where once a complex chemical reaction is replaced by a series of ones and zeros to represent visual data. Digitalization is a process that can be seen in many disruptive technologies today including mobile media, internet-based TV, digital publication, and digital cameras (Lyytinen et al., 2010). There are three design characteristics that play a decisive role in this process. The first is the homogenization of digital data, this allows for the transformation of data from a multitude of devices (audio, text, video and images) into a single and coherent language that can then be shared and recombined. The second characteristic is the universal programmable computer, which allows for once

solitary devices to be combined into one. The digitization of these individual artifacts allows for the ability of all of these capabilities to be utilized in one digital artifact by utilizing software. The third characteristic is the self-referential nature of digital technologies which refers to the nature of digital connectivity between artifacts. As traditional solitary mechanisms were translated into the digital also the ability to connect to things like a computer and the internet also became possible. "Therefore, more use of digital technology accelerates the diffusion of digital tools, creating strong network externality and positive feedback loops (p.10, Lyytinen et al., 2010)." Digitized technologies are different from other artifacts in their material makeup. Yoo discusses seven properties that compose a digital artifacts materiality including programmability, addressability, senseability, communicability, memorizability, traceability and associability, which can all be seen as enabling technologies (Yoo, 2010). The Canon DSLR Mark II exhibits all of these characteristics. It has programmability enabled by its low-powered microprocessor that allows its behaviors to be modified by instructions, as a result of this the Canon has become malleable, capable of being used for more than what it was originally intended for. It has addressability in that its programmable memory chip enables it be uniquely identified, this opens up opportunities for new forms of interaction between devices and networks. Its senseability characteristic allows the device to interact in real time with the environment around it, this was a huge leap from analog to digital because it resulted in many programs being written that would automate these processes and thus free up the user from having to learn how to operate complex processes as they would happen automatically. It exhibits communicability as it has the ability to be connected to other digital devices and exchange digitized information. Memorizeability is a feature that can be subtly compared to traditional film photography as the images were recorded onto a film, but in the digital sense these images are stored in such a way that they can be maintained indefinitely, but even farther beyond that the data storage capabilities far exceed that of analog film and even more information beyond the image itself is able to be stored such as place, date and time, not to mention all the date

which must be stored on the device itself in terms of programming and customization. Traceability refers to a digital devices ability to be able to ‘chronologically identify, memorize and inter-relate events and entities in time,’ this representative in the way that the Canon 5D Mark II records and stores both images and video (p. 12 Lyytinen, Thummadi, Weiss, Yoo 2010). Associability refers to an artifacts ability to relate to other artifacts, people or places and to construct an association between them in order to predict future states and associations. This is more of a general application to digital devices in general, you may be able to relate the Canon 5D Mark II by its ability to programmed through firmware, thus far applications that function at this level of complexity have yet to be seen. So the combined enabling technologies that led to the fruition of the Canon 5D Mark II include the evolution of the camera, SLR development, and of course all the bells and whistles that come along with digital capabilities including HD quality photographs and videos. The evolutions of these combined technological paths collapsed on one another to elicit one of the most recognized cameras today the canon 5D Mark II.

Canon 5D as a Sustaining v.s. Disruptive Technology

Most of Canon’s technologies would be considered sustainable, but the Canon 5D mark II definitely has disruptive characteristics, and oddly enough not in the field of photography but in a parallel area, cinematography. It is apparent that the world recognized the revolutionary capabilities embedded within these newly combined technologies that form the Canon 5D mark II as soon as it came out; “In addition, in 2008, Canon debuted the EOS 5D Mark II, the industry’s first SLR digital camera capable of recording full HD video. This camera won three major international camera awards (Canon, 2012).” Many in the community of professional filmmakers own and use these cameras as a tool in their productions and hold a highly regarded respect for this camera. Lancaster refers to the “Canon 5D Mark II as a game changer because the paradigm has shifted (p.xi, Lancaster, 2011).” Svetlana Cvetko, the cinematographer that produced *The Inside Job* and *Miss Representation* said, “This camera can adapt to whatever situation you’re in and allows you to customize your white balance. I can adjust

it to whatever light situation I need (Filmmakers Notebook, 2005).” It is apparent that there is a lot of excitement and enthusiasm about this camera in general. There are a number of emergent properties representative in the Canon 5D Mark II that seem to be game-changers resulting in its popularity and as a disruptive technology. The Canon 5D Mark II is disruptive in that it has literally created a new market. When comparing traditional pro-video cameras the canon 5D far outshines them in these categories; size of camera can be used as a means of appearing in cognito, flexibility in terms of lenses, its small size and light weight make it easy for traveling and decrease setup time, cinematic quality of HD video, high quality video in low light situations. This camera is highly beneficial for those working in the field as photo journalists or recording documentaries in sensitive and potentially dangerous situations. There are two major constraints in the design of the Canon 5D, that is the quality of the audio when doing video recording and also the length of time in which the camera can record video until the memory card must be changed, it’s at a maximum of 10 minutes depending on output quality.

Aside from the constraints, this camera has provided amateur cinematographers the opportunity to own a camera capable of producing professional quality HD video. As a result of its competitive benefits when compared with pro-cameras it has also simultaneously begun to pull users (professional cinematographers) into this market, a reaction that was not intended. The result has been a growing community that has been progressively innovation new tools and applications to improve on this already great technology. “However, a year later that changed and there was a whole industry built around this camera (Filmmakers Notebook, 2012).” This reaction from the public is representative of what happened with the invention of the automobile. Historically we know that when large numbers of users begin to innovate with and around your product that a giant leap in technology has just occurred. A number of very interesting innovations have been introduced including a firmware

program that was designed to allow users to better modify the system, these options are not available through Canon's firmware releases. The most popular of the programs developed as a result of this update are the audio modifications now available to users. As stated above one of the setbacks of the Canon 5D is its audio quality, and one of the user created hacks enables users to record professional grade audio as well as connect sophisticated audio equipment to the computer for recording. Another innovation produced by Dynamic Perception is a slide rail that enables film makers to execute extremely artistic shots. The pricing on this kit is parallel to the market demographic of amateur cinematographers. Although this kit will work with most DSLR's the majority of its users are Canon 5D MarkII's. The most exciting innovation specifically for the Canon 5D is aerial. Heli Video Productions has created a mini helicopter that allows a user to capture aerial shots. This design is not available to the public thus far, but it seems like accessibility to mini remote control crafts of all sorts for creative video capture is not too far in the future.

Overall the Canon 5D Mark II has revolutionized the cinematography industry for both amateurs and professionals alike. It has enabled people who are on a tight budget to feed their creativity. This camera has also brought out new cinematic capabilities that were missing from HD videos. It has stirred the pot, and new questions about price, function and form are beginning to rise to the surface of the professional cinematic community. It seems that this camera really is a game changer, and just as we witnessed in the computer industry, technology will evolve to the point at which professional grade equipment at some point will all become accessible to the public. What kind of world would it be if all technology was available and affordable to all sectors of society even at the point of its entry, wouldn't that be exciting!

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