

Internet of Things for smarter living

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EPFL scientists are developing a new concept of a smart building that adjusts to your lifestyle, by allowing you to control your preferences. An important component, called the Internet of Things, involves monitoring your overall energy consumption by networking together all of your devices.

Do you forget to turn off the lights when you leave a room? Have you ever forgotten to turn off your stove... or worried that you hadn't? Wouldn't it be nice not to have to think about it—and still be environmentally friendly? How would you like to live in a building that adjusts to your lifestyle?

If you are aiming for the 2000 watt society, or simply trying to prevent a fire from starting, then you may be interested in the way EPFL scientists are using the Internet of Things, i.e. connecting appliances together and monitoring their overall [energy consumption](#) to make every day life a little bit smarter.

The Internet of Things is a network of [smart objects](#) that can be controlled together for optimal energy consumption. Those connected objects, which can be anything from your usual appliances to the heating system, are augmented with sensors and electronics that relay information about how you and your building consume energy. The concept of IoT is a few years old already, so what's new?

Maher Kayal and his team at EPFL are using the IoT to redefine the idea of the smart building by putting the user's comfort at the core of the

system. You, the user, can control your own comfort – temperature, humidity and lighting – in careful balance with how much energy you consume and how much is available from the power grid. Their results are now published in the Krakow Conference Proceedings from the ["International Conference on Control, Communication and Signal Processing EBCCSP"](#).

Their concept of a smart building has three components. The first consists of electronics that would have to be integrated into all of the building's appliances and plugs, basically everything that requires power, like the stove. The electronics make each appliance intelligent, first by adding control-at-a-distance, but also by collecting data about how you use a specific appliance. The second component is the user interface, with a built-in learning mechanism: the interface allows you to control your appliance, while learning about your energy habits and preferences. The third is the building, as a whole, and how it interacts with the environment and its energy demands for intelligent management with the grid.

To illustrate the concept, Kayal and his team built a demo wall fitted with intelligent lights and plugs. Kayal identifies himself by placing his identity card on the wall. The system registers Kayal, loads his preferred settings and the lights immediately dim. Meanwhile, he consults his smartphone and reads the temperature of the room, the humidity and the amount of electricity being consumed by the demo wall.

Today, the impact of our individual comfort, in terms of energy consumption and environmental footprints, is far too complex to quantify. But this shouldn't prevent us from trying. "Given the right tools, we are intelligent enough to make the right decision for optimizing our energy consumption," says Kayal. "Our main objective is to educate the user, to include people in the feedback loop of energy control, and moving away from fully automated systems that dismiss human

interaction."

Smart buildings of the future may well be personalized for your lifestyle. If you're the forgetful type and you've left home without turning off the stove, then you could tell your smartphone to turn it off for you, prevent a possible fire and overall consume less energy.

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