USC School of Cinematic Arts
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CONNECTED
HERE AND THERE: CONTENT EVERYWHERE

KEYNOTES
INTEL, AUDI, SONY, YAHOO! AND CISCO

TOP TRENDS
4K, UHD, WEARABLE TECH & PRESENCE

CES 2014: COOL AND CONNECTED

Emerging **Presence: Changing the Customer Relationship**

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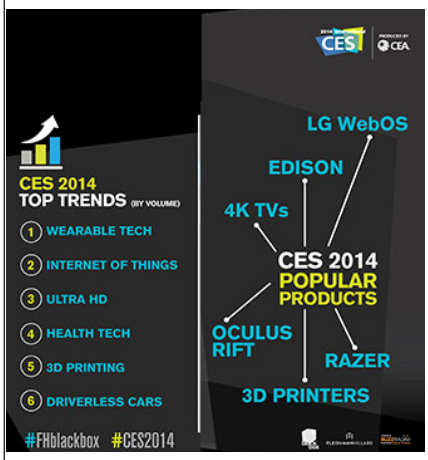
The Trends



Kenneth Williams
CEO and Executive Director

Covering CES

The following report is the Entertainment Technology Center's post show analysis of the 2014 International CES. Over the course of the week of January 5-10, 2014, ETC tracked the most interesting and breaking entertainment technology news coming out of this year's event. The ETC team reported on new product announcements, keynote presentations, evolving industry trends and individual demonstrations.

Extensive Posts

ETC's coverage began before Thanksgiving with an early preshow report posted to its ETCentric.org news website. In the two weeks prior to the year-end holidays, ETCentric published a series of stories forecasting the anticipated trends and early product announcements. In total, with two daily editions of the ETCentric Daily Bullet, more than 105 original posts and links to another 124 noteworthy articles were published during the week of CES.

To see all of the posts please visit http://www.etcentric.org/ces/

Perspective

After spending the week with 150,000 other visitors, walking 2 million net square feet of exhibit space housing more than 3,200 exhibitors, it's time to reflect on the products, announcements and innovations we saw and add some perspective. The pages that follow highlight the key trends and categories that emerged during CES 2014 as analyzed by our team of seasoned journalists and industry experts. With so much to see, we focus on those areas that directly or indirectly impact entertainment and the interests of ETC members.

The Entertainment Technology Center at the University of Southern California is a think tank and research center within the USC School of Cinematic Arts that brings together senior executives, innovators, thought leaders, and catalysts from the entertainment, consumer electronics, technology, and services industries along with the academic resources of USC to explore and act upon topics and issues related to the creation, distribution, and consumption of entertainment content. For information or to become a member, contact: emeadows@etcenter.org

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EXECUTIVE SUMMARY

4K Everywhere, Content Anywhere, The Internet of Everything, & Wearable Tech

The promise of the future is gaining momentum and velocity. Technologies and concepts, such as 4K, UHD, Augmented Television and Content Everywhere, introduced in years past were on display throughout the more than 2 million square feet of exhibit space in real products. While there were no seismic shifts this year, the general categories of Presence, Wearables, Automotive, and 3D Printing reveal the contours of change and opportunity over the next 3-5 years.

Trends to Follow

The ETC@USC focused on 7 trends to follow during CES:

- 4K and UHD
- Gaming
- Wearable Tech and Personal Data
- Connected Content
- The Internet of Things
- Cloud Services
- Oddities and Outliers

This report details ETC findings in each of these areas, except The Cloud. The speed with which The Cloud has been embraced was reflected on the show floor and conference sessions less as a separate category for consumers as it is an integral and integrated part of the "Smart" revolution. Every CE manufacturer, both premium and value, announced partnerships with various content carriers including Netflix, Hulu, M-GO and Roku. Smarter, more refined discovery and recommendation technologies calibrated to the individual are among the features announced in the latest generation of televisions and services, many built on Android, iOS and, in the case of LG, webOS. Both consumer data and the metadata associated with the content are vital to these technologies. Increasing dependence on a Cloud infrastructure appears evident.

Key Takeaways

- UHD Adoption may be quicker than expected. Value-priced manufacturers' introduction of sub $1,000 displays plus low-cost upconversion will balance the premium manufacturers to make UHD affordable for a wider audience and increase demand for 4K programming.
- The Internet of Things (IoT) is a smarter, more connected world in which devices are far more powerful, intuitive, integrated and know us better. Sensors connect us to our devices and devices to devices. Intel's Edison processor

delivers computing power in the size of an SD Card.

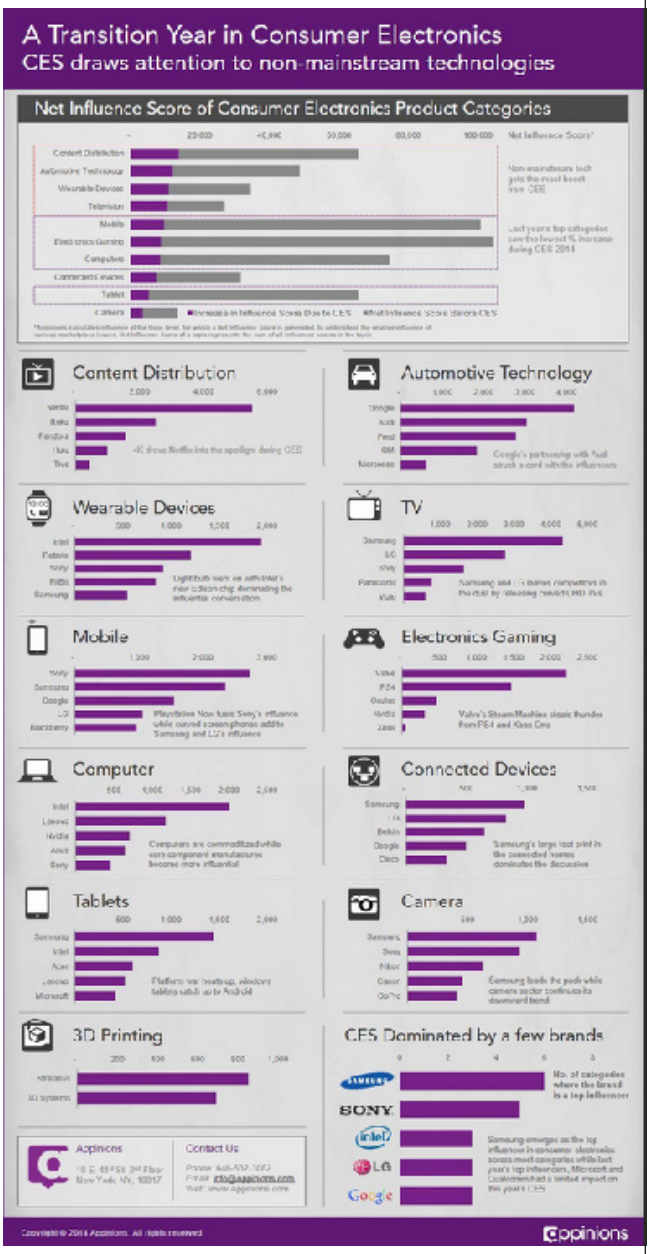
- Presence, an extension of the IoT, is knowing our customers and their requests, where they are, who is with them, what we know they like, and what products we have to engage them.
- Hi-Res Audio - The audience is listening and so are the manufacturers. Audio catches up with video to deliver vast improvements in mobile and home .
- Social and Augmented Television effectively become the second screen experience.
- 3D printing goes mainstream. Even food can be printed. New market for consumer products.
- The Automobile as a mobile family room. Advent of piloted driving combined with advanced Internet connectivity open new programming channel.
- Immersive entertainment enabled by head-mounted display products support "world building" design and potential for new forms of storytelling.
- Wearable tech, today largely limited to health & fitness, open to new engagement with entertainment.
- Kids Tablets - Fuhu's deal with DreamWorks Animation is only part of an expanding line of tablets designed for the young.

CE Market Snapshot

CEA projected a record $208 billion in U.S. sales, up 2.4 percent over 2013, and an estimated $1.07 trillion worldwide in 2013. CEA also predicts more than $1 billion worth of Ultra HD displays are expected to ship in 2014 with the greatest uptake of UHD expected in Asia. Tablet sales are expected to reach 89.3 million in unit sales, up from 77.4 million in 2013. Steve Koenig, director of industry analysis at the CEA, noted a trend towards homes having one large screen and multiple smaller displays, usually a tablet, replacing smaller TVs and other devices.

More at Etcentric.org

In addition to this report, you will find complete coverage of CES and all of the ETC's pre-show reports at ETCentric.org. http://www.etcentric.org/ces/



Infographic pictures trending topics and companies during CES2014 Courtesy of Appinions. Used with permission.

Katie Couric at the Yahoo! keynote

CES KEYNOTES

INTEL, AUDI, SONY, YAHOO! AND CISCO LEADERS SEE A CONNECTED FUTURE

CES keynotes this year revealed a depth and breadth of innovation. While not every product or idea demonstrated in the context of these keynotes ever reaches the market, there was an overwhelming sense that most of what we saw is real. Enabling technology, mobility, play, information, and the Internet of Everything, present five very distinct perspectives on our connected future.

Links

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CEA OPENING

"We are at the forefront of a momentous wave of innovation," said CEA President Gary Shapiro. "The incredible growth that emerging product categories such as Ultra HDTV, wearable electronics and 3D printers will experience this year underscores the significant role new technologies play in the total consumer electronics story." The magic of our industry and CES is that something new is always just around the corner. He also announced that CE revenues for 2014 are projected to reach a new record of $208 billion in the U.S., an increase of 2.4 percent over 2013.

INTEL

"MAKE EVERYTHING SMART"

CEO Brian Krzanich sees a revolution in how we live, work and play. "Make everything smart" drives a wearable and connected future. Edison, a fully functioning Linux computer in the form factor of an SD Card, enables a universe of new gadgets demonstrated on-stage, including earbuds that monitor heartbeat and a "onesie" that transmits your infant's bio-feedback, and automatically warms a bottle (and brews your coffee!) when the baby begins to stir. Games, animation and a dazzling Augmented Reality display of "Leviathan" added to the vision.

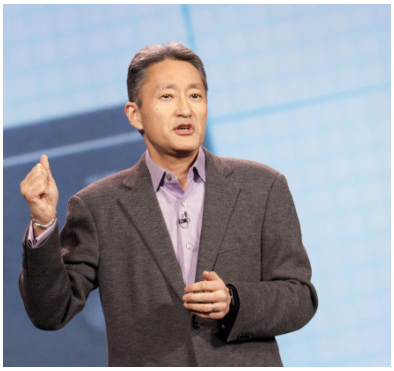
AUDI

"REDEFINING MOBILITY"

The Audi of the future is more than mere transportation. Rupert Stadler, chairman of the board of management of Audi AG, demonstrated how the "connected car" is redefining today's automobile, and mobility, with an array of innovations that include piloted driving and "a new dimension of in-car entertainment." Enabled by tech from AT&T Mobility and Nvidia, "it is now about connecting the driver with the car, the car's surroundings, the traffic infrastructure, and all of the connected elements of their life." Self-driving cars will be available by the end of the decade.

SONY

> I BELIEVE THE MISSION OF SONY IS TO INSPIRE AND FULFILL PEOPLE'S CURIOSITY AROUND THE WORLD. "



It began Monday night with a low cost 4K camcorder, new 4K TVs and a 4K streaming partnership with Netflix, all announced during Sony's press reveal. CEO Kaz Hirai continued during his keynote as Sony introduced new cloud-based streaming TV and gaming services. These events clearly helped set the tone for a show that was dominated by every aspect of the 4K pipeline, especially TVs, and notably, streaming services. In charge of both cloud streaming services, Sony's Andrew House cited 70 million Internet-enabled Sony devices, which would rank it among the top 5 U.S. cable and satellite providers. PlayStation 3 is the number-one device in the world for watching Netflix in the living room. A more robust networked entertainment delivery system will be a hallmark of Sony. "Breaking Bad" creator Vince Gilligan praised image quality on all sized screens for expanding the canvas for storytellers. Curiosity, play and a deeper emotional value are at the heart of Sony, Hirai said. "The power to make people say, "Wow.""

YAHOO!

> "WHAT IF YOUR PHONE SUGGESTED MUSIC AND MAP APPS WHEN YOU GOT IN YOUR CAR OR FITNESS APPS AT THE GYM."

CEO Marissa Mayer made it clear at Yahoo's CES 2014 keynote address that the company will be mining the popularity of its news and entertainment offerings to put the exclamation point back in the Yahoo! brand. Along with fellow new hire Katie Couric, former New York Times staffer David Pogue was on hand to discuss the repackaging of Yahoo's news content and the company's digital magazine initiative, including the launch of Yahoo! Tech, an ad-free, jargon-less electronics and technology information source for the masses. Yahoo! also confirmed its acquisition of Aviate, which places the company in the personalized smartphone frontpage fray alongside Google's Now service and Apple's Siri. With the acquisition of Summly, Yahoo unveiled its News Digest. Using a mix of algorithms and editors, the app summarizes the day's top stories, providing with it, pictures, maps and other useful "atoms" of information in addition to links to the original stories.

CISCO

> "THINK OF THE CHANGE THE INTERNET BROUGHT INTO OUR LIVES, AND IMAGINE THAT 5- TO 10-FOLD OVER THE NEXT DECADE."

Thought leaders are looking beyond smartphones in anticipation of smart cities and smart nations. The Internet of Things — or what Cisco Chairman and CEO John Chambers refers to as the Internet of Everything (IoE) — presents a $19 trillion revenue opportunity. "Think of the change the Internet brought into our lives, and imagine that 5- to 10-fold over the next decade," Chambers said, quoting a proprietary 2013 Cisco study. That figure breaks down to $14.4 trillion in private revenues and savings and $4.6 trillion from the public sector. Retail represents a $1.5 trillion opportunity. His presentation emphasized big data as the roadmap that will allow society to productively navigate the interconnected landscape, with smart devices driving the journey.

The presentation also included a demonstration of cloud enhance-ments to Cisco's Videoscape TV delivery platform that will now be offered on a consumption-based model, its software and APIs cloud accessible and open via OpenStack.

Ultra HD At CES

Ultra HD was a big story of CES—with many moving parts. On the consumer electronics side of the equation, major set makers featured Smart 4K LCD, LED and OLED Ultra HDTVs in all shapes and sizes (curved was big). On delivery, OTT service providers such as Netflix and M-GO were promoting 4K streaming; and in production, 4K programming from season 2 of "House of Cards" to "The Blacklist" were highlighted.

4K was also highlighted in technologies from camcorders to monitors, and Hollywood was weighing the addition of high dynamic range and wider color gamut capabilities to its home entertainment image-creation arsenal.

THE DISPLAY LINEUP

All major set makers had 4K display announcements. Among them, Samsung launched an Ultra HDTV lineup of 4K TVs with screen sizes ranging from 50- to 110-inches.

LG launched 12 new Ultra HDTVs ranging in screen size from 49- to 105 -inches; and Sony similarly launched a wide range of 4K Bravia TVs.

Value-priced UHDTVs were also at the show this year, including new 50-inch 4K TVs from Vizio and Polaroid, both set to retail at under $1,000.

Seiki has addressed the commonly heard criticism that low-end 4K sets, especially those made in China, do a bad job up-converting 2K content to a 4K display. Seiki offers an HDMI cable with a built-in, high-quality up-conversion chip from Marseille for $50. The chip-embedded HDMI cable, paired with an $899 55-inch Seiki display, produces a remarkably good image for the price.

At the highest end, both LG and Samsung showed curved 105-inch Ultra HDTVs. Samsung additionally showed a 110-inch UHDTV and an 85-inch

"bendable" display that can change from flat to an even curve at the push of a button, extending approximately 3 inches from the wall at its left and right sides.

CONTENT IS KING

Most of LG's new Smart TVs will support webOS, including all Ultra HDTVs, supporting 4K delivery services from companies such as Netflix.

Netflix CEO Reed Hastings was on hand at both the LG and Sony press conferences to announce that Netflix is adding a 4K streaming service. Content will include season 2 of "House of Cards", which debuts Feb. 14; and the 4K remastered version of "Breaking Bad", expected to be available on Netflix later this year.

Samsung will be the first to support a new 4K service from M-GO, the PPV joint venture between DreamWorks Animation, Technicolor and Amazon. It's expected to launch in the spring with around 100 streaming movies and TV shows from Hollywood studios and TV networks. (At CES, Technicolor was demoing its upscaling capabilities, which will be used for content that doesn't originate in 4K.) Amazon's Instant Video service is also taking a 4K path with help of studios including Warner Bros., Lionsgate, 20th Century Fox and Discovery. Samsung announced support for this service at CES. Comcast and DirecTV also made 4K delivery announcements. Sony launched its 4K Media Player and 4K Video Unlimited library last year, and the company reports that the library now offers 140 titles. Sony is also giving the 4K treatment to TV series such as "Trophy Wife" and "The Blacklist", as well as upcoming feature films including Spike Lee's "The Sweet Blood of Jesus" "About Last Night" and "Think Like A Man 2."

> "Samsung, Toshiba, LG and Hitachi all showed impressive 105-inch diagonal, '5K' displays. The immense curved screens, featuring an ultra-wide 21:9 aspect ratio, are the first of their kind to present movies this close to their native cinematic format."

As to how to get this content to the home. Hastings said Netflix would be able to utilize download speeds around 15 Mbps, well within most In-

4K and Beyond

ternet provider's average offering of around 50 Mbps.

HEVC (High Efficiency Video Coding, or H.265) was a big topic, and Sam Blackman, CEO of Elemental Technologies, was demoing 4K streaming at the booths of GoPro, Qualcomm and Samsung.

Meanwhile the VP9 video decoder (an open and royalty-free video compression standard being developed by Google) was getting support from companies including LG and Sony.

5K AND 8K

Immersive technology was all the rage as wide screens took over cinema in the 1950s. Its impact was made real again in at least 4 manufacturers' booths at CES. Samsung, Toshiba, LG and Hitachi all showed impressive 105-inch diagonal, "5K" displays. The immense curved screens, featuring an ultra-wide 21:9 aspect ratio, are the first of their kind to present movies this close to their native cinematic format.

LG showed a 105-inch, curved Ultra HDTV with a 5K resolution of 5120×2160 at an MSRP of $70,000. The company opted for an LCD panel rather than the OLEDs more commonly used for curved screens.

Samsung countered with its own 105-inch, curved, UHD LCD TV that also offers 11 million pixels and features an ultra-wide 21:9 aspect ratio that takes full advantage of the size and curvature of the set.

Hitachi and Toshiba, surprisingly, also showed examples of a beautiful 105-inch, 21:9 screen (2.35:1 aspect ratio).

8K also made a statement at CES. Samsung showcased its first 8K screen, a 98-inch QUHD or Quad Ultra HD, while Sharp demonstrated an 85-inch 8K display. Sharp also showed a prototype 85-inch 3D display with Dolby 3D glasses-free technology (that delivered nearly 4K resolution per eye).

AUTOSTEREO

Steve Schklair, CEO of 3ality Technica, said 3D needed a "restart" during a CES panel. "The momentum for 3D is diminished. You need a gamechanger, and that will be autostereo."

DreamWorks Animation's Jim Mainard agreed, saying on the same panel that "3D active shutter glasses competed with second screens, so there was this occlusion of technologies. I think, though, that autostereo will make up for that barrier in the home."

Companies showing glasses-free 3D

Panasonic showed a 4K Curved OLED designed for Arenas, Displays and Architecture.

technology for TV displays included Dolby 3D, Stream TV Networks and Izon. Samsung showed a prototype 85-inch glasses free 3D TV set using its own technology.

4K EVERYWHERE

4K wasn't just about displays.

Panasonic introduced a 4K video camera that you strap to the side of your face. The waterproof point-of-view camera, set to launch later this year, has a wire connection to a device that you wear on your arm. The prototype is similar to the $244 HX-A100 HD camcorder that Panasonic debuted at the 2013 CES, but is reportedly more powerful inside and includes 4K recording, a fisheye lens and mini-HDMI port. Panasonic also announced a 4K projector for the events market and 7-inch ToughPad, and revealed plans to ship its developing 4K Varicam around April.

Sony came to CES armed with new technologies including a new, lower-cost 4K Handycam camcorder for $2000. Expected to hit stores in March, the FDR-AX100 features a 1-inch 14.2-megapixel Exmor R CMOS sensor, larger than those typically found in camcorders.

Toshiba showed a 4K Ultra HD mobile workstation, expected to hit the market this summer at an estimated $2,000. The Tecra was shown at CES with the TUM-32PRO1 4K professional monitor, a 31.5-inch UHD panel (3840×2169 pixels) that offers multiple color modes, including

the Abobe Super Wide Color Gamut. The Ultra HD 4K monitor is expected to come to market in Q1 with a price of about $15,000.

Links

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Connected Content

The Challenge of Ubiquity

Will it Play on Google Glass?

As platforms multiply, so does the difficulty of providing engaging content that works on all of them. Google Glass as well as its new competitors, Meta (glasses that include a 3D camera and can sense gestures) and Atheer Labs (glasses with depth sensing) are good examples. A lack of content hampers all these heads-up displays. Augmented Reality, by which 3D CGI, video, graphics or other data is superimposed over the real environment, is the strong suit of the heads-up display but content creators are slow to produce relevant, entertaining content and finding the best ways for users to interact with it.

Leverage Features

Other platforms once considered futuristic are now mainstream: smart phones and tablets among them, but content creators haven't found winning ways to exploit their feature sets. Creative Artists Agency's Sarah Passe noted that, "people are consuming media in new and interesting ways. My goal is to come up with what these new products are going to be to take advantage of that," she said. Xbox LIVE's Matt Feodoroff encouraged content creators to "keep in mind the power of the platform you're creating for."

New Marketing Challenges

Knowing how to effectively utilize and market to each platform is also a woefully unaddressed topic, said Michael Becker, former head of the Mobile Marketing Association and a consultant for Somo Global and mCorbis. According to a recent Adobe report on Digital Distress, he said, only 9 percent of marketers are confident they're doing digital marketing properly and 83 percent haven't been formally trained in mobile marketing. "Your customers care about mobile," said Becker. "Studios and networks have to realize that mobility and mobile connectivity is at the center of their customers' life cycle. If they don't understand how to be present and relevant, they're losing business".

Netflix, Amazon, DirecTV, Xbox and YouTube are now in the content-creation game, blurring the lines between traditional and new media. Still, the business strategies of these new content creation players aren't much different from the path trod by premium cable. Starting as content aggregators, these new players are now spending large sums on new original programming. "This is tentpole programming to build audience, similar to how, back in the day, HBO spent a lot of money on boxing to draw in audience," said Steven Katleman of Greenberg Traurig. Whether content comes from a studio or an independent, a well-developed plan across platforms is more important than ever.

Like a Home Movie

"Content without strategy is a home movie," said David Tochterman, head of digital media for Innovative Artists, a bi-coastal talent agency. Evan Bregman of digital studio Electus, agreed. "Consumers want to consume wherever and whenever, so whether you're a distributor or a content creator, you have to understand the nuances of the platforms," he said. "It's not a TV show or a Web show… it's a business." More platforms means more opportunity for content creators, but at a price. "If it's a cool new dramatic show, it'll be extremely low budget and a lot of the performers, writers and producers see that as a double-edged sword," said Katleman. "They're being paid so much less."

Analytics, personalization, attention to the nuances of the platform and social media data are all important going forward. "You have to have the business model on the table when you're pitching to digital," said Tochterman. "Now, my business is more about hit businesses, not hit shows."

Things Will Get More Connected: Should Media Companies Care?

"Where does Entertainment Fit in the 'Internet of Things?'"

In what was a surprise to many, Cisco was back at CES after having shed all its consumer facing products over the last few years. The focus of the keynote and the booth was the coming interconnection of all the things in our lives to hopefully improve them. In this model many of those magical things highlighted in "The Jetsons" will finally be possible. Indeed the focus on infrastructure to support this kind of development was in their wheelhouse and they showed some interesting examples that sort of looked mildly interesting, especially after folks in the specific product areas get to experiment with their customers. Probably longer than they predicted for a number of reasons social, increasing privacy concerns, and life safety but some version of this will happen. Much of what was seen fit into the Direct Device model where your familiar smartphone took on one more app to control some new thing or display some new data for your benefit. Examples were locks that could be activated by a phone or a ultra-violet sensor that could tell you to get out of the sun. Interesting, but like multicolor WI-FI lightbulbs, probably not the highest priority on next year's

Christmas list. But what of the recently announced Google acquisition of Nest, the thermostat and smoke detector company for $3.2 billion. Will it all come faster because of that? Maybe a little but the reality is probably it's just too geeky in its current version. So now you have to trust Google and in some future version explain to the false alarm fine-issuing local fire company why your new smoke detector decided, based on its big data understanding of the events in all of our houses that this was only the burned pizza, not a fire.

> "THE CONNECTION OF THESE PROGRAMS AND ANY OTHER PROFILE DATA THAT THE SENSOR STORM AFFORDS US CAN BE ADDED TO OUR UNDERSTANDING OF OUR CUSTOMERS."

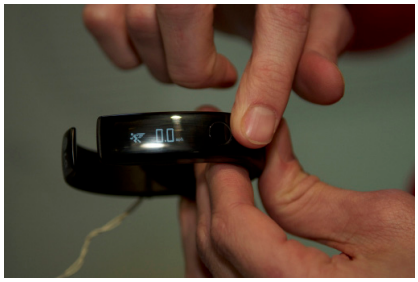
As this gets closer to reality- based situations the need for almost perfect decisions gets quickly real. The legal, social and business tangle that it approaches will not reward even small failures. So growth that we see will be probably smaller than forecasted by a good margin. But… connections that we don't see will grow really quickly. Imagine that fancy stainless steel refrigerator that you bought 4 years ago that was supposed to have its filter cleaned once a year. Expect device folks to include connectivity that notes its performance and service needs and perhaps if you opt in a reminder that you need to pull that front panel and dust off the filter. That sort of connected device will most likely happen soon and if it helps out by predicting and even managing service arrangements to avoid failures we might all opt in the day it's installed.

Last Word

Presence is the knowledge that our guest is making a request, where they are, who is with them, what we know they like, and what we have to engage them seamlessly. This all impacts media companies because this part of the Internet of Things is already arriving. Thank goodness that most often viewer experiences in their homes are not driven by life safety issues that are our responsibility. More importantly, the entire compendium of available entertainment is actually finite and the profiles of viewers is also finite. The connection of these programs and any other profile data that the sensor storm affords us can be added to our understanding of our customers. Here's an example of what can happen this year if we are lucky. There is a real and installed base of smartphones that already is ready to respond to low energy Bluetooth iBeacon messages that can micro locate individuals during retail and leisure activities. The last three generations of iPhones, iPads and a few Android devices can sense the presence of an iBeacon and also be one. So using this installed infrastructure, it is possible to know who for example is in a room if it has a connected iBeacon. An example close to our hearts: If your Apple TV was tomorrow enabled by software it could tell if it was you, a couple looking for a movie, or the whole family in the living room, for instance. For entertainment this is the beginning of the holy grail. Knowing who the customer making the request is, knowing what shows he has viewed, deducing what the guest liked of those shows is a big data task. Considering who is with the guest, knowing what time of day and week and season it is, adding the serendipity of professional programing magic and serving that same customer in all the other spaces he consumes content in is now, or in months, possible. For the media companies it is time to let the experiments in our own tiny Internet of Shows begin…

Wearable Tech

Wearables Emerge as a Burgeoning Trend



LG's Smartwatch

According to research done by the Consumer Electronics Association, the wearables market is poised to reach $1 billion in 2014. CEA Senior Research Analyst Kevin Tillmann reported that 2013 numbers were up 32 percent over 2012's market, which was valued at $648 million. The 2012 market showed significant growth of 170 percent from 2011. Despite the buzz around Google Glass, the wrist is the ideal place for a fitness wearable, according to the vast majority of consumers polled by the Consumer Electronics Association.

The most developed category in the broad wearables space is fitness tracking. CEA's Research drilled down into the specifics of this market, noting that 94 percent of those queried say they engage in some sort of fitness activity. "There are opportunities to use technology to have these activities become more important to consumers," noted Tillmann.

The most commonly owned fitness tracking device, however, is an analog pedometer. Wearable digital fitness devices only represent 9 percent of the marketplace in 2013. Although that number has tripled since 2012, it still represents a miniscule portion of the marketplace. Also revealed was the fact that the majority of those who own fitness wearables are already engaged in a committed fitness schedule. CEA research data revealed that the majority of those wearing fitness devices are male (60 percent), young (roughly 56 percent in the 18 – 34 group) and affluent (43 percent of those interested in buying one make over $75,000 a year).

FitBit's CEO James Parks said the company currently accounts for 67 percent of the fitness wearables market, but it's got plenty of company.

Companies Introduce New Products

Companies that introduced fitness tracking wearables at CES 2014 included Sportseat with its Skecher's-branded GOwalk Activity Tracker; Garmin's Vivofit; Fitbug's Orb line of devices; Geopalz iBitz trackers for children and parents; Hothead Technologies' Spree; and Wellograph's Sapphire Wellness watch.

Smart watches are another booming category. CEA research showed that most people see smart watches as an extension of a fitness device. "This is a category to watch," said Tillman. "The CEA predicted this

See ***Wearable Tech***, next page

Sensor Revolution Opens Doors to Wearables Industry

Wearables have been made possible by tremendous advances in sensor technology. MEMS (micro-electro-mechanical systems) are the tiny sensors that enable motion to be translated into digital information.

But the MEMS industry is still in its early stages; the MEMS industry's goal is to integrate these microsensors and microelectronics into a single microchip, enabling the development of even more powerful smart devices. Sensor "fusion" will also enable multiple sensors to work in tandem for more sophisticated activities.

Flexible displays, materials that can change their shape, and micro-needles are some of the other technologies coming down the pike that can help wearables assume new form factors and capabilities.

The wearables industry also needs to standardize internationally, said Chuck Parker, executive director of the Continua Health Alliance. He reported that there are already 15 device classes with 22 more in development.

MImo Baby Onsie has sensors and Intel Inside

Battery life and computing power are seen as two other factors currently limiting the potential for wearables.; though Intel's keynote introduced the Edison processor, designed to power this market.

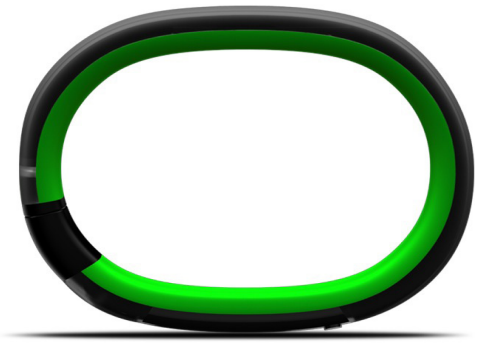
this sector to be $95 million in 2013 and we predict 86 percent growth to $177 million in 2014." He said one in 10 consumers queried expressed interest in purchasing a smart watch.

But smartwatches are doing much more than acting as simply fitness trackers, although some experts believe the smartwatch is still an undefined category. "First, you have to ask — do I need to wear anything?", said NeuroSky CEO Stanley Yang. "If I do, what's helpful? After motion tracking, what do you do with it? Who can design the next wearable technology for the masses with the functions we need?" It could be argued that the difference between a fitness tracker and a smartwatch is hard to parse, since devices from both categories offer multiple functionalities.

Apple, Microsoft and Google are rumored to be working on smartwatches but, in the meantime, there were plenty of smartwatches to try out at CES 2014, all of them with different functionalities. Major CE manufacturers Intel, Samsung, Qualcomm, and Sony all offered their take on the smartwatch. Numerous smaller players have also entered the smartwatch race: Pebble brought its next-gen smart watch and others who debuted smartwatches included Martian Watches, Neptune Pine, Archos, Magellan, E-Fun, and Yifang Digital.

Best Of CES Award Winner is a Wearable

The annual "Best of CES" Engadget Awards honored Razer with the Peoples' Choice Award for its first wearable, the Nabu smartband/watch. The Nabu offers the typical fitness data, sleep data and smartphone notifications



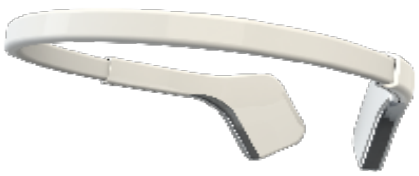
of many other devices, but with a twist: the notification screen is on the top of the wrist, but the actual message appears in a more private screen on the inside the wrist. Nabu also offers a potentially "killer app" with its social media component. On an opt-in basis, users can exchange LinkedIn, Facebook and Twitter information with a mere handshake. The Nabu is also built on an Open API platform and the company is encouraging 3rd party developers by selling the wearable to them for $49. A Razer spokesperson said that "thousands" of developers have already bought the watch; Razer will reveal the exact number and the price of the Nabu within the next few weeks.

The Tipping Point?

It's unclear what will be the tipping point for wearables to enter the mainstream, but fashion and celebrity endorsement is one possibility. Fitbit announced a partnership with fashion designer Tory Burch, who will incorporate the company's fitness tracker into a line of jewelry. The Hong Kong-based Ezio is offering a range of necklaces, brooches and bracelets and French-company Netatmo sells June, a very stylish bracelet that offers sun exposure information. Swiss-made MyKronoz also push the "fashionable" quality of its smartwatches. Several brands are said to be seeking celebrity endorsements.

Digital health is another huge category for wearables as well as devices that can be implanted, ingested or painted on the skin. Intel showcased a onesie that relays biometric information for infants in the crib. A Digital Health Summit at CES 2014 showcased such items as a wearable pulse oximeter, ambulatory blood pressure monitor, and Reebok's CheckLight, a skullcap worn under a helmet to measure head impact in sports. Wearable smart monitors also already play a role in reducing hospital stay time. Singapore's hospitals send their foreign patients home with wearables that communicate important data.

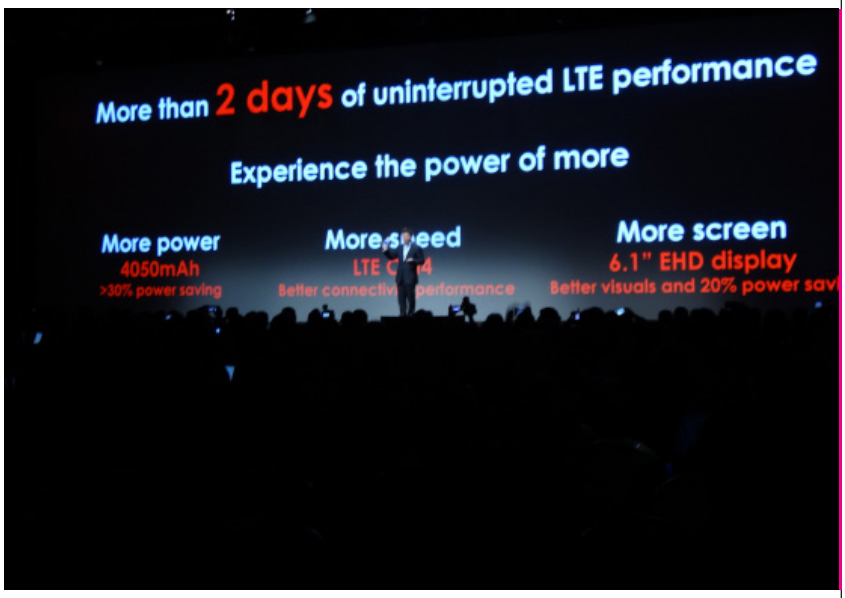
Will wearables play any role in the entertainment industry? Not in the near future, but these devices will almost certainly play, in conjunction with smart phones, distribute and display entertainment content. Whether they become devices that figure in transmedia storytelling applications remains to be seen. Muse, a brain tracker billed as a stress reliever enters the market this spring. An SDK goes to early adopters who surely will figure out novel ways to play mind games.



"What Isn't Your Phone?"

Phone, Tablet, Phablet - Can Be Anything

This year will go down as that in which the phone became the camera and batteries became sexy. Chinese manufacturer Huawei hit a benchmark in both realms, debuting the Ascend Mate 2. The first phone it will actively market in the U.S. boasts a 13MP front camera and Huawei promises it will deliver two-days of non-stop use when it ships Q1. (The 4050mAh battery makes it the first smart-phone to offer "reverse charging," powering other devices). It also offers a 5MP front camera – more than twice that of its top phablet rivals, the Samsung Galaxy Note 3 and the LG G Flex . The Ascend 5MP offers in-camera clean-up (like having a mini-Photoshop onboard), allowing Huawei to cleverly bill it as the ultimate tool for self-reflection.



Another Chinese phone manufacturer, ZTE, pushed "modular mobile computing," quietly showing off its Eco-Mobius concept phone, which will allow users to upgrade specific features – the battery, the process, the camera – without sacrificing the entire phone. Dutch firm Phonebloks last year announced a modular development venture with Motorola Mobility (acquired by Google in 2012). Whether modularity becomes a trend, much less trickles to other devices, remains to be seen (desktop computing is one area of past precedent – where monitors, drives, RAM could all be swapped and upgraded). Some cite the potential for cross-compatibility between CDMA and GSM reception technologies (GSM, cemented by a European industry consortium, is used by T-Mobile and Sprint, while Verizon, Sprint and U.S. Cellular use CDMA, controlled by Qualcomm).

Phones as controllers – driving devices from your car to your home security, videogame players – and receivers (everything from your body's bio-feedback to baby monitoring), these concepts seemed comfortable; a tipping point. Samsung hinted that its new Galaxy S5, which it will unveil in February just before the Mobile World Congress, may include an iris-scanning security feature and will definitely sync to a new Samsung Galaxy Gear smart watch so users can keep up with texts and calls by glancing at their wrists. As the year in which 4G LTE and quad core became standard issue, there wasn't any seismic shift in the mobile handset space. Perhaps the most interesting thing about mobile phones these days is the zeal with which marketers are using it as a means of collecting big data on consumer habits. There is simply no way to go "off the radar" with an active cell phone on one's person, and where you go reveals

Games: Virtual Reality (VR) Is Real and The Cloud is Hot

Oculus Rift, Steam Machines and Sony Now Draw Attention

As anticipated, gaming had a strong showing at 2014 International CES this year powered by Nvidia, a host of Steam Machines, and some impressive new interfaces. Sony made news with an update of its head-mounted display - which in its current iteration appeared to be optimized for immersive viewing of movies - and with a new streaming game service that garnered both attention and awards. Yet the superstar of gaming was the newest prototype from Oculus.

With the focal point of the virtual reality (VR) renaissance, the Rift, edging closer to its consumer release, Oculus was at CES showing off the latest update to its ever-improving 3D head-mounted display. The new prototype, code named Crystal Cove, improves the frame rate and image persistence of its two screens to reduce motion blur.

Crystal Cove also features optical tracking to allow the system to follow where the user is looking and how they are moving through space. And while claims of paradigm altering VR technology have come and gone before, the latest Rift delivers.. Our team experienced the Crystal Cove first hand, and when the final version of the Rift does hit store shelves, the days of playing video games on flat screens may be numbered.

The prototype won six different best in show awards, from organizations like IGN, PC Mag and Wired, despite not being released yet. And as good as Crystal Cove is, the Oculus team still have time to make improvements before its consumer release.

While there are direct competitors for the Rift right now, the closest device is Sony's HMZ-T3Q head-mounted display. The latest version of their display has limited head-tracking and slightly improves the field of view. It was announced amid what Sony President and CEO Kazuo Hirai designated as the company's "year of play." The most interesting of Sony's announcements, however, involve its new game streaming service, PlayStation Now.

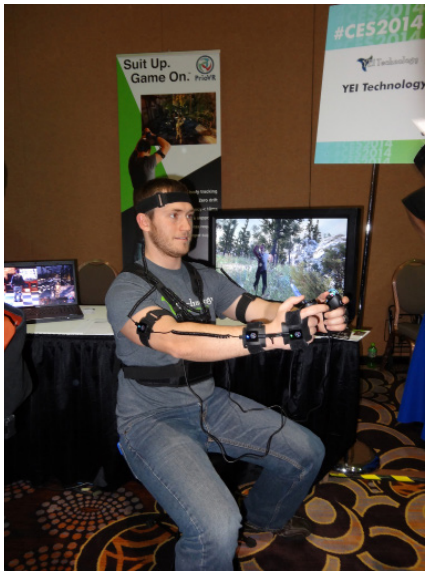
The new cloud-based streaming service provides access to previous generation PlayStation games to users across not only its devices but popular mobile platforms like iOS and Android. The app will deliver content

under a tiered subscription model or users can buy access to individual games. Through this system, Sony has resolved the question of backward compatibility for the PS4 and is leveraging its existing customer base far beyond gaming.

Meanwhile, Oculus wasn't the only company trying to change how we interact with the virtual world. Virtuix showed off its aptly named omnidirectional treadmill, the Omni, as a means of completing the VR experience by enabling full range of motion. The controller, if you can call it that, is a low friction stage that allows the user to stay centered on the device while walking, jumping or even running and translates that motion to in-game movements. YEI Technology, on the other hand, introduced PrioVR, a 17-sensor, full-body motion capture suit, available for under $400. And Tobii showed off its latest eye-tracking device, the EyeX controller.

Not to be left out, Valve made good on its pre-show marketing and announced partnerships for 12 different Steam Machines. What began as a delivery system for synchronized upgrades to popular games, Valve's Steam platform has morphed into a unique software storefront akin to iTunes. Its latest evolution, the Steam Machine, is equipped with a Steam-centric Linux-based operating system as well as gamepads designed to "bridge the gap" between traditional controllers and the mouse and keyboard. Priced between $500 and $5,000, these console-styled PCs are linked natively to Valve's software distribution network and could substantially alter the gaming landscape.

Omni Treadmill for Oculus



PrioVR full-Body Motion Capture Suit

EYE TRACKING FOR GAMES AND IMMERSIVE WORLDS

Tobii Technology and SteelSeries, a leading manufacturer of top-quality gaming gear, announced a partnership to launch the world's first mass-market consumer eye tracking device for gamers. The eye-tracking experts are working with the peripheral manufacturer to deliver a unique controller capable of navigating the virtual world in a more natural way. The technology, which has been used extensively in research and medical applications, suggests a richer, more immersive gaming experience. The eyes are used to signal intent and interest, guide your actions, aim, express emotions, and more. This type of natural behavior can be used to make more functional, yet less cluttered interfaces that can be navigated more quickly and intuitively, for a richer and more immersive gaming experience.

One can also imagine how this could apply beyond gameplay and into immersive worlds, virtual reality and future storytelling where users fully explore and engage in their environments.

One Tobii representative mentioned the core concept behind Tobii's aspirations: "You always need to look first before you do something."

The Connected Car

"The car is going to not only get connected to the Internet, but it's going to be connected to other cars, and it's going to be doing a lot more sensing on what's going on in the environment, and making decisions as to what it's going to do," explained Qualcomm CEO-elect Steve Mollenkopf.

The connected car was in overdrive at the 2014 International CES, with 4G LTE rolling out in a fleet of vehicles. You don't need a phone or tablet to connect these vehicles, they are WiFi enabled and loaded for "infotainment." The cloud is the new VIP parking area for every smart-car, turning autos into digital cockpits.

Google unveiled the Open Automotive Alliance, pushing Android on the open road (much like the Open Handset Alliance promotes Android for devices). Audi, GM, Honda and Hyundai are onboard, and will begin offering things like Siri-enabled "eyes free" capability that allows you to voice-control automotive apps through an iPhone, as well as iOS music integration.

Manufacturers are also building-in their own foundation operating systems. GE is working mainly through its wholly-owned OnStar division, which is implementing a custom AT&T platform that was announced for 10 Chevrolet models coming to market beginning in summer. Customers will be able to connect to the Internet through the WiFi enabled vehicles, as well as download and run apps directly to the car. The line between smart phone and car as "mobile device" is disappearing.

AT&T Mobility President Ralph de la Vega was omni-present, onstage at events hosted by Audi, GM, Qualcomm and BMW that underscored cloud-based connectivity. CES marked the premiere of Qualcomm's Snapdragon™ 602A quad-core processor, designed specifically for the stringent temperature and longevity requirements of the car. Volkswagen and Nissan have agreed to use Intel chips.

Audi also showed-off an A6 Avant "piloted" car (more reassuring way of saying "no driver"!). BMW also had a driverless car, the i3 electric concept car. In a neat twist, it communicates to the Samsung Galaxy Gear smartwatch for diagnostics, auto-activation and security features.

Toyota, which debuted its autonomous auto last year, this outing touted its hydrogen-powered vehicle, the FCV,

which promises to be every bit as revolutionary as the auto-pilot when it hits the market in 2015 at an expected $50K.

As of the introduction of 2015 models later this year, center-stack display screens will be virtually standard issue, although an emphasis on safety has them relegated to voice-activated info functions. The Audi TT was on display, featuring a bold 12.3" screen in lieu of a traditional instrument cluster. The Audi Smart Display system is powered by a range of NVIDIA Tegra chips, culminating with the Mobile Audi Smart Display, a 10.5" screen Android tablet designed to integrate optimally with the car, but the online edge will be extended to other 2015 models including the A3 Cabriolet.

Eight is the magic number when it comes to auto hotspotting for portable consumer devices – functionality built into Audi as well as GM and Ford. To further leverage the car's connected status, manufacturers are rolling out developer kits for content applications and opening app stores.

"The next phase is the car is going to not only get connected to the Internet, but it's going to be connected to other cars, and it's going to be doing a lot more sensing on what's going on in the environment, and making decisions as to what it's going to do," explained Qualcomm CEO-elect Steve Mollenkopf. "In order to do that, it needs to embrace technologies that are very similar to what you have in high-end smartphones".

Links

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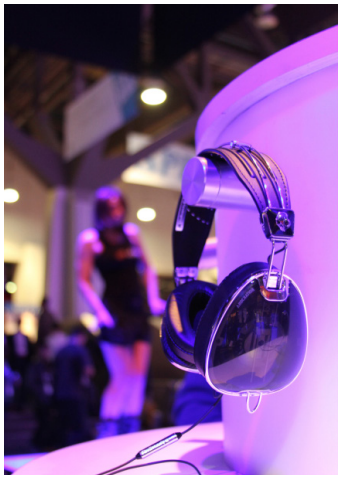
Emerging Tech: WHAT'S NEXT?



High Resolution audio is coming to living rooms and headphones. DTS had the floor jumping with 15.1 sound in its Headphone X.

The S800 EVO is the first fully integrated unmanned aerial platform designed specifically for cinematography and still photography. It includes everything needed for flight, and is all an experienced aerial filmmaker or photographer needs to capture amazing footage and stills, right out of the box.

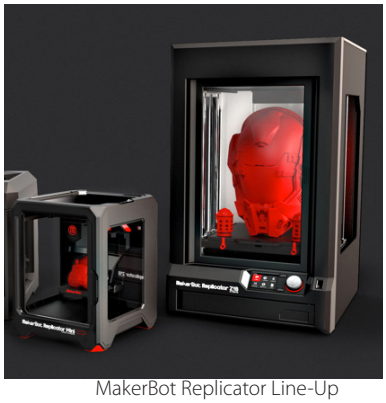
According to Razer: "Project Christine is a revolutionary new concept design that allows users to build and customize PCs in any configuration without any prior technical knowledge. Choose any module on-the-fly in any combination, whether it's the CPU, memory, graphics card, storage or power supply module, and simply plug it in. The PCI-Express architecture of Project Christine automatically syncs the components."

Visit the ETC Photo stream on Flickr for CES from the floor.

http://bit.ly/1mteoJm

Heads Up. Immersive entertainment goes deep with multiple entrants in the head-mounted display category including Sony, above, and Avegant, whose virtual retinal display, Glyph, uses a new, miniature DLP chip to project an image (720p, per eye) directly onto the viewer's retina, eliminating the headaches, eyestrain and nausea that can be associated with viewing immersive, 3D footage.

> THE MOVEMENT TO MAINSTREAM 3D PRINTING IS AGGRESSIVELY PURSUING A SEA CHANGE THAT REPLACES 'EXPERIMENTAL' WITH 'EASY'
>
> Makezine



MakerBot Replicator Line-Up

ChefJet (3D Systems) prints sweets

MakerBot's booth was on the outskirts of the South Hall last year but still drew capacity crowds. This year, the maker industry was present in force with everything from aptly named 3D Doodler to the more traditional rapid proto-typing machines that can get you from idea to working prototype. 3D printing is still in the nascent stage but it holds the promise of printing actual products. One look at the displays and it is clear that the market for collectible characters and model making . has a new digital partner.

> IT'S BECOMING CLEAR THAT HARNESSING THE PHENOMENON IS NOT ONLY ABOUT ATTRACTING AND RETAINING VIEWERS. SOCIAL TV ACTIVITY ALSO CREATES A TROVE OF USEFUL DATA
>
> Business Insider

CES2014 Airtame HDMI Dongle.

SeeAir's InAIR Prototype

While the leading manufacturers showcased their connected, social streaming televisions two crowd financed startups, Airtime, on Indiegogo, and InAir, which launched its Kickstarter campaign at CES, delivered elegant HDMI dongle solutions that make virtually any television smarter. These, plus other entrants, like Hal, a voice and gestural replacement for the remote, are part of a wave of products that enable all of the second screen value without the need for a second screen.

> 75 PERCENT OF ALL KIDS IN AMERICA HAVE EASY ACCESS TO MOBILE DEVICES AT HOME....
>
> Common Sense Media
> Zero to Eight: Children's Media Use in America

Kurio10sAppExplosion

fuhu"s Dreamtab

Fuhu, ranked #1 on Inc.'s 500 list with an astounding 42,148% 3-year growth rate. On the eve of CES they announced a deal with DreamWorks to create a branded tablet and followed with a partnership with Intel. They are hardly alone in the growing field. Kurio, based in Europe, is expanding with a line that includes durable smartphones. So too Leapfrog. One LapTop per Child is now marketing a low priced model for kids. With the tablets come apps and services designed to serve and, hopefully, protect young viewers.

Scenes from The Floor...

01 Intel/Leviathan
Augmented Reality

02 Cisco
The Internet of Everything demonstrated in vignettes

03 LG
The world's largest 3D Video Wall greeted guests

04 Samsung
Presenting the Smart Home

Links

Overview/Summary
- http://bit.ly/1jm4D2B
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- http://bit.ly/1f4qx6Z

Wearable Tech
- http://bit.ly/1aoCANj
- http://bit.ly/1dNoOV1
- http://bit.ly/LD5UUI

The internet of Things/Internet of Everything
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- http://bit.ly/1hK77ou
- http://bit.ly/1jwlM7m

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A Millennial's **Perspective**

by Cassie Paton,
USC Annenberg School for Communication & Journalism 2015
Student Writer, ETC

Smart TVs and appliances, 4K displays, cars with built-in mobile technology and wearable devices are all the rage at this year's CES, and technology-loving consumers are lining up, wallets in hand, to make big purchases. But what's most likely to capture the attention of millennials isn't a 105-inch TV or a refrigerator that can send text messages, but wearable devices that are affordable, stylish and truly convenient alternatives or aides to the smartphones and other devices we already own.

As a millennial in graduate school on a tight budget and with an appreciation for technology that makes life easier, I can attest to the fact that people my age typically require a specific combination of criteria in any device before they purchase it.

For one, a device has to do something my smartphone can't while working seamlessly along with it. Many people wonder if the smartwatch is truly a necessary device when it's essentially the same thing as a smartphone, except with a smaller screen. But the simple fact that a device like the Neptune Pine, a smartwatch created by a 19-year-old college dropout, does everything my phone can do and makes talking hands-free would make me consider purchasing one.

Millennials also want something stylish, even trendy — not some bulky, awkward device on the wrists or face. Hopefully over time, the styles of devices like Google Glass or smartwatches will continue to evolve along with the technology. Fitbit is one wearable device that embraces style and has even partnered with fashion designer Tory Burch to do it well.

Fitness wearables alone are projected to make up a $1 billion industry in 2014 with companies like Fitbit taking the lead. These devices only serve one purpose unlike smartphones or watches, and though it's a product I'd be interested in, the single-purpose technology means I expect to pay less for it — especially if it's trendy and new to the market. Ben Wood of CCS Insight tells The Guardian that the evolution to wearables is a necessary one. "Technology companies are feeling their way in the dark, but we expect innovative features to appear first on wearable devices that will be integrated into smartphones and other consumer electronics devices," Wood said. The article notes that "more than $100m has been invested in wearables through crowdfunding sites, which [Wood] cites as evidence of their huge potential."

And it's true — if there's something that so perfectly meets my criteria of affordability, convenience and style on a site like Kickstarter, I may even be willing to shell out the money ahead of time just to be one of the first to own it. That action speaks volumes about what I think of and expect from the product. After all, we millennials can be picky customers when we have so many options.