



Swarm intelligence:
AI is revolutionising lighting



Picture: shutterstock

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Imagine that you're walking through a building and as you go, the lamps switch on automatically, light your way and turn themselves off again. Is it magic? Some futuristic dream? It's neither of these!

Revolutionary developments are currently taking place within the lighting sector, involving lamps that operate autonomously using swarm intelligence. This technology has a huge range of potential applications: from flexible, sustainable lighting concepts in the workplace to the energy-saving illumination of towns and cities, and increased road safety. It is easier to implement this concept than it sounds, because the lights are controlled using mesh networks – a technology that can be used anywhere today with the latest Wi-Fi routers or Bluetooth.

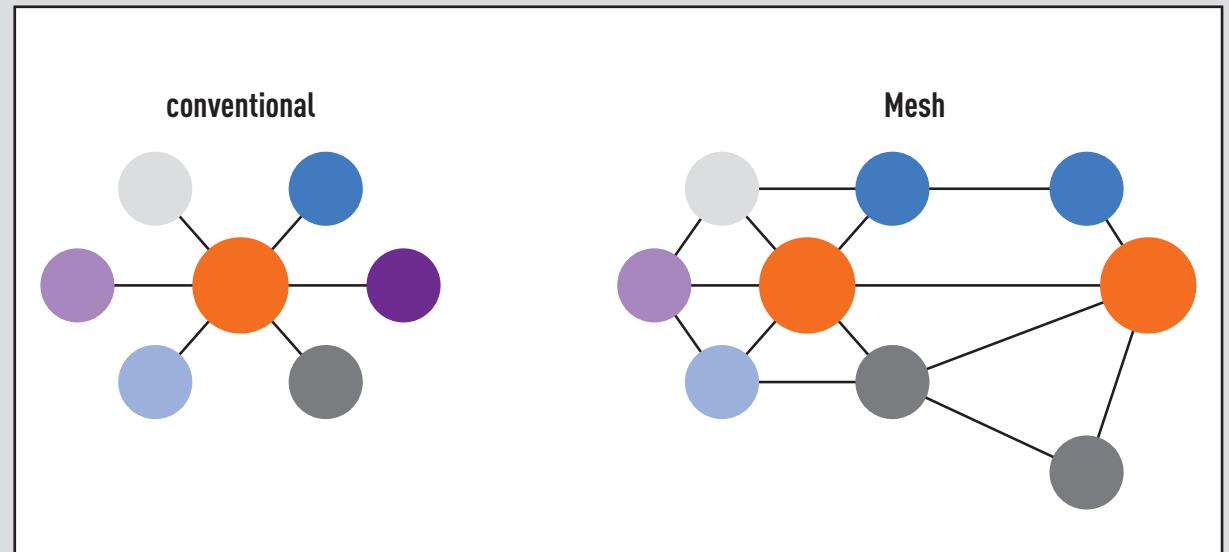
The modern work expert DURABLE provides innovative lighting solutions with its LUCTRA® lamp brand. In this trend paper, DURABLE presents the future of lighting, explains what a mesh network is and what it can do.

Mesh: 1 + 1 = 100

By definition, a mesh is a 'material woven in a net of wire or plastic threads.' In a similar fashion, a mesh network consists of several different Wi-Fi routers and devices, which are closely interwoven. The devices connect to one another to create a local network. Every Wi-Fi node can make contact with all other nodes within its radio range, resulting in a wide-reaching mesh. All devices are considered equal and can establish contact with whichever device they need to. The mesh network is autonomous and organises itself, with what can virtually be described as swarm intelligence. Some mesh systems can even use the mains supply to communicate with one another – using power-line networks instead of Wi-Fi. Bluetooth connections are another option.

Small mesh networks in the home environment do not require any specialist technical skills or fancy devices. A router with an access point, together with extra repeaters or adapters, is all that is needed to set up your own mesh network at home. The necessary devices are available from all reputable telecommunications providers. The key advantage of @Home, the intelligent 'mesh' network, is to achieve better reception throughout the entire property and grounds, and to enable smart home capabilities.

WI-FI NETWORKS: DIFFERENCES



Graphic: LUCTRA

New dimensions in lighting

The potential of smart networks, however, is much greater and extend as far as controlling highly complex systems. One of the most interesting fields of application is smart lighting concepts. Today, companies, towns and cities are discovering the opportunities of a lighting system with swarm intelligence. "There are going to be revolutionary changes within the lighting sector over the next five to seven years. Particularly in the context of connectivity, brand-new kinds of digital services will emerge. The opportunities are virtually infinite," explains Olaf Schindler, Managing Director of the smart light platform VREEDA.



Picture: LUCTRA

Networked lamps in the corporate environment

Companies are currently facing big challenges, and these include how to best furnish the workplace. Office space must be redesigned to accommodate hybrid working models. At the same time, they urgently need to be equipped with more sustainable energy concepts.

Lighting is a critical component of these considerations. Instead of employees coming into the office all at once, they now arrive at completely different times. In other words, the whole building no longer needs to be lit for a specific number of hours. A flexible approach is needed to lighting. No one enjoys walking through dark rooms in the early hours of the morning to reach their desk. And the 'night owls' don't enjoy sitting at a lone, lit workplace in the evening, surrounded by darkness.

"A lighting solution that is operated by a smart group system increases safety. Avoiding spooky, isolated pools of light also makes the user feel much more comfortable," explains Britta Kupfer, Brand Manager at LUCTRA®.

What this means in practical terms is that the areas in which employees are currently working is lit up sufficiently, while other, empty areas of the building have dim lighting or no lights on at all.

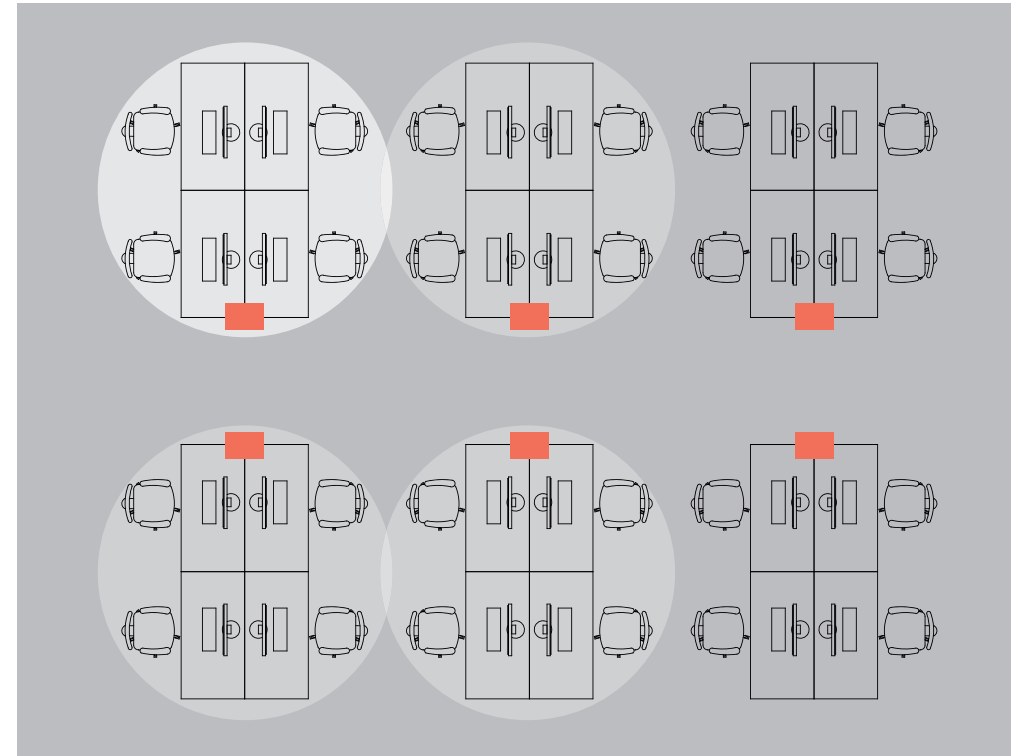


Picture: LUCTRA

Use of automatic on-demand lighting in thoroughfares, escape routes and staircases prevents anyone from feeling ill at ease, even when they're on their own in the office. It also reduces the risk of accidents because tripping hazards and steps can be seen easily. This type of concept requires that the lamps are able to communicate with one another. This 'communication' takes place on a mesh network and can be controlled by app, computer or sensors.

Lighting systems with swarm intelligence also improve sustainability. "Since lamps can be controlled individually, only the ones that are needed light up. This creates significant energy-saving potential," confirms Kupfer. There are also many other possible functions. "One idea is for desk lamps to briefly flash red to inform office workers about severe weather warnings. This will alert employees as early as possible and enable them to make their way home in time," reports Olaf Schindler.

According to Schindler, smart lighting comes with a key requisite: "Quality is more important than quantity." The choice of lamps is an essential factor for the system to operate at its best.



Graphic: LUCTRA

LUCTRA® Mesh

The LUCTRA® lamp brand from modern work expert DURABLE delivers high-quality lamps that provide the best possible light for each individual user, whichever workplace they happen to be sitting at. “LUCTRA® not only brightens up the workplace, but also ensures that employees are happier, less exhausted and a little more successful – with the right lighting giving them a helping hand,” explains Kupfer.

LUCTRA® is launching into the future of lighting technology. The German brand manufacturer teamed up with VREEDA to develop LUCTRA® MESH – an intelligent swarm control system for LUCTRA® VITAWORK® lamps using a Bluetooth mesh network. The lamps can be assigned to different groups. Even when certain workplaces are empty, the mesh-controlled LUCTRA® lamps automatically emit a dimmed light when someone is working at the next desk. Long gone is the contrast between bright lights and darkness, depending on whether someone is sitting at their desk or not. This is replaced by a very comfortable graduation of light intensity. The groups can be defined easily using an app. Sensors on the integrated lamps can then be controlled automatically to create the desired lighting effect.

LUCTRA® VITAWORK® is equipped with energy-saving LED illuminants. Due to their variable distribution of light, the floor lamps are also suitable for illuminating larger office spaces. Additional table lamps or ceiling lights are not required.



Picture: LUCTRA

Street lighting 4.0

Reduced energy consumption, greater sustainability and lower costs are key factors that are driving European town, cities and villages to modernise their street lighting. Several moves towards swarm intelligence solutions have already been taken. For example, sensors are used to detect passing vehicles and pedestrians and transmit this information to the street lamps nearby, which switches these lamps on fully. As soon as the street or pavement is empty again, the street lamps reduce their light strength automatically. This decreases energy consumption and light emissions.



Picture: shutterstock

Museums and public buildings in a new light

Brand-new dimensions are also emerging for interior designers and building preservationists. Mesh networks enable custom-controlled lighting systems to be installed in historical buildings and spaces without the need for cabling or for drilling holes in or prising open the walls. For example, Siena Cathedral and the Royal Academy of Arts in London have recently been lit up in style using a mesh control system.



Picture: © Mateus Campos Felipe, unsplash



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About DURABLE:

With its intelligent solutions, DURABLE Hunke & Jochheim GmbH & Co. KG helps professionals succeed in today's and tomorrow's working world. DURABLE boasts over 100 years of expertise in professional presentation and organisation concepts, which are used in many lines of work around the world. The forward-looking company identifies work trends and develops innovative concepts to meet the needs of the changing professional world. DURABLE's product lines in the premium segment stand out with their excellent quality, design and functionality.

DURABLE currently has a staff of about 700 employees at its headquarters in Iserlohn/Germany and its subsidiaries in Europe and the USA.

For more information, see durable.eu

About LUCTRA®:

LUCTRA® is the professional, biologically effective LED lamp system that uses the latest scientific findings on the effect of light on human beings. It follows the principle of Human Centric Lighting, HCL for short, by focusing on people's personal lighting needs for healthier and more efficient working and living. The more closely our daily routine follows our personal biorhythm, the better our health and ability to perform. Daylight is the signal generator that synchronises our inner rhythm with the natural course of the day. LUCTRA® light can almost perfectly simulate natural daylight and thus supports the user's personal inner clock.

The product range consists of table, floor and mobile lamps in various designs. LUCTRA® has already won numerous renowned design prizes like the German Design Award.

The brand was launched in 2015 by DURABLE Hunke & Jochheim GmbH & Co. KG, which specialises in products and solutions for modern workplaces.

For more information, see luctra.eu