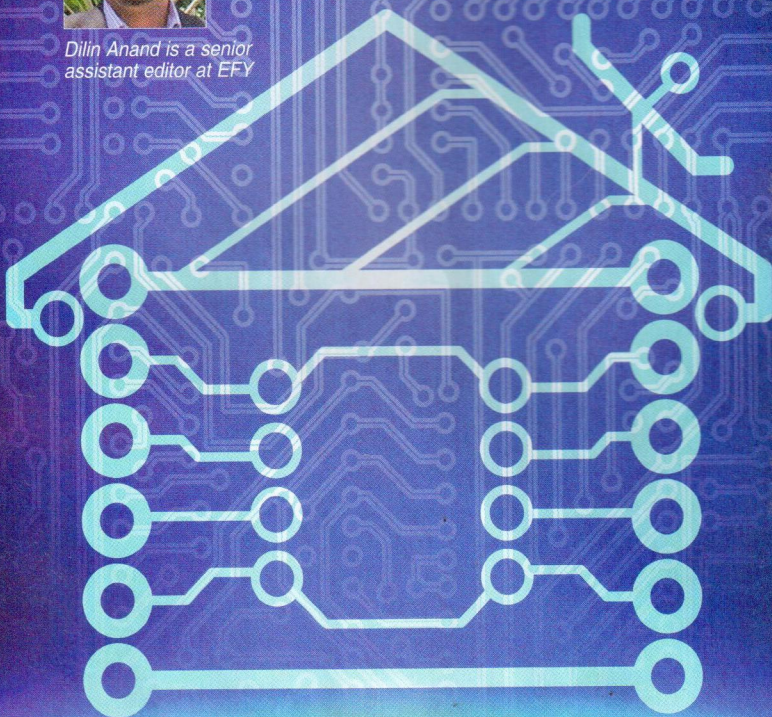# Would You Like Some 'Smarts' in Your Home?

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A n automated stacking car lift packs your car into a garage, while you proceed to enter Kensington House at 16 South End, London W8. It has more than a couple of floors and, so, comes with its very own lift to take you up. Touchpanels give you control of the ₹ 25 million worth of electronics in the house connected via 30 kilometres of wiring and controlled by a computer server rack that by itself costs approximately ₹ 6 million.

For the kind of clients who would look for a place like this, there are special panic rooms inside the house protected by bomb-proof doors that can withstand the blast of 10 kilograms of trinitrotoluene (TNT). It is not every day that you can watch your house get attacked by terrorists, as you relax in a warm bubble bath in your temperature-controlled bathtub, while catching up on the action unravelling outside.

A display in the panic bathroom lets you watch security footage and control your house from a bathtub using a waterproof remote. There are 24 audio zones and 16 cameras spread across the house that can be used to single-handedly run things like awesome parties, while making sure nothing gets out of hand.

The house also comes with a temperature-controlled cellar for storing red wines and a special humidor for cigars. To prevent your teenager from consuming the wine, the cellar comes with biometric access points. The cellar can also be programmed to send across a text to you if someone tries to get in.

There is also a ballroom with a dance floor that almost magically lowers itself into a swimming pool with just the press of a button.

But, how do we build something at least close to this?

Connection 1: The living room and the bedroom

Crestron is introducing the next version of their DigitalMedia AV distribution technology with the new DM 3.0 standard that was introduced at InfoComm in Orlando, the USA, in June 2015. This means, you can create a movie experience through your living space without worrying about connectivity problems.

Just like Kensington House, you can have wireless touchscreens placed around your house to directly control various automations in it. You can connect these devices using standard technologies like Wi-Fi and Z-wave or go for specialised technology like Smartlabs' Insteon technology that uses power lines and radio frequency (RF) or Crestron's Extended Range (ER) RF technologies. Often, there are equipment vendors who force you onto specific communication technologies but the above seem to be among the most popular.

Control4 Simple Device Discovery Protocol (SDDP) is a bit of software built into products to ensure seamless integration between the 50+ supporting manufacturers and partners. With SDDP, the system automatically finds and adds SDDP-enabled devices, thus making it far easier to add new elements of automation to your home.

Dimmers. It is the first thing that comes to mind when we talk about lighting. Controlling the brightness of your LED bulb is pretty simple and there are many low-cost drivers that can do it. But if you are really in it for quality, drivers like EcySystem LED driver from Lutron lets you continuously dim the brightness without any unsightly step-like dimming. Moreover, the driver lets you select from two types of dimming, namely, constant current reduction (CCR) or pulse width modulation (PWM).

Hue lighting system from Philips is a high-tech light bulb that lets you control colour, timing and brightness through a phone. You can go so far as to get it to simulate a sunrise in the morning.

Of course, just controlling the dimmer on an LED is not worthy of the home automation title. That is where light-management systems come into play.

Quantum Total Light Management System blends LED drivers, digital ballasts, motorised window shades and other lighting controls within one system.

Other systems like Lutron's EnergiSavr Node Solutions lets a smart system control light and save energy by controlling third-party ballasts, drivers, wired and wireless occupan-

Designed in India

THE-BUTTON. We are working on an interesting futuristic device that would be a small Wi-Fi based device called THE-BUTTON. It is a single-button-assignable action device that can be fitted in the house on prominent/specific places and would do the job when pressed. For example, if it is placed near a washing machine, it could be used to order a new batch of washing powder when you see that it is getting over. The same could be used as a distress-signal generator (to call for support), if placed near the main door or in the den.

—*T. Anand, managing director, Knewron*

Home automation smart plug (HASP). We have come up with HASP, a device that lets you transform your gadgets to achieve home automation. Paired with Bluetooth, an Android application is used to enter data to HASP, which is then monitored by an inbuilt timer-controlled electronic switch that switches the device on or off according to the instruction given by the user via Android user interface.

—*Edwin Andrews, co-founder, SPATEZ*

cy sensors, daylight sensors and wall stations to efficiently manage light.

A motor controller like QS Motor Module can also be used to control natural lighting through AC blinds, shades and louvers.

Onset HOBO occupancy and light-data loggers provide time-stamped occupancy and on/off light data. These can be used free of charge on qualifying projects. This should provide project managers and contractors with a competitive advantage and make the case for adding lighting controls to a project based on actual occupancy data.

Connection 2: The kitchen and the garden

Firms like Grahams Hi-Fi have been setting up lighting systems that connect with Web interfaces, time locks and even integrate with smoke detectors. So, if your beef steak just went from medium-rare to on-fire, the lighting system will show you the quickest way out of the room without

you getting suffocated, while the fire-control system takes care of the charred meat.

Systems from Honeywell will also have real people monitoring data from your home so that they can act in time in case of fire, a carbon-monoxide-related event or some other emergency.

Smart appliances. There is probably nothing cooler than Brewie, the world's first fully-automated home brewery. The system takes of everything from milling and mashing to adding hops and storing craft beer in kegs. It even lets you know when the brew is done as well as when it is ready for you to drink the brew or share it with your friends. It even cleans up after itself.

You can control your environment by using devices like Honeywell Lyric thermostat that let you adjust the temperature and control energy usage through the Internet or your smartphone. While Nest thermostat needs no specific mention, there are some new ones like iT500 by SALUS Controls for the European market and Ecobee 3.

For all those not-so-smart devices that you already have, you can use Incipio's series of smartplugs to give you complete smartphone control over these. You can use its fancy proximity-detection feature to turn on the PlayStation when you get

I automated my apartment and it kind of creeped me out

"A few weeks after I gave my apartment a home automation makeover, I found myself in a strictly 21st-century pickle. I was naked and shivering, stranded post-shower in my bathroom, trying to plot a route past a motion-activated camera to the freshly-laundered towels I had left by the bed. The camera was only meant to shoot pictures of trespassers, but the trigger that shuts off the system when I am home is my smartphone and I had allowed the battery to run down. From technology's point of view, I was an intruder in my own apartment."

—*An excerpt from an article by Alexis SobelFitts at www.popularmechanics.com*
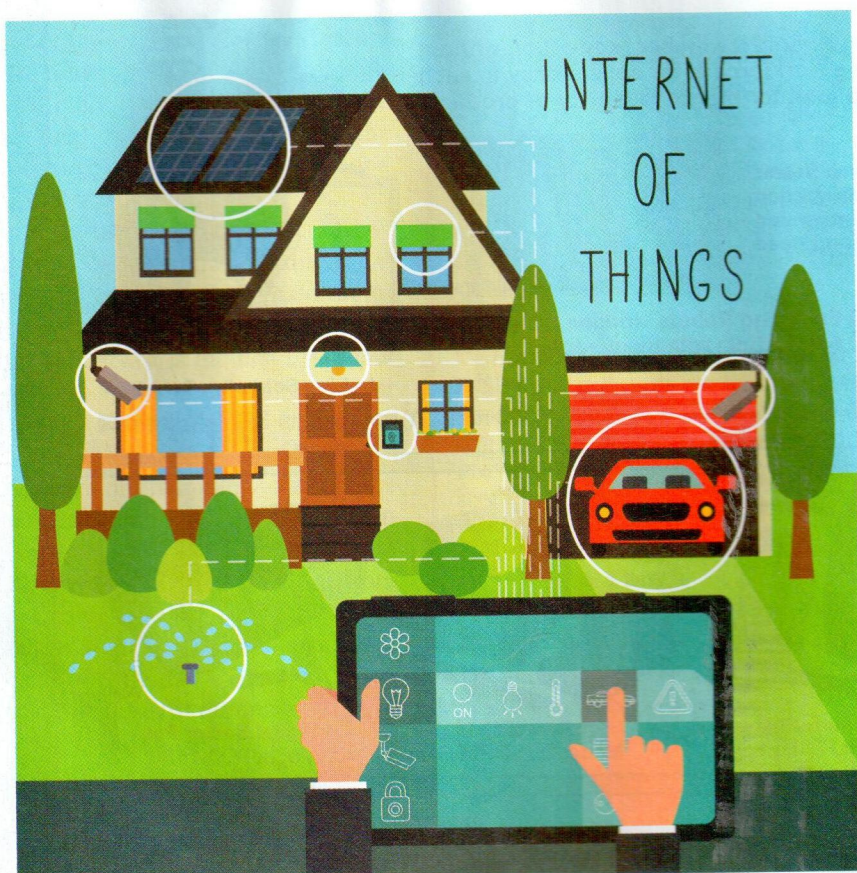
INTERNET OF THINGS

The Internet of things and the household of the future

close to it. That way, you can always escape by bending the rules if your significant other has imposed martial law forbidding you from switching on the PlayStation.

Voice commands. In places like the kitchen, you probably have your hands full with dough or raw meat, and a touchscreen would not be the best way to interact with your home. In such cases, voice-command-recognition devices can come to your rescue. While some require a gesture to activate a command, others are smart enough to listen to the sounds in the kitchen and figure out when you are speaking to your mother and when you are speaking to the computer controlling your house.

Crestron TST-602 comes with a touchscreen and tactile push-buttons.

Alternatively, Honeywell has their Tuxedo Touch system that works as a hands-free home-control system. Arm it by saying, "Hello Tuxedo," and it will let you do a variety of things like controlling lighting, heating, television and locks, among others.

Connection 3: Physically accessing your home

Physical access to your home has to do with main doors, windows, garage doors and other access points to gain entry into your house.

The new smart Control4 Garage Door package gives you a system where mere motion of your garage door can activate specific routines. For example, imagine coming home from work. As the garage door lifts, and before you have even parked your car, a sensor communicates with Control4 system, which begins

prepping your house for your arrival—select lights go on, thermostats kick up the heat, coffee starts brewing, Brewie gets ready to make some craft beer and your favourite music plays through the living room speakers.

You can now lock/unlock doors using your smart device, without making your door look like a robot that came out of the series Doctor Who. Bladwin wirelessly-controlled access-control systems give you remote control over your locks (along with manual key access) and include locks that can work together with systems like Crestron Connected to create a system that can understand other events and connect these together. As an example, if you lock your door on the way out, the system will begin switching off the lights, lowering the shades, adjusting the air-conditioning system and activating the burglar alarm.

Schlage Sense lock system is another alternative that is also designed to play nice with Apple's HomeKit.

Sensors like glass-break detectors are able to listen for the sound of breaking glass to guard against intruders. While it is also possible to use window sensors, these only work if the thief opens the window like a normal person. If he is of the aggressive variety, then you would need a glass-break detector to catch the sound and let the house know that there is an intruder in the house.

If you are really tech-savvy, you could even try programming in some Home Alone style action. Some popular glass-break detectors are Bosch DS1108i, Honeywell Flexguard FG-730 and Reliance THP213.

Devices like MyQ are a mix of a simple Wi-Fi hub and a door sensor

A device that learns about and adapts to you

Canary absorbs and analyses what is happening at home to keep you safer and connected. Its algorithm based motion detection learns over time to send you smarter notifications. When Canary senses anything out of the ordinary, you receive a notification with recorded HD video of the event, as well as the option to watch live. The longer you have it, the more effective it becomes.

that can be rigged to control a garage door using the existing locking or motor-driving mechanism. It also notifies the owner when the door opens.

Another interesting automated-door lock system is August Smart Lock that works with the deadlock already on the door.

Connection 4: Monitoring your home virtually

One much talked about solution here is Eve home monitoring system by Elgato. It offers a huge set of sensors that let you measure weather, water, energy, smoke and other elements, and provide statistics of how these have been varying. It can also be connected to systems like HomeKit.

Merging home automation with wearable technology. With devices like Apple Watch and smartpendants arriving on the scene, you do not need to dig through your pockets for a smartphone or take your laptop out

to connect or monitor your home. Two-way communication between your wearable device and your home allows you to not only monitor your home but also control it.

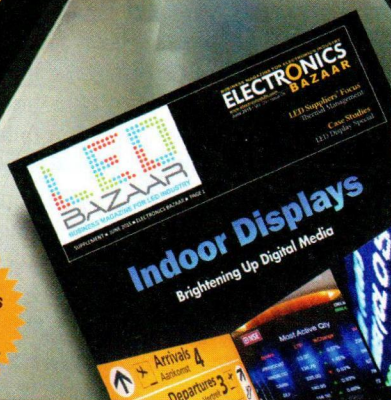Firms like Creston have started to bring out apps that run on your

watch that let you turn on lights, adjust the air-conditioner, stream music or open the garage door using your watch. Using Symbol Intensive Master Programming Language (SIMPL), other developers can support their own devices through Crestron app.

Smarthome solutions by tech giants

Apple's HAP Kit. Apple with its HomeKit framework has made a strategic move to enter the smarthome market. The large installed base of its smartphones and tablets with the powerful voice assistant, Siri, provides a platform for a basic, easy-to-use plug-and-play-type smarthome solution.

Google Nest Lab Solution. Nest thermostats automatically create a heating or cooling schedule based on the daily routines of residents. Initially, residents are required to set the target room temperature by turning Nest thermostat wheel several times a day. Once these settings are stored, the thermostat is capable of building a temperature schedule and profile. Nest thermostats are Internet-connected and get updated through the Internet. Nest acquired streaming video camera maker Dropcam and integrated its products with Dropcam's surveillance capabilities.

Samsung SmartThings. Samsung is another vendor that has created a set of SmartThings automation devices, which can be used in smarthomes. Samsung mobile phones can control all these devices. In addition to this, Samsung supports IFTTT, a Web based service that allows users to create a chain of conditional statements. Its expanded form is 'If This Then That,' conveying what it actually stands for.

—*S.A. Srinivasa Moorthy, director, D4X Technologies Pvt Ltd*

Sensing the environment. Environmental sensors are ideal for detection of floods, leaks and extreme heat. Air Quality Egg is an environmental sensor kit that gathers high-resolution readings of NO_2 and CO concentrations.

Another technology is one that is developed by University of California Riverside and is called electronic nose. It is a multi-sensor device that can detect small amounts of hazardous airborne chemicals like pesticides, combustion emissions, gas leaks and chemical warfare agents. Designers see the device being used in three different platforms, namely, handheld devices, wearable devices and smartphones.

Withings Home device is equipped with an HD camera that has up to 1080p, 135-degree wide angle, as well as night vision and general motion detection via a motion sensor, two microphones and air-quality tracking. The device also has a sound sensor and an environment sensor that can measure temperature, humidity and detect levels of harmful chemicals.

Tempo by Blue Maestro is a lightweight device designed to track environmental conditions in a number of personal and commercial situations. Utilising either HomeKit or a Bluetooth connection via a dedicated app, Tempo allows you to track humidity, barometric pressure, temperature and other metrics for a wide range of environments, from your pet's habitat to your humidor or wine cellar, just like at Kensington House.

Connection ∞: Your home is aware of you

Companies like Control4 have built some really impressive software for home automation. Even Cisco has teamed up with Control4 and the company was also the lead investor in a recent round of private funding for Control4.

Control4 software is believed to be like an operating system (OS) for connected devices in a home and includes consumer electronics, home

What next-gen technologies drive their smart features

Low-power RF technologies. Zigbee, WPAN are examples of technologies that are being used for wireless interaction between the user's smartphone/laptop and the various devices/gadgets present inside the house.

Connectivity protocols. The world is moving from IPv4 to IPv6 as the insatiable demand for Internet-connected smart devices can be easily accommodated via IPv6. IPv6 also adds enhancements for security, multimedia traffic management and simplified network configuration.

Low-power application processors/microcontrollers. For performing complex computations and a convenient user interface, low-power application processors/embedded processors acts as the main engine.

Gesture control. A user can initiate various actions like turning on the television, lights, fans or air-conditioners using just hand movements.

Integration of energy management into home gateways. Once energy consumption details are calculated and shared, the home gateway can detect and suggest various options through which the user can reduce the overall energy consumption and billing.

High-definition video capturing/encoding/streaming. High-resolution surveillance video is captured, encoded and transmitted over the Internet without lag/latency.

Smartphone integration. Smart software technology has to be integrated into smartphones to interact with various devices/gadgets present in the smarthome. There are already various standards introduced by big players such as Apple, Google and other home automation vendors in this area.

—Ravindra B.S., senior project manager, Mistral Solutions

What is up in India with respect to smarthomes

With an increase in smartphone and tablet usage, smart technologies are becoming easier to use and are becoming more affordable and prevalent. Additionally, the government's recent initiative on building smartcities, the core of which is formed by the Internet of Things, has provided a boost to the establishment of home automation systems. According to Allied Market Research, the home automation market globally is expected to grow at a compound annual growth rate (CAGR) of 29.5 per cent from 2013 to 2020, with Asia Pacific as the fastest growing market with nearly 38 per cent CAGR.

—Manjul Trehan, director sales - India, Lutron GL Sales & Services Pvt Ltd

appliances, lighting and thermostats. You could connect it with modern motion sensors like the ones from Honeywell to make your system aware enough to be able to differentiate between a cat and a cat burglar. This means no more false alarms when your dog jumps on the sofa.

Apple's HomeKit, Google's Nest Lab Solution and Samsung's Smartthings have a lot of potential in simplifying the current state of home automation. HomeKit is like any other OS for your house that any manufacturer can support through its devices. It can leverage the existing Apple ecosystem like Macs, iOS devices, Apple TV and Siri to make the process of control and monitoring that much easier.

HomeKit is also believed to work with non-HomeKit devices that use competing protocols and standards like ZigBee or Z-wave.

Newer updates have allowed systems to be able to do their magic without any input from you. These can track your fitness band (like Jawbone UP series band) and use the information from it to control your home. It can detect that you have fallen asleep by the lowered pulse rate and then activate the alarms in your home, turn down the lights to save power, lock all doors and set the alarm to wake you up the next morning. You can also tell Siri to do stuff for you, and it will understand what exactly you mean when you say, "Brew me a latte, please!" ●