Of Cameras and Clouds

By Peter Corcoran

I am writing this at Easter from the sunny Spanish island of Tenerife, which helps put me in a summer mood—most of Europe has been suffering an unseasonal return of winter in late March/early April. It seems that global warming does not always mean the heat is turned up; it also means that all of that cold Arctic air finds it easier to break free and head south in large bursts from time to time!

Easter break also provides an excuse to share some thoughts and pictures from the latest consumer electronics (CE) toy with which I have had the opportunity to play—a Samsung Android camera, a new hybrid device that is a camera rather than a tablet or smartphone. It has a SIM card but only for a data connection.

The most interesting feature of this device is that it is very easy to upload my photos onto the Web and share them through multiple channels. Having struggled since Christmas with trying to organize and consolidate my family collection of digital photos across several generations of laptop and desktop computers, iPhones, and now tablets, I am becoming a firm convert to the gospel of Web uploads. It really is quite enlightening to just snap your pictures and find them all on the Web 30–60 min later. To make Web uploads even more convenient, a 50-GB Dropbox account was included with the camera. All I had to do was register, and there it was—I now have 54.5 GB in my Dropbox without paying a penny! Hold that thought, and we will discuss it later.

This device also made it very easy to link to my Google account. When I checked that out, I found that Google provides a camera upload folder with unlimited space for your picture uploads. They are resized to 2,048 pixels on the long edge, but that is generally large enough for most online sharing activities. As a backup, I have a 32-GB memory card—at some point, I will have to offload that, but for now, it can work as a full-resolution backup of my images.

THE AGE OF CONNECTED PHOTOGRAPHY

I have had a bit of an interest in device connectivity [1], [2] and linking digital imaging directly with the Internet [3]–[5] for quite some time now. More recently, an article about real-time connectivity was featured in the launch issue of *IEEE Consumer Electronics Magazine,* showing that digital cameras based on today's Wi-Fi connectivity could work quite well with no local storage apart from a small cache buffer [6].

While data rates were much lower in these early proofs of concept, so too were the image sizes. Thus, connected photography has been feasible for over a decade. Of course, part of the problem was that storing uploaded images was relatively costly. And, more importantly, the potential commercial return per image stored was too small to catalyze the development of improved user services and methods to leverage the content created by this online storage.

So while we could link cameras with the Internet 12 years ago, the time was not right for mainstream adoption. There was simply not the widespread commoditization of device connectivity that exists today, and the Web services offered were too slow and complex to scale in a cost-effective manner.

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Today, the marginal costs of adding a Wi-Fi or cellular connection to a device are quite small—indeed, there are very few CE devices that are not connected. All major industry players are offering new cloud services to the consumer. What better way is there to engage with the consumer and drive demand for cloud storage than offering low-cost or even free cloud services?

The commercial value proposition has been turned on its head by the social networking revolution. After all, what data are people most likely to share and reuse, generating added-value data transactions? Their pictures and video clips, of course! No wonder everyone wants to draw you into using their cloud services—once they have your precious personal content, they will be able to

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recoup this investment through a range of new products and services designed to add value to your content.

In short, all of the main barriers to seamless Internet photography as envisaged in [3] and [4] are now gone, and we really are at the beginning of the age of connected photography.

DIFFERENT STROKES

Suddenly, I have found that my whole approach to taking pictures has had to change. I used to shoot stuff with the mindset that someday I would go through all of these images and video clips and sort them out to select the best ones for sharing. So my philosophy was to shoot a dozen shots, and I would pick out the best one or two later. Not surprisingly, this became a bad habit, and I have now built up an image collection on my desktop computer that is three to four times larger than it should be.

Of course, I never found the time to get things organized the way I wanted. From time to time I managed to do a bit and maybe post a couple of pictures on Facebook or mail a set of images or a video clip to my wife, but mostly I was just accumulating an ever-growing set of personal content that needed sorting. On my personal desktop alone I had an image collection of 120 GB and probably another 100 GB of personal video content; in addition, there were several other family computers, laptops, and smartphones with many additional uncataloged pictures and video content.

Now, I suddenly find that all of my images are almost immediately online and available to me as soon as I have access to a browser; and the truth is that we cannot go very far these days without finding a browser—they are in our phones, tablets, and now our TV sets. Quite quickly, I realized that I had to change my photography strategy.

I now find myself inspecting images immediately after I shoot them—the large, high-quality display on the camera hybrid helps a lot—and in many cases, I am deleting 35–50% of the images immediately. The idea is to filter images before they get uploaded to the cloud. This is not because I do not have enough space to store them, but rather because now I know they are going to be available to me the next time I am using a browser. I am going to have those images in front of me to review and consider how to use them, maybe filtering some of them to improve the final images (Google+ has quite workable tools for that), putting others into albums for longer-term storage/archival, and making decisions about with whom to share them and how.

A MATCH MADE IN HEAVEN?

Now, because I am actually using my images, I want to make sure that those that I capture are good, and I am pretty sure that my review at the point of acquisition is reducing the number of images I am retaining for upload by 50%. So a new mode of capturing pictures has modified my behavior and reduced the number of images I am capturing.

Perhaps the correct observation is that I am getting better use and personal value from my digital photography experience.

Or maybe not, because I do find that I am taking more pictures, encouraged by the fact that I am starting to use them in a timely manner rather than having them become faded memories on a hard drive in my home office. Perhaps the correct observation is that I am getting better use and personal value from my digital photography experience. And it is because of a new connected camera and a range of new cloud services that match this device. As we have remarked before, cloud computing and CE can be a match made in heaven [7]. If you have had a similar personal experience of using new CE technologies, please do consider whether it might be worthwhile to share your experience with our readers. Please contact me at cesmagazine@gmail.com.

IN THIS ISSUE

REVIEW OF ICCE 2013

In this issue, we feature a look back at the IEEE Consumer Electronics Society's (CE Society's) premium conference—the IEEE International Conference on Consumer Electronics (ICCE), which was colocated with the January Consumer Electronics Show (CES) in Las Vegas, Nevada. If you are a regular member, you will know all about ICCE, but if you are a new member of the CE Society, this is a good opportunity to get some insights from different people on this year's conference. It is also a good time to make your plans to attend ICCE 2014, which will again be colocated with CES.

Our review features contributions from a wide range of Society officers and volunteers. We have articles on the IEEE Graduates of the Last Decade event; the Doctoral Workshop that is becoming a regular feature of ICCE; the Tricorder session, courtesy of the Future Directions Committee; a reflection from the technical chair, Tom Wilson, on this year's conference; and personal thoughts and reflections from Will Lumpkins, Joe DeCuir, and Christian Schüldt, among others.

BACK TO THE TV

Two of our feature articles this issue fall back on our old reliable and core CE technology—the TV set. The first of these deals with hybrid broadcast broadband TV (HbbTV), which is both an industry standard (ETSI TS 102796) and promotional initiative for hybrid digital TV to harmonize the broadcast, IPTV, and broadband delivery of entertainment to the end consumer through connected TVs (smart TVs) and set-top boxes.

The origins of HbbTV are European, and it was first demonstrated in 2009 in France by France Télévisions and two developers of set-top box technologies, Inverto Digital Labs of Luxembourg and Pleyo of France. Since then, it has evolved to become the European

approach to TV/Internet integration. Our article will lead readers through the background to HbbTV and provide an overview of the current status of this emerging technology, mainly deployed in some European countries, which has recently begun to attract interest in North and South America, Asia, Australia, and even Japan.

The second article, "Future Terrestrial Broadcast Systems," covers the development of technologies in TV white spaces. Many readers will be familiar with the white space concept—TV frequencies are licensed and allocated in most countries by a government agency. This frequency allocation process creates a band plan, which, for technical reasons, assigns frequency gaps, or white spaces, between allocated radio bands or channels. In addition to white space assigned for technical reasons, there is also unused radio spectrum that has either never been used or is becoming free as a result of technical changes. In particular, the switchover to digital television frees up large areas of the broadcast spectrum. Our article covers these issues from the perspective of recent developments in Germany, but many aspects are common across all TV broadcast regimes.

"MY CAR, MY WAY"

Thanks to Tom Coughlin for inviting this interesting article on customizing the electronics in cars. The underlying hypothesis is that today's smartphone culture empowers the user of a phone to completely customize it to his or her lifestyle by selecting a particular set of apps and online services, and today's cars have so much electronic technology integrated into their individual components that we should be able to achieve a similar degree of customization. The authors explore this idea and carry it to some interesting limits. Perhaps some of the technical feasibility is questionable, but it is definitely an article with a lighter theme.

"TWO WIRES AND 30 YEARS"

I have had the idea for this article sitting in the back of my mind for a while now. The I^2C bus is a fascinating serial control bus that any CE engineer worth his salt must have worked with at some point in his or her career. It underpins so many CE products and systems and enables complex CE products to be broken down into multi-IC subsystems.

Perhaps the most interesting aspect is that this simple two-wire control protocol is more than 30 years old. There are not many CE technologies that last that long and are still found permeating today's CE products. For some of you, this will be a walk down memory lane; for others, it may be your first meeting with I^2C. In both cases, I hope you will find something to interest you in this short overview of the I^2C bus.

FUTURE DIRECTIONS COMMITTEE

The Future Directions Committee is a new CE Society initiative to encourage members to form working groups aligned with new emerging technology areas that are relevant to Society members and the CE industry. This covers a wide remit, and you will find contact people for topics as diverse as home health care, smart vehicle technology, sustainability in CE, the smart grid, consumer robotics, metadata, cloud computing and big data, smart imaging, consumer biometrics, and advances in product safety.

Our review features contributions from a wide range of Society officers and volunteers.

Tom "where-does-he-get-the-energy-from" Coughlin is driving the Future Directions Committee and has provided an overview with details on its goals, objectives, and contact people for each particular interest group. Check through his article and consider adding your name and contributing some ideas and energy to any of the working groups that are of particular interest to you.

REGULAR COLUMNS AND CE STANDARDS

We also have our regular "Standards Corner" column from William Lumpkins and one article in a series from Craig Sato of Underwriters Laboratory on the development of product safety standards for CE. This ongoing series is intended to help demystify the standards development process for our readers. And Bob Frankston's "Bits Versus Electrons" column in also this issue.

CORRECTION

I would like to correct an error that appeared in the January issue of *IEEE Consumer Electronics Magazine*: On page 64, it is stated that William Lumpkins was president of the CE Society from 2007 to 2009; in fact he was president for two terms (2007 and 2008) only and was succeeded by Dr. Larry Zhang, who was president in 2009.

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