SMATRONIC

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Control4

Triad system

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Crestron

TSW-560P touch screen

Crestron has announced that it is now shipping its first portrait touch screen, the TSW-560P, in the EMEA region

Prevent Smart Home Hacks

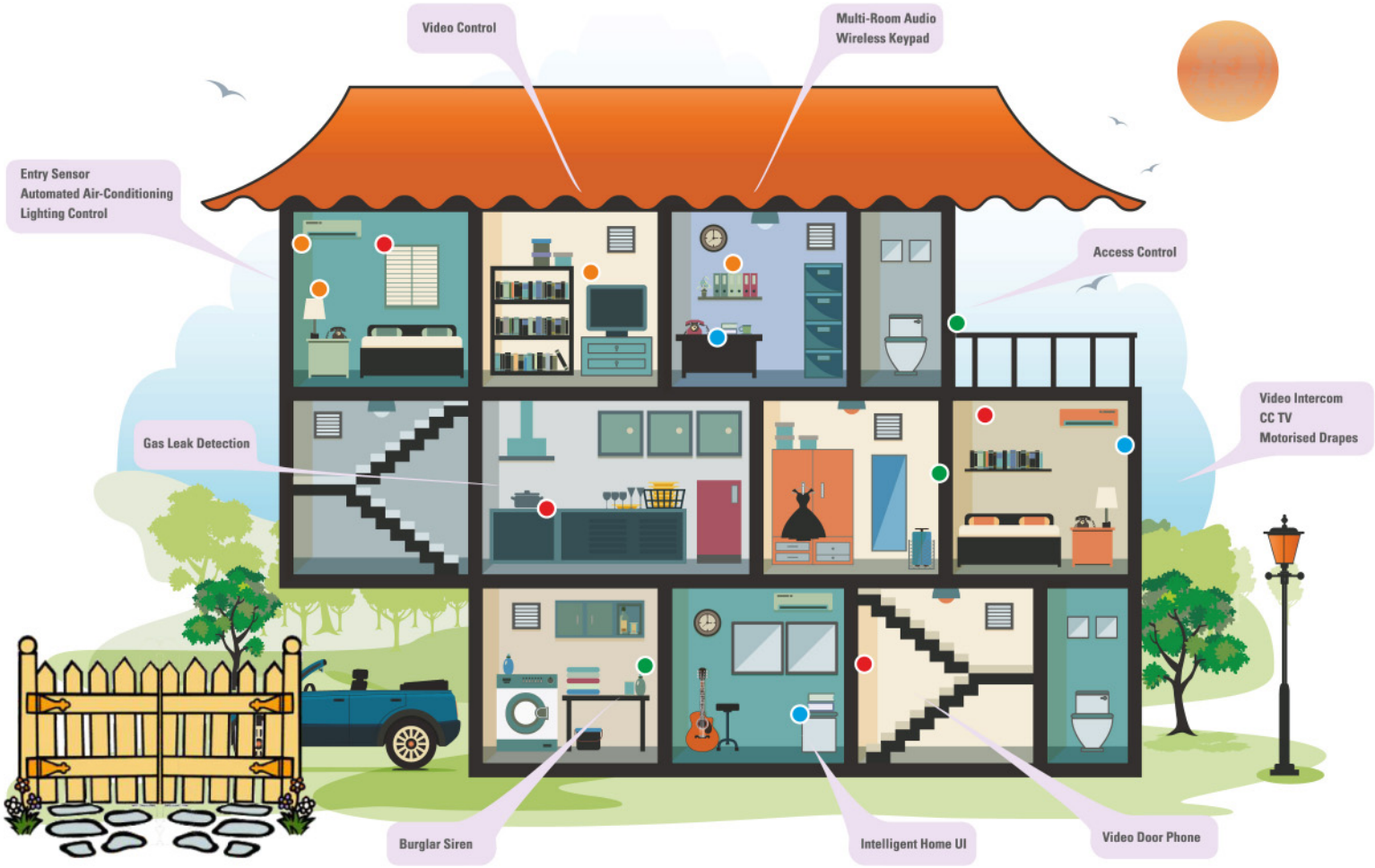
As the smart-home industry grows rapidly — estimates say it may be worth $21.6 billion by 2020— smart home-security alarm systems

This could turn your entire home into a smart home with a simple click

If you have a smart home or are thinking of turning your home into one, you probably know just how expensive and inconvenient it is: either ...

The smart home might finally get some brains

It's great that you can turn down the heat when you're away at work," he says. "But all the intelligence is coming from you. It's not actually smart yet."



One-touch operations and automated Scene Settings

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If you have any questions regarding BPL iQ or wish to get this world-class solution for your home or business, please contact us:

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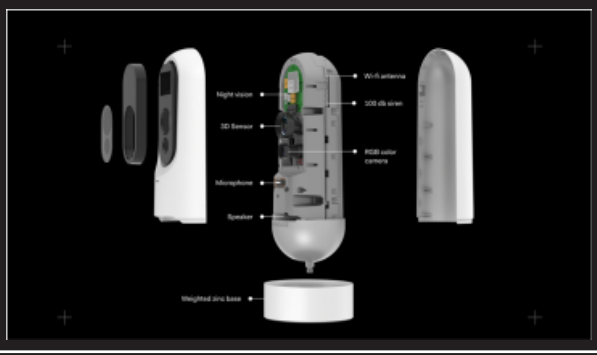

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It's great that you can turn down the heat when you're away at work," he says. "But all the intelligence is coming from you. It's not actually smart yet

ABB launches new wireless home automation solutions

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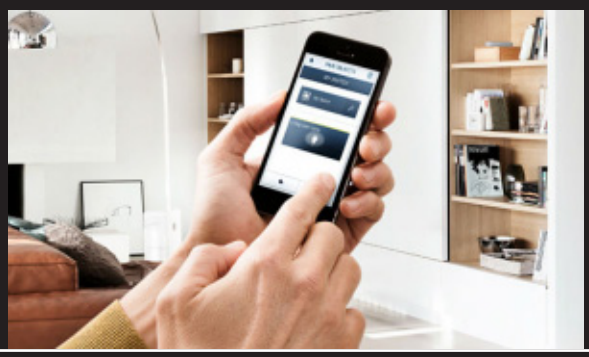
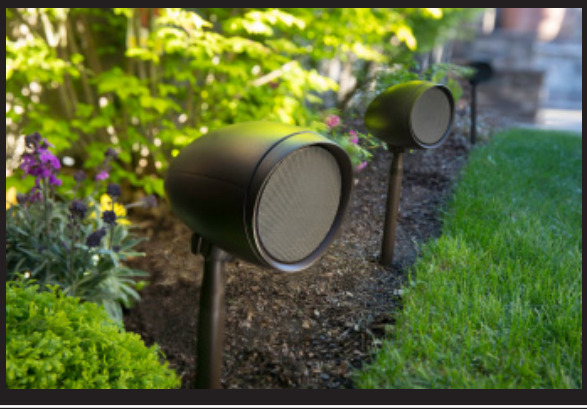
Whilst wandering the halls at ISE 2017 in Amsterdam, Voltimum was fortunate to get a glimpse of some of the new wireless devices added to the ABB-free@home home automation system



Control4 Triad system



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Control4 has introduced its first outdoor speaker range, the Triad Garden Array speakers

Smart Buildings: Giving Buildings Consciousness

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This revolution now comes from the Internet of Things (IoT), a marriage of lighting elements, sensors, software and networked systems that not only promises to save companies enormous amounts of energy but also improve employee productivity, safety and wellness

Crestron

TSW-560P touch screen

Crestron has announced that it is now shipping its first portrait touch screen, the TSW-560P, in the EMEA region.

Launched at ISE 2017 in February 2017,the TSW-560P provides fully customisable control of audio, video, lighting, shades, HVAC, security using controls and icons.

The real-time display supports live streaming video, voice recognition, web browsing, and can also act as a media player in the home.

The touch screen can be deployed into drywall or other surfaces using the included TSW-UMB60 universal mounting bracket. Each display includes an optional security latch for installations in which the physical security of the touch screen is vital.

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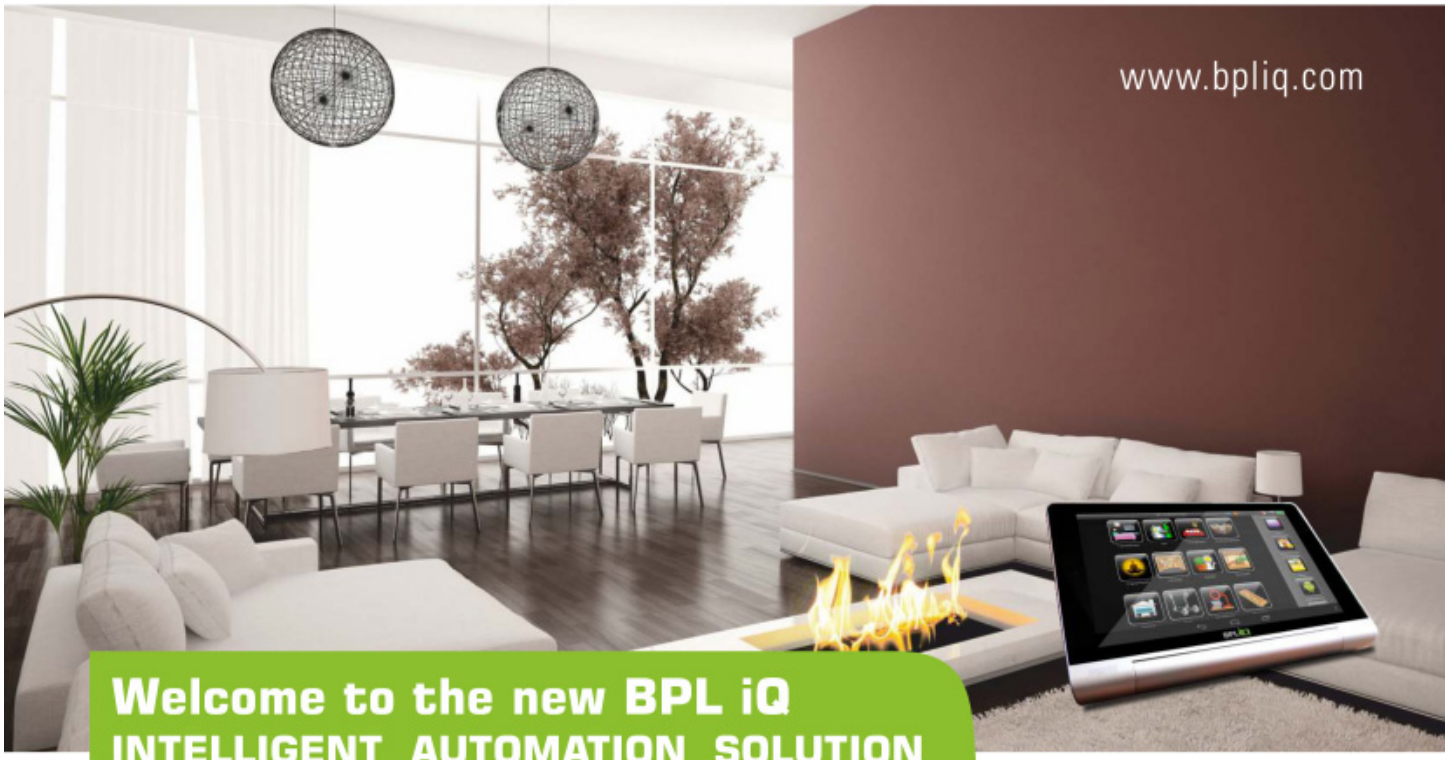


Welcome to the new BPL iQ INTELLIGENT AUTOMATION SOLUTION

Unlike any other automation solution in the world, BPL iQ is complete, intelligent and easy to fit in an existing or a new home. New features can be added on later based on your preferences as well. The solution addresses a variety of aspects related to **Safety, Security, Comfort** and **Convenience**. It is backed by BPL's strong nation-wide service expertise and can be customised to suit different lifestyles and budgets. BPL iQ is an easy, delightful and advanced way of controlling and managing nearly everything with a single touch.

World-class, advanced technology

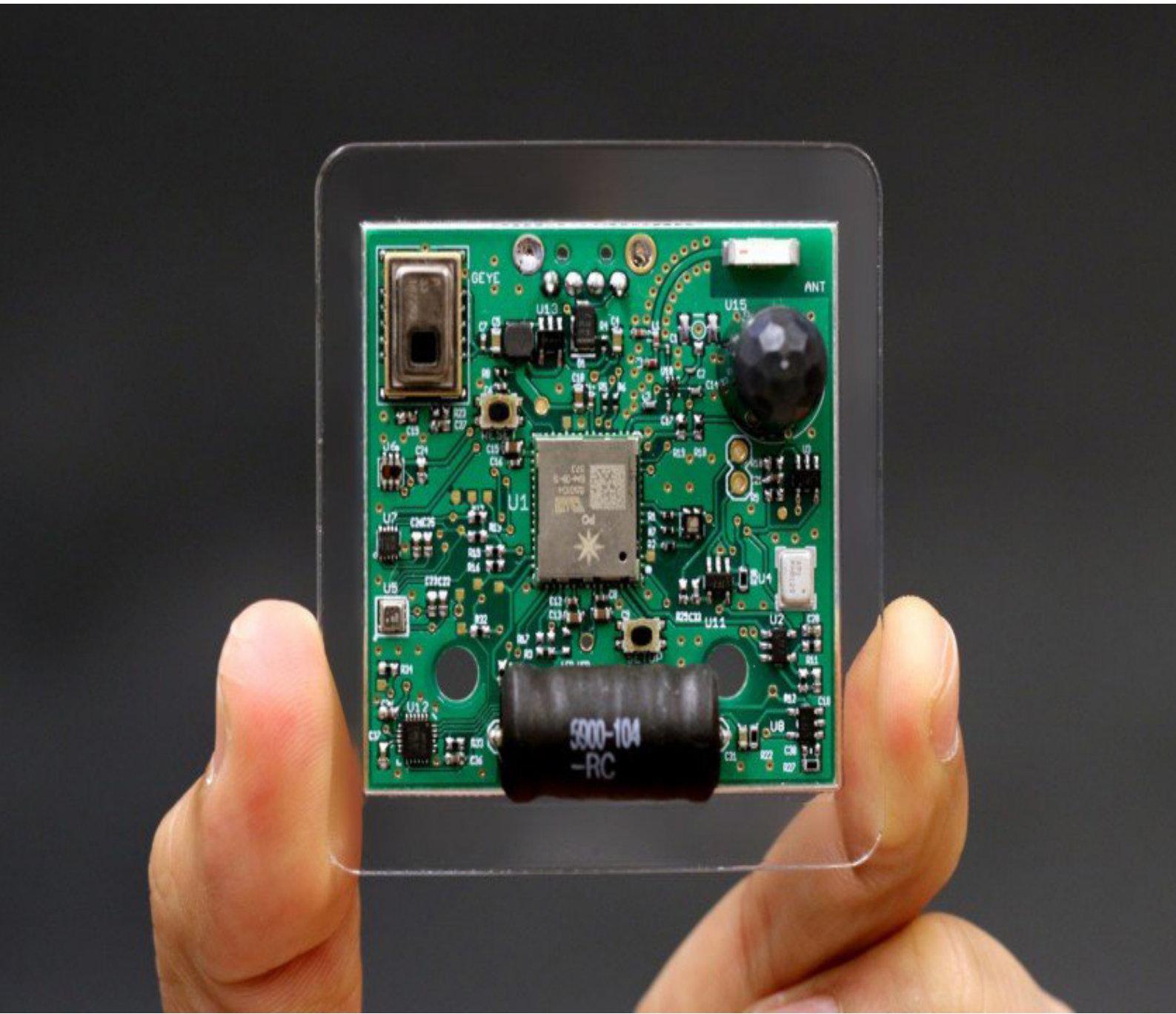
The new wireless BPL iQ Intelligent Automation Solution has been designed and developed by BPL, a pioneer in electronics, at the company's in-house R&D lab after years of research and testing. BPL iQ employs the global standards of latest automation technologies from around the world. Since BPL is a CDN member, part of Cisco Developer Network Program, BPL iQ devices have been tested by Cisco and are Cisco Compatible.

Key technology features

- **Wireless:** India's only completely wireless solution, ideal for retrofit in the large housing market
- **Scalable:** Various configurations made to size, facilitating add-on devices over the years without changing or upgrading the controller
- **Global platform:** A standard compliant platform which adopts latest technologies such as Zigbee, SIP, GSM
- **Customisation:** Ability to tailor solutions as per consumer need
- **Extensible:** New unforeseen features can be developed and integrated at a later stage

This could turn your entire home into a smart home with a simple click

If you have a smart home or are thinking of turning your home into one, you probably know just how expensive and inconvenient it is: either you have to buy brand-new Internet-connected smart home products (which, as explained in the video, don't even communicate with one another effectively), or you have to tag every item with an aftermarket sensor (which could get ugly really fast). So how do you create a smart home that's a truly connected network in a convenient and affordable way?



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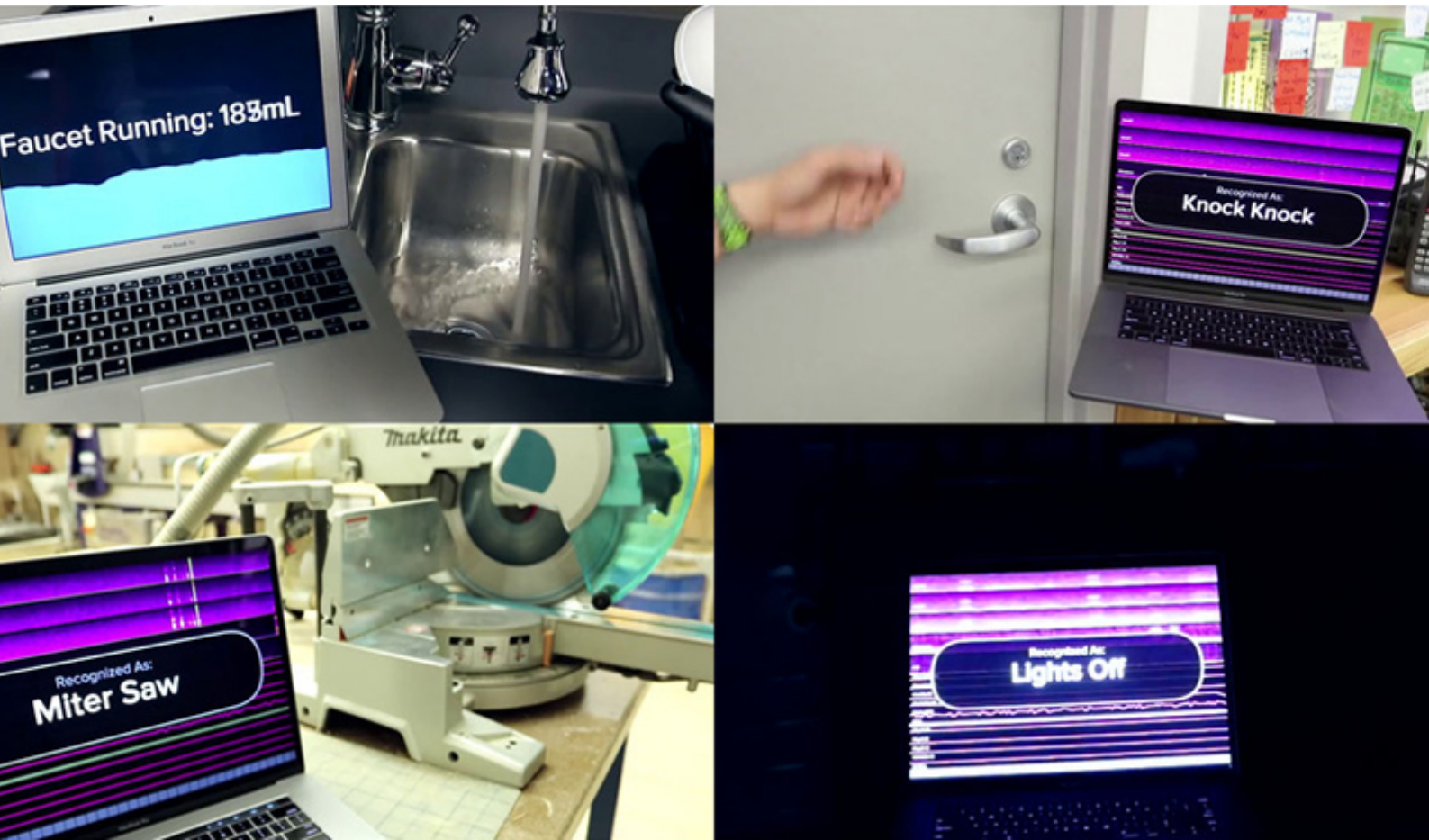
Well, researchers at Carnegie Mellon might have an answer: called Synthetic Sensors, what the researchers have developed is a prototype of a future hub that can track and monitor every activity in a given area. There are a dozen sensors that measure things like radio interference, electromagnetic noise, motion, illumination, humidity, acoustic, and vibration built right into one product – all you have to do is plug it into a USB wall port. As the video explains, the researchers deliberately did not include a camera due to privacy issues.

A single sensor board can use the array of advanced sensors it has to detect what you are doing: whether you are using the sink, the blender, the stove, etc., each activity creates unique sensor signals. Using machine learning technology, the sensor board essentially takes those signals to translate them into human activities. The result is that you can monitor what's going on inside your home on any portable device.



The data is never sent to the cloud but featurized inside the sensor board, which helps to anonymize signals before transmission according to the researchers. The possibilities seem endless: these applications can be taken even further to be fed into what they call second order synthetic sensors, which can capture higher level semantics like tracking not just whether you're using the water or not but *how* much water you're using.

The biggest drawback is that while you can track various activities with the sensor board, unlike IoT home appliances, you cannot control them remotely.

The biggest drawback is that while you can track various activities with the sensor board, unlike IoT home appliances, you cannot control them remotely. So, for instance, the sensor board might notify you that the faucet is still on, but if that faucet is not a smart device, you will have to manually turn it off.

Again, the Synthetic Sensor is a prototype, meaning you probably won't see it commercially available anytime soon, but it certainly offers a unique (and probably more affordable) alternative to how we currently define a smart home.

Prevent Smart Home Hacks

As the smart-home industry grows rapidly — estimates say it may be worth $21.6 billion by 2020— smart home-security alarm systems, security cameras, baby monitors and other devices that rely on apps and web portals are becoming more commonplace.

While internet connectivity for home devices may be convenient, it's not so great for security, as "smart" gadgets can be hacked much more easily than their "dumb" predecessors.

There are a few tried-and-true gadget-hacking methods that form the basis for most smart-home security attacks. Here's a closer look at various attack types, as well as examples of how they've been implemented, and what you can do to prevent them.

Signal interception

Wi-Fi- and Bluetooth-enabled devices use wireless signals to communicate. Hackers with the right tools can easily tap into those signals, and — if the transmissions aren't encrypted — use them to take control of the system in question. In 2014, security researchers demonstrated that intrepid hackers could easily monitor several popular professionally installed home security systems. Using cheap SDR devices — software-defined radios that are essentially TV-tuner dongles plugged into laptops — they could capture unencrypted transmissions from alarm sensors and control pads. Once those signals were captured, the hackers could easily use them to direct the home security systems.

How to avoid it

If you're committed to the features of professionally installed wireless home security, you can avoid some vulnerability by investing in a recognized name-brand home security system with good customer reviews. Additionally, look for a system that emphasizes encryption. Any data sent — no matter what the method — should be sent securely to avoid interception.

Software loopholes

the name of convenience, many smart security devices open up their apps' design elements to developers. Although there are a few payoffs of providing such open developer access, there are downsides, too.

"Customizable apps do give users access to more extensive functionality," said Carson Ward, a web developer with Fractal Media in Utah, "but they also set the stage for security weaknesses."Systems that allow you to open a smart lock through an app, for example, don't always have security locked down. Many of these security-system apps also allow third-party app developers to make and sell compatible apps, and some of those apps create the perfect environment for easily breached loopholes.

Researchers at the University of Michigan found that 40 percent of nearly 500 apps written by third parties for the Samsung SmartThings platform could easily be accessed because of small design flaws in the apps' codes that allowed too much access.

How to avoid it

If you're adding a smart lock, or any smart device, to your home-security arsenal, look for a model that regulates third-party access, Ward suggested. Additionally, he advised users to keep up with software and firmware updates released by device manufacturers, as those should help patch any gaping holes in the code.

Physical tampering

Even the most high-tech security devices still have physical weaknesses. If they're easily moved or reset, these devices could act as gateways into private digital information.

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In 2016, security testing company Pen Test Partners discovered a big vulnerability in the Ring Video Doorbell. The device's setup button created a Wi-Fi access point, and the setup button could be accessed if someone removed two screws and pulled the Ring Video Doorbell from its mounting bracket.

Once the setup button was pressed, a hacker could access the doorbell's own Wi-Fi network, and then check the settings to find the normally connected home's network name and password. Ring fixed the issue, but this wasn't the first attack of its kind on smart alarm systems, and it won't be the last.

How to avoid it

Invest in products that can't be moved or detached without some effort, especially with products that are placed outdoors, and opt for a professional installation if you don't trust your own setup skills. Regardless of whether you end up with a device that has physical weaknesses, make sure to keep the firmware updated.

Password cracking

A weak password is an open invitation for unauthorized access, and hackers are always eager to RSVP. Once a thief cracks a device's passcode, he or she can potentially take complete control of the gadget.

If you've watched local TV news in the past few years, you've probably seen a story about hackers terrorizing nervous parents by speaking to children through baby monitors. Such security breaches are often made possible by unchanged default passwords.

Always check the history log, if possible, to double-check who has accessed your device. Register the monitor with the manufacturer so you can be notified of any software upgrades and required updates.

internet outages of October 2016, which made it hard for users to reach major sites such as Twitter, Amazon, Netflix and Tumblr. Hackers used malware to attack thousands of devices connected to the internet, including security cameras, to overwhelm Dyn — a company that provided domain-name system (DNS) service, a central piece of internet infrastructure — with a flood of traffic.

Security experts warn that these kinds of attacks, known as distributed denial-of-service (DDoS)

Malware attacks

Because smart-home security devices connect to the internet, they're vulnerable to some of the millions of pieces of malware drifting across the web.

Mass infection of Internet of Things (IoT) devices is what caused the widespread attacks, will become increasingly common in the age of IoT.

According to Richard Meeus, vice president of technology at security-solutions company NSFocus, "DNS has often been neglected in terms of its security and availability," meaning that there are still significant vulnerabilities in current internet structuring and regulation.

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How to avoid it

There's still a lot of discussion around how to regulate security protocols for smart devices, especially for devices whose internal settings are difficult to access or change. However, by following best practices around IoT devices, such as installing a firewall on your home network and updating a device's default network names, you can lower the odds of a breach. You might also consider one of the new devices designed to protect IoT devices, such as the Bitdefender Box or the Norton Core.

Bottom line

More than 25 billion devices will be connected to the internet by 2020, according to a report by Gartner market analysts. If smart-home tech is part of your security strategy, make sure you tighten up on safety measures as much as possible.Partner with a trusted home-security company that offers reliable technology, and add your own layer of security — by using network firewalls, strong passwords and reliable installations — to protect yourself from home cyberattacks.

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Various Standards in the industry - ISO, IP ratings, CE, UL, LEED certifications

Technical Drawings & Documents - Project Specification, Scope of Work, Datasheet, Connection Details, Drawings, Schematic Diagrams

Industry Work flow details - System Designing Process & Technical Documentation, Project Management, Installation & commissioning process, Project Handover.

Low Voltage Systems

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The Next Big Opportunity

for Tech Entrepreneurs? 'Smart' Homes

The role of technology in the home has changed drastically in recent years. We've come a long way from the kitchen wall phone and desktop computer, in an era when smartphones, tablets and wearables dominate the scene. The newest wave comes from the internet of things (IoT), and today's offerings are raising the bar on what makes a device "smart."

This Company Wants to Make Your Dumb Fridge Smart

Increasingly, "smart" means safe, in terms of security and health. Joe Colistra, architect at the Center for Design Research at the University of Kansas, was recently profiled in The Atlantic on his vision for a smart home that safeguards occupants' well-being. Such updates include motion-sensing walls and force-detecting floors that notice walking problems in senior citizens. Another update: "smart toilets" that analyze biochemistry and report to doctors on the user's health.

With technology redefining home life in these ways, now seems like a ripe time for entrepreneurs to get in on the action. But, with the new terrain comes unforeseen pitfalls, so those looking to make that leap would do well to watch where they land.

The pitfalls possible with "smart" homes

Soon we will expect more and more from our homes in terms of safety and health monitoring, energy efficiency, convenience and other domains. But the path to success for entrepreneurs requires the safe navigation of some new terrain.

Take those smart "healthy homes," for instance. More than any group, seniors would benefit, but they aren't typically early adopters. Many will be reticent to install the sorts of sensor technology necessary — not because of cost, but because of security.

And there's good reason for that: It's already bad enough that our webcams could be spying on us; we surely don't want our entire houses to be informants to some unseen hacker or corporate bad actor.

Smart home artifical intelligence needs to be designed to recognize uncharacteristic network traffic from every connected device in a home, acting as a tipoff for bot network shenanigans. Luckily, that's not difficult: It's instilling the "security first" mindset into developers and entrepreneurs that takes the most effort.

For those who can establish the right approach to security and data sharing — and back it up with truly innovative and robust practices, there is a tremendous future ahead.

The opportunities smart urban dwellings present

With an explosion of population growth, tech offerings such as robots, IoT devices and energy-efficient updates will be important ways the economy and infrastructure can support society.

Related: Moving Forward: Building a Smart Digital City in Qatar

Consider my own company's home base of Miami. With the Port of Miami getting a $2 billion expansion, and once a multibillion-dollar expansion of the airport is complete, the city can expect even more travelers and commerce in coming years. But that influx will ultimately increase the human density in downtown areas. The city's residences and businesses will not be able to effectively handle that increase without IoT and better automation.

Entrepreneurs should take note: Big problems present even bigger opportunities, and Miami in particular is blooming with exciting new tech in this sector.

Thankfully, these opportunities for smart living spaces are already on their way. The Muse Residences in Sunny Isles Beach, condos designed in collaboration with Deepak Chopra, and scheduled to open this year, will feature facial recognition, robotic parking, features for optimization of our sleep cycles, window shades that adjust to the sun's brightness and other aspects that promote overall wellness.

These improvements are reshaping workspaces, as well. Miami real estate entrepreneur Matthieu Merchadou Melki has created Art of Miami, a studio design firm, working with Mana downtown and local authorities to develop smart environments for buildings, thereby providing entrepreneurs a more effective shared space.

The firm will include prototyping labs and VR/AR labs that will allow companies to prototype on site while enjoying support, special access to funding for their startups, introductions to lenders and access to other smart development startups for collaboration.

Riding the future wave

The tide is already coming in for these smart living developments. For entrepreneurs looking to be part of this movement, these few steps will help lead to smoother sailing:

1. Leverage the protective instinct. From parents with young children to businessmen concerned about elderly parents when the latter are travelling, people worry about their loved ones' safety. And, with threats such as the Mirai malware which turned IoT devices into unwitting accomplices in large-scale attacks, nailing down security concerns should be at the top of any entrepreneur's list.

Apps have worked in this space for some time, but there's a lot of room to grow. So, entrepreneurs can "do well by doing good" and focus on smart home products that keep occupants safe — including safe from the products themselves.

2. Seek innovative architects and industry experts. Integrating smart-home technology starting with the design phase is much easier than is retrofitting. Often these architects, such as the late Zaha Hadid, are known for their breakthrough designs, and their names increase trust from homeowners.

Likewise, chances are that you may not understand the housing or development industry if you're a tech entrepreneur. Imagine selling thousands of square feet of "smart flooring" to contractors, only to have it returned because it doesn't match the city's code where the contractor is located. To avoid this problem, get those who know the ropes of the home development game in your corner from the get-go.

3. Consider a licensing-based business model. Housing is heavy on regulation, requires you to hold inventory and puts you up against entrenched players who know the game better than you ever will. Instead of playing on this uneven field, consider patenting a product and then licensing it or generating royalties from it. This allows all the innovation and profits, with none of the hassles of the housing market.

Google just launched a service, Google IoT Core, which allows startups to connect all IoT devices to a single cloud layer. It only collects data from these IoT devices — it doesn't offer a way to build applications that leverage AI or trigger actions.

But by adding in a layer such as Losant, it's fairly easy to complete one-off AI tasks, such as connecting to IBM Watson's API to perform speech-to-text. This approach allows the company to get into the game from a safer regulatory distance.

Everyone wants to live a healthier and longer life, but the last thing the world needs is more snake oil preying on people's fears. Fortunately, there's no shortage of legitimate applications for this technology.

Related: Is Apple Losing the Smart Home Battle?

The time of the smart dwelling is upon us. Soon, many of us will be living this way and benefiting in terms of healthier lives. But those entrepreneurs who start now may benefit most of all. Are you up for the challenge?

COMPLETE HOME AUTOMATION SOLUTIONS

We live in stressed out times.Smart living calls for intelligent solutions that puts us in control, be it at home or workplace or even in public spaces and facilities.BPL also have a whole range of surveillance system that can keep a watchful eye on things because you can't be present everywhere at any one time.

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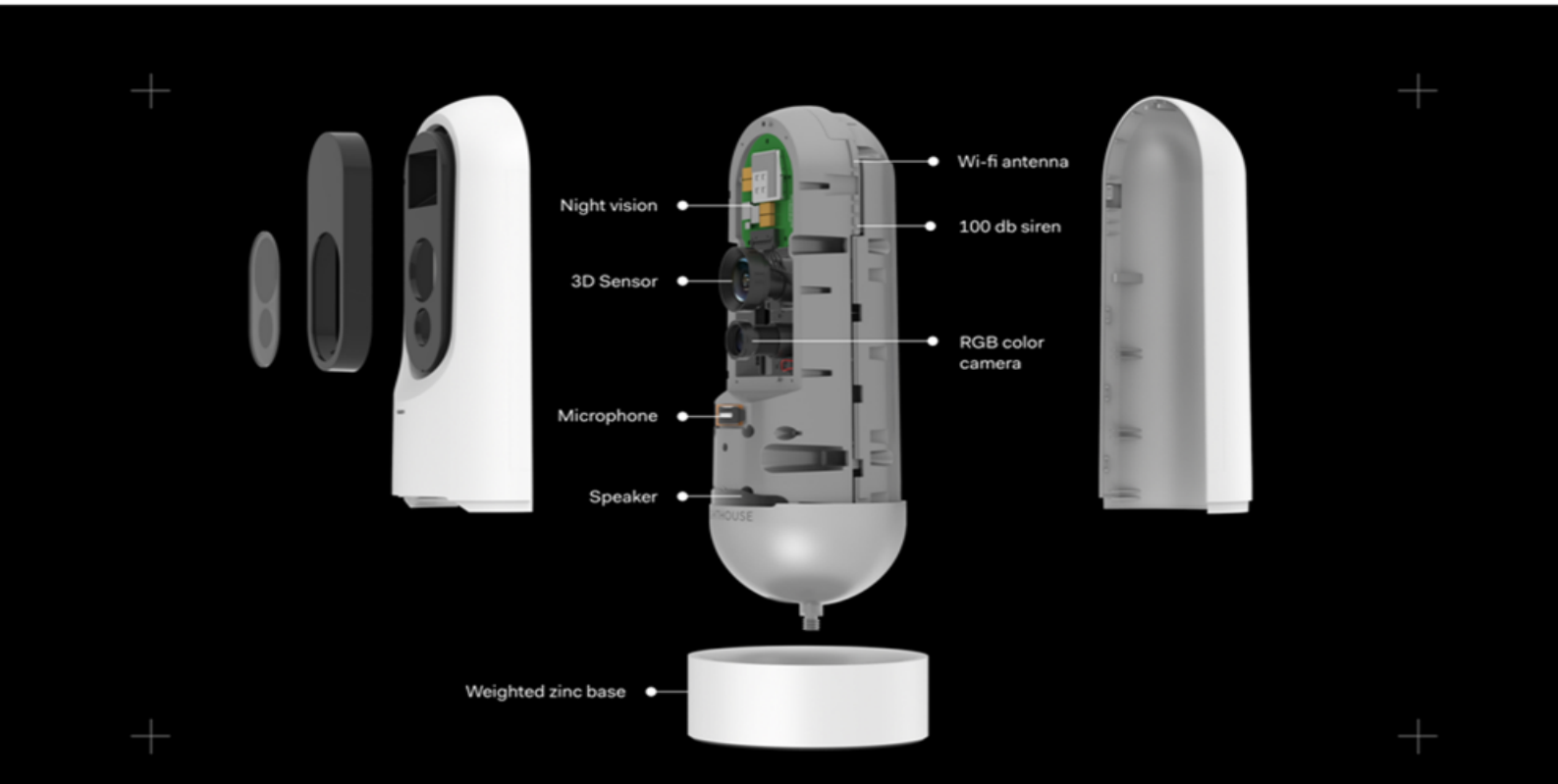
BPL has been pioneers in intelligent automation systems that connect the dots and put you in control. At home we can connect all your gadgets and equipment so that you can command everything at the touch of a fingertip, and enjoy life without getting hassled. You can do that in your workplace too. BPL also have a whole range of surveillance system that can keep a watchful eye on things because you can't be present everywhere at any one time.

The smart home might finally get some brains

It’s great that you can turn down the heat when you’re away at work,” he says. “But all the intelligence is coming from you. It’s not actually smart yet.”

Teichman is CEO of Lighthouse, a startup out of Android cofounder Andy Rubin’s Playground incubator. The company has redesigned the home-security camera to include similar 3D-sensing technology as self-driving cars, coupling that with artificial intelligence to make sense of what’s happening. The chosen tech isn’t random—Teichman got his PhD working at famed Stanford professor Sebastian Thrun’s self-driving car lab, and his cofounder HendrikDahlkamp was the first Google X engineer and a DARPA Grand Challenge winner.

Lighthouse’s guts. (Lighthouse)



The company's first product, called the Lighthouse interactive assistant, can not only detect who's at home but also what they're doing—running, walking, opening a door, or waving to the camera. Users can also give out complex commands, like "Let me know if the kids don't get home between 3pm and 5pm," and Lighthouse will understand and act accordingly.

This is the brain that the home has been missing, Teichman says—an assistant you can ask to check in on your home while you're away or can proactively give you a heads up when something goes wrong.

Consumer technology companies have been chasing the smart home for years, but the idea really became possible in 2010 with the founding of Nest. Former Apple engineers Tony Faddell and Matt Rogers built the company's flagship thermostat to automatically learn owners' preferences—a relatively simple task of coordinating temperature and time.

Since then, the most successful smart-home gadgets, like the Philips Hue bulbs and Belkin smart plugs, have mainly been controlled remotely rather than with intelligence. When devices are set based around the specific time you want to get up or go to sleep, they fail when things don't go according to plan.

Lighthouse is focused on letting you keep tabs on your home when you're away, but the technology could have important implications when you're inside as well. A device that can trigger actions because it understands action and intent is inherently more powerful than a device that works on a timer. It could theoretically alert police of an intruder or see that

you're walking into the bathroom with a towel in the morning and activate your coffee machine with equal ease. Perception and understanding are the answer to everything the smart home today can't anticipate.

It also raises inevitable privacy concerns. Lighthouse says it doesn't look at any video inside its customers' houses until specific files are actively shared by users with the company. But AI needs data to get better, so Lighthouse also runs a beta program, where testers consent to their data being used in return for early access to new features and some input into features they'd like to have.

Putting an internet-connected camera in your home might have seemed ridiculous a few years ago, but the security-camera market actually accounted for 61% of all home-automation revenue in 2015, according to research from NPD. That means Lighthouse is entering a crowded market, with competitors ranging from startups like Canary to Alphabet, which now owns Nest. Those products typically rely solely on cameras rather than the photoelectric sensor used in Lighthouse, which also allows night vision. Rather than having to calculate the shape and distance of objects from video, the sensor bounces its own invisible light off objects to gauge that directly, giving better data for the AI to then understand what it's looking at.

And that, Teichman says, allows for nuance that other smart-home cameras can't achieve today.

"It understands the 3D environment,'" he says as he describes how Lighthouse processes an unknown person in a house. "'Oh hey, there's something new here. I don't understand what this is, it's physically large enough that it might be a person, I better tell someone about this.'"

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- Music and TV while you bathe
- Touch-free WC & taps slow the spread of germs

KIDS BEDROOM
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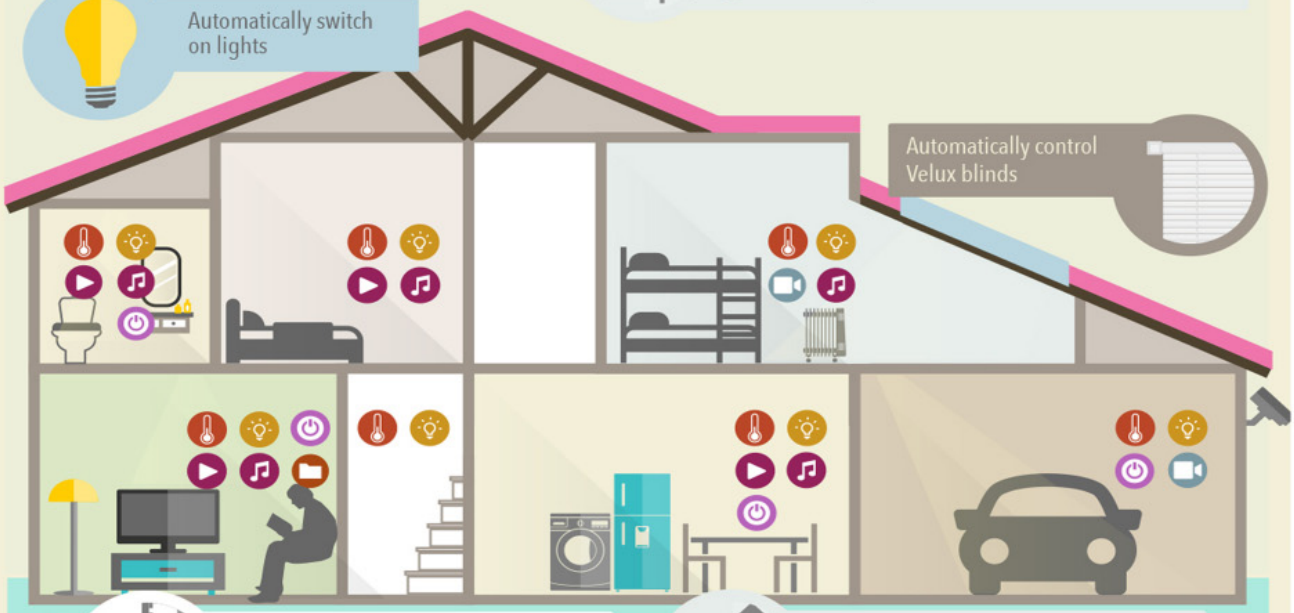
- Monitor baby with an automated camera

Automatically switch on lights

Automatically control Velux blinds



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LIVING ROOM
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- Cinema style surround sound from integrated speakers
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- Store valuable video, music, pictures and data on a home media server

GARAGE
- Garage door raise automatically
- CCTV helps to protect your home

ABB launches new wireless home automation solutions

Whilst wandering the halls at ISE 2017 in Amsterdam, Voltimum was fortunate to get a glimpse of some of the new wireless devices added to the ABB-free@home home automation system.

Until now, ABB-free@home has been, predominantly, a wired system, with sensors and actuators communicating via a 2-wire bus line. The system can be commissioned to control blinds, lights, heating, air-conditioning and door communication systems in a client's house with control achieved using an app, logic functions and voice commands.

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Various Standards in the industry - ISO, IP ratings, CE, UL, LEED certifications

Technical Drawings & Documents - Project Specification, Scope of Work, Datasheet, Connection Details, Drawings, Schematic Diagrams

Industry Work flow details - System Designing Process & Technical Documentation, Project Management, Installation & commissioning process, Project Handover.

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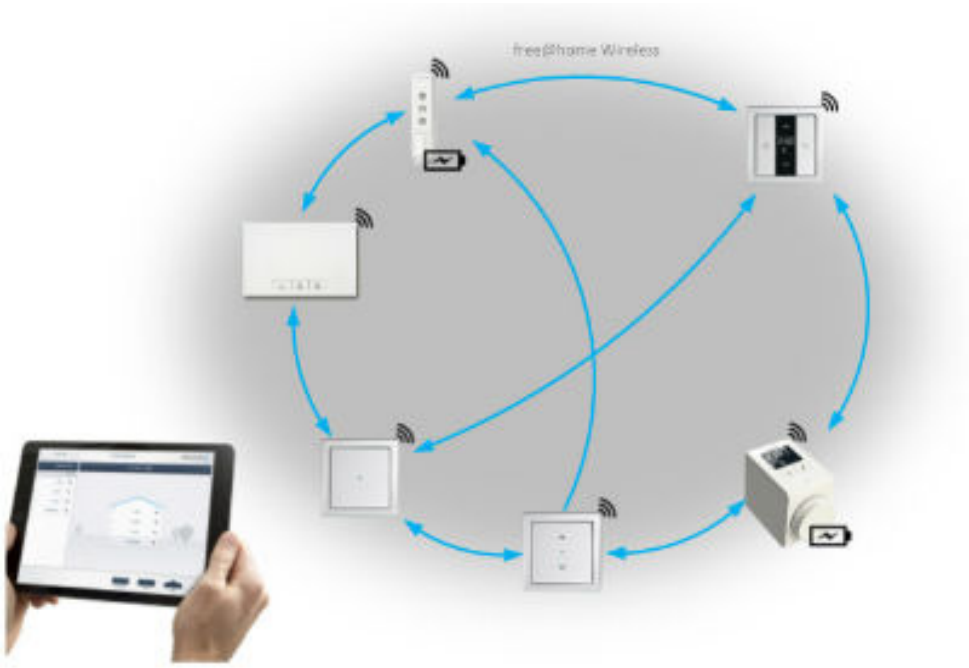
Communication between the new wireless devices is achieved via radio frequency and offers the same level of functionality as the wired ones, removing the necessity of connecting a bus cable which can be intrusive for clients in retrofit scenarios. The commissioning of all components is conducted through the same interfaces used with the wired system – either through an ordinary web browser or the ABB-free@home App.



Together with existing wired components of ABB-free@home, the new wireless devices form a seamless system: The new wireless products can either be installed completely independent or combined with products that require a bus cable to create a mixed installation.

The benefits of mesh networking

A challenge facing all installers of wireless home automation systems is to ensure that all components in the system can reliably communicate with each other. this is particularly problematic in larger properties, especially across multiple floors.

ABB have addressed this challenge by incorporating a mesh network topology.

Every free@home wireless device with a mains supply is designed to automatically work as a repeater, extending the coverage of the wireless network to its maximum ensuring that even the switch on the last floor is reached and executes its commands appropriately and reliably.

In a mesh network, all participants communicate with one another. Either directly, if they are within range, or indirectly (via another or several other nodes) if they are not. The free@home network uses a routing process where the system automatically determines the most efficient way to send a message from one point in the network to the correct receiver. This process is implemented on an ongoing basis so that the system can also react to subsequent changes e.g. in the event of individual devices failing, new devices being added or constructional changes that impair the reception.

Control4
Triad system

Control4 has introduced its first outdoor speaker range, the Triad Garden Array speakers.

Following the acquisition of Triad Speakers in February, Control4 and Triad have launched its first all-weather audio offering for a variety of outdoor settings.

Incorporating a subwoofer (GA10 SUB) and satellite speaker (GA4 SAT), the series' speakers feature Triad's Ultra-Broad Dispersion (UBD) driver technology for a 150-degree field of coverage, with the subwoofer providing bass. A single system can size for a small patio or an estate garden.

Users can stream playlists via the speakers, and use a broader Control4 system to control music selection, volume or mute the audio from an outside setting.

The sub has been designed to be buried underground using Triad's optional underground kit, which only shows its small mushroom port above ground, or it can be installed in an outdoor space as a freestanding, down-firing subwoofer using the optional foot kit.

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The GA4 SAT is shaped to resemble landscape lighting and blend into flower beds and gardens or mounted on walls or trees with a full range of motion. The GA4 SAT comes with 18-in mounting posts, ground stakes, and silicone wire nuts, with a standard 3/4-in conduit for installation and maintenance. The GA4 SAT is compatible with 8ohm, 70V or 100V systems.

The Triad Garden Array series is available now in various options through Control4 and Triad dealers worldwide. Each product comes with a 3-year warranty.

Smart Buildings: Giving Buildings Consciousness

Courtesy

Aniruddha Deodhar, senior manager, IoT Solutions

More than 130 years after Edison's bright idea transformed society and workplace productivity, lighting technology is being revolutionized. This time, it's not just about bulbs. The transformation, in the words of one lighting-technology executive, "will give buildings consciousness."

This revolution now comes from the Internet of Things (IoT), a marriage of lighting elements, sensors, software and networked systems that not only promises to save companies enormous amounts of energy but also improve employee productivity, safety and wellness. The data being harvested from these IoT systems also are creating other efficiency opportunities within enterprises that recently were either difficult or impossible to imagine. For example, location based services that send employee location to these connected lighting systems help optimize space allocation and utilization, thereby saving thousands of dollars on real estate rent, something that is currently being installed at ARM's Cambridge HQ.

This kind of opportunity was something John Osborne envisaged when he became ARM's U.S. head of property in 2015.

Old building, new life

Osborne walked through ARM's 32-year-old San Jose building, which the company had occupied for a decade and saw a chance to have ARM drink its own IoT Kool-Aid, to leverage its technologies that make workspaces smarter.

Lighting in ARM's San Jose offices were typical of many offices sprung around the world in the past 20-30 years—fluorescent lighting that could be turned on or off at set intervals, through simple sensors and lighting controls. But advances in electronics, semiconductor and wireless networking technology now enable vastly more intelligent, cost-effective and interactive lighting automation. Lighting and thus

spaces can be managed far more effectively, giving managers insights into traffic flows, occupancy trends, indoor environmental quality (temperature, humidity, daylight) there by reducing operation and maintenance costs, slashing energy bills and improving employee productivity.

"If you want to know what's going on in a building, there's no better place to do that than to watch from the top down," said Sanjiv Kaul, EVP, Marketing, Enlighted. The eight-year-old Sunnyvale, Calif., company uses ARM IP in its smart-lighting IoT technology that ARM deployed in its San Jose building. The company is so passionate about the business that its chairman and CEO, well-known Silicon Valley executive Joe Costello, likes to say "we give buildings consciousness."

The opportunity to transform the world's largest asset class (commercial buildings) is vast. Worldwide, there is an estimated 400 billion square feet of commercial office space, a quarter of that in North America. In the United States, 2-3 billion square feet of new commercial space is added each year, Kaul said. Buildings are responsible for a large portion of a country's GDP. In the U.S., building operations contribute around $235 billion to GDP, support 17.5 million jobs and generate $67 billion in new earnings, thereby contributing to around 30 percent of the economy. Higher-performing buildings have been found to increase lease rates, improve occupancy rates and net operating incomes, and lower capitalization rates thereby leading to higher resale values.

The whitepaper: "Intelligent buildings: For smarter, healthier, more productive people" (ARM, 2016) on details describes many of the motivations for making buildings smarter as well as how technology helps address many of the barriers to doing so.

The $100-plus billion lighting market lends itself well to being a great platform to help make buildings more intelligent According to the Boston Consulting Group (BCG), 25 percent of all luminaires by 2020 will be 'smart'.

Illuminating upside

Osborne sat down with Enlighted, one of the disrupters in connected lighting, and IOEnergy, which helps architect and install such systems to get a sense for cost, time commitment and payback. The expected returns justified the investment, according to Osborne. What's more, Osborne was able to take advantage of utility incentives that shaved another 25 percent off the payback period.

Over a couple of weeks, workers installed hundreds of sensors in our San Jose building. The lights themselves were upgraded from relatively efficient 28w T5 fluorescent elements to even-more-efficient 13w LEDs.

Each node is hardwired into the lighting fixture for power and connected peer-to-peer by a version of IEEE wireless standard 802.15.4 back to a series of gateways. One gateway can handle 50-100sensors.

"These are basically minicomputers," each collecting bits of sensor data 65 times per second, said Danny Krueger, CEO, of IOEnergy.

This networked technology—completely programmable—allows building managers to control everything from areas and rooms down to individual lights. Lights in the San Jose building change brightness based on occupancy in the spaces below them and the amount of ambient light streaming into a space from outside (known as daylight harvesting). The system is extensible based on the services a company wants.

Untapped potential

The value of such systems extends far beyond savings on lighting, which generally are 20 percent of a building's overall energy costs (HVAC being 40 percent).

Switching to LEDs in and of themselves saves not only on energy but also maintenance costs. This is because the replacement cycle of the bulbs, which last upwards of 15 years is four times longer than fluorescents and 10 times longer than traditional incandescent light bulbs.

Connected lighting further improve the return on investment as the rich new streams of data that it collects minute-by-minute, can be used to optimize how a building is used. A smart-sensor-based system could enable drop-in workers to find open desks quickly. It can help building managers understand traffic and usage patterns and optimize based on data rather than on gut feel.

When Osborne, IOEnergy and Enlighted ran the numbers, they believed the system would pay for itself in three years, which is considered a very good ROI in building-automation projects. The system has been up and running since February 2017, and ARM is already seeing savings over its baseline of more than 50 percent.

About the Author: Aniruddha Deodhar is Principal, IoT Solutions at ARM, where he is responsible for driving IoT strategy and marketing for Smart Buildings and Smart Cities. Before joining ARM, he spent more than fifteen years in high technology in Asia, Europe and North America in startups and venture capital firms, and mid-size and large corporations. His career has spanned roles in product

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