Lighting control and interaction for the future

No Switches Allowed

Lighting control and interaction for the future

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Ever since the light bulb was first discovered, we have turned lights on and off with a switch. Today, the intelligent lighting technology allows many opportunities ranging from autonomous lighting control to advanced user interaction styles. If researchers in the No Switches Allowed program get their way, radical change is on the way.

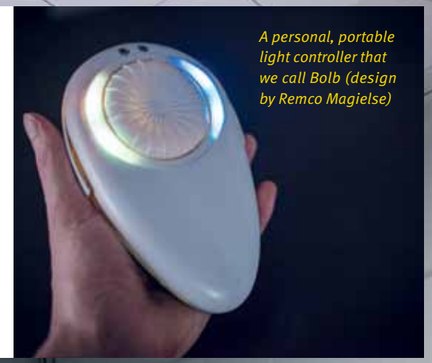
Thanks to the latest developments in the solid state lighting technology, miniaturization of processing hardware, and wide-spread usage of wireless communication, we are entering a new era of lighting. Light sources can now be embedded into everyday objects and be controlled by low power devices with digital computing capability. Thus, traditional light sources that just aim to light living and working spaces are slowly being replaced by networked intelligent lighting systems that are ideally energy and cost efficient. These systems have many goals ranging from simple illumination to performance and well-being support for people, aesthetics through decorative lighting and information delivery through coded light. This is a paradigm shift that will change the way we live in a way similar to the transition into the smart phone era.

Do you think a toggle light switch does not match your needs in terms of imposing desired lighting settings for different user activities and environment contexts? So do we!

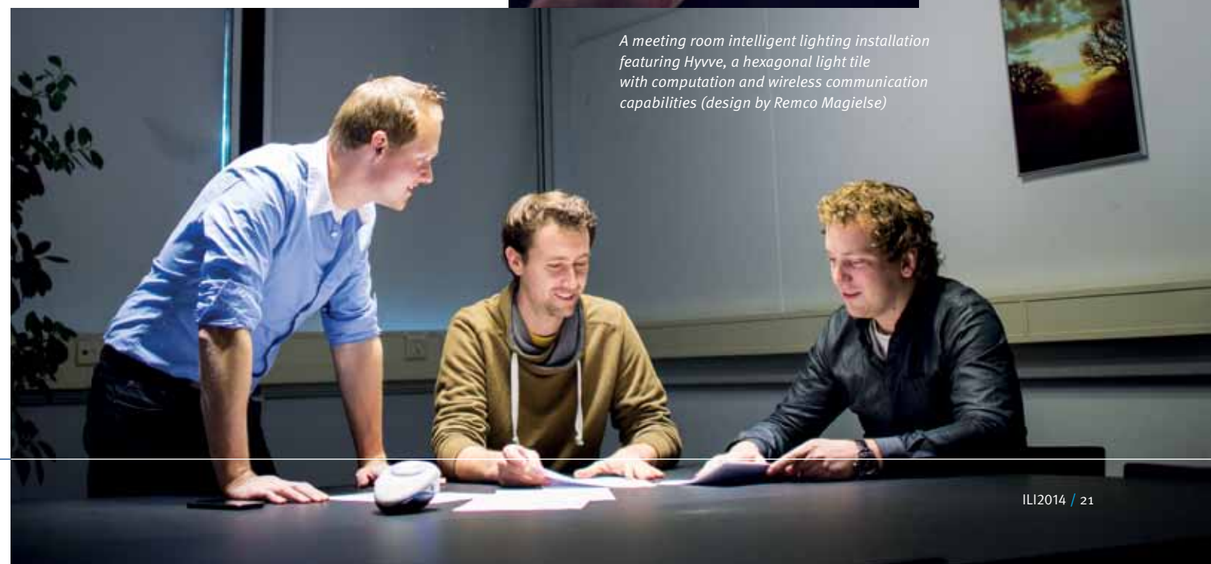
The advantages promised by indoor intelligent lighting are compelling. There are opportunities to be seized in terms of advanced – and autonomous - control and user interaction capabilities, but there are difficulties to overcome as well. Intelligent lighting systems are composed of many devices that have digital computation and communication capabilities, e.g. smart lamps, interaction devices and sensors. Given such complexity, it is important to find a good balance between autonomous lighting behavior and user control. Currently, programming such a system requires significant expertise and writing lines of code. In NSA, we investigate how to identify activities and contexts in an environment and how to define and impose a corresponding desired lighting behavior on the system, as well as new methods of interaction between humans and light sources.

In the future, the Internet will reach all light sources, sensors and interaction devices in intelligent lighting systems.

Intelligent lighting is tightly linked to the developments for the realization of the Internet of Things (IoT) concept, which connects digital “things” to the Internet Protocol (IP) domain. Today, there are more IP connected devices than there are humans on the planet. According to a Cisco report on IoT, the number of IP connected things in 2020 will reach 50 billion. We envision that a fair share of these will be low capacity lighting and sensing components. In this direction, lighting systems as well as building management and other services that are enabled by an indoor lighting infrastructure will converge to all-IP solutions, with IP reaching end-points. In NSA, we aim to develop robust, dependable and secure full-IP intelligent lighting systems that are energy and cost efficient.



A personal, portable light controller that we call Bolb (design by Remco Magielse)



A meeting room intelligent lighting installation featuring Hyvve, a hexagonal light tile with computation and wireless communication capabilities (design by Remco Magielse)