



THE CLEVER ABODE

CONVERTING TO SMART HOME

TEACHING TIP

LECTURE

Everything starts at home. When we go to school or work, we often start our day inside our homes. From our beds to dining areas to the living room, we have domesticated our daily routines. Nowadays, there are instances that you just feel like if you could snap your fingers, your repetitive household tasks would quickly be done. Although that maybe magical, there are innovations in technology that may help us at least alleviate our routinely work. For instance, there are appliances like self-drying washing machines help us reduce not only the effort needed to the laundry, but also saving other resources like time, electricity and water. These newly invented machines are called smart appliance. Majority of this so-called smart appliances are built-in for home application which create the structure of a smart home.

SMART HOME

A **smart home**, also called **home automation**, is the ability to control areas and appliances of a house automatically. Derived from the term automation, a smart home has the capacity to replace human effort in doing household tasks. It is also meant to control different electronic devices remotely by a smartphone or a computer. Basic electrical items like lights, sockets and breaker boxes can also be automated by converting them to electronic devices using a pair of **relays and microprocessors**.



WHY MAKE A HOME SMART?

The necessity of a smart home did not matter many decades ago when the first concept of communication between existing electrical wires of a house was introduced. Nowadays, you can see many smart home devices from left to right offering their own smart solutions in what seems to be a bubble or a trend at the surface. But what does a smart home provide that a regular home cannot?



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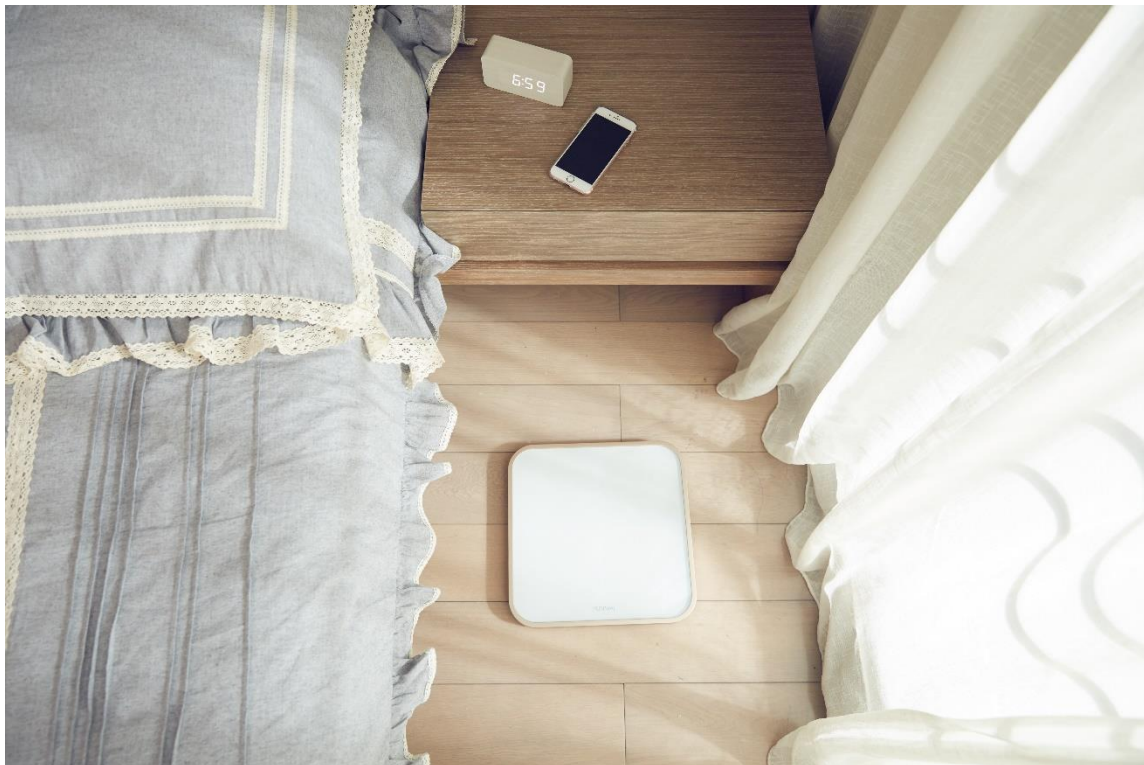
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What it entails to be smart inside a house is not only **the capability to control and automate** electrical devices but also the capability for these **devices to communicate with each other**. So why make a home smart? One reason would be tasks done at home becomes efficient, meaning it achieves the maximum productivity without spending or wasting human effort. For example, when leaving your home to go to school or work, you won't have to go from room to room to check if you have turned the lights off or pulled the plugs. With your smartphone, you can quickly do this from anywhere in your house or even outside.

Another advantage of a smart home is that it helps a household save energy. We often forget to close lights when leaving a room. With smart lights, it can also automatically turn itself off even if you forgot to or even turn it on when it detects your smartphone. Lowering electrical consumption of your lights may seem trivial at first, but expound it in a month, it will make a difference in the electrical bill. A more advance smart home solution can even give an electric bill breakdown on which appliances consume the most energy and give suggestions on how to limit its usage.

SO, HOW CAN WE AUTOMATE OUR HOMES?

Automating our homes can either be easy or difficult. First thing to distinguish are your daily routines done inside a house. Look for areas where you can improve these routines and from there, find a way to automate these tasks. One sample routine is when you get up in the middle of the night to go to the bathroom. It is a struggle to find that light switch when it is dark. A solution can a bedroom night light that will automatically light up when it senses your feet, help you find that missing slipper and provide safety while navigating your way to the bathroom.



Another good scenario could be your morning routine. For example, an alarm clock goes blaring at your ears as you try to reach for it to either stop or snooze it. Upon taking a bath, you usually wait for the heater to heat up the water or fire up the stove to start boiling water. With automating this routine, 10 minutes before



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waking up from your alarm, the water is starting to heat up. Snoozing the alarm won't even be a problem since the smart device will continue to keep your desired temperature until you decide to shower or take a bath.



1. A smart alarm clock alerts your heater 10 minutes before the alarm rings.



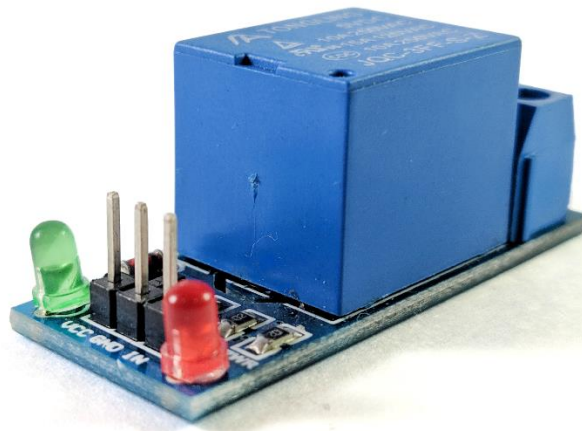
2. The water heater then heats the water as it receives the notice.



3. Snoozing the alarm clock will not be a problem as the heater keeps it at your desired temperature.

There are also a lot of common smart home devices that you can purchase that caters to your daily routines. Smart light fixtures are ubiquitous in the market. Smart locks that provide security cameras are also popular because these are often equipped with motion sensors that detect if there are movements in an area. Buying smart appliances is another way to make our homes smart. Traditional appliances like refrigerators, vacuum cleaners, even frying pans are already turning smart.

USING RELAYS AND MICROPROCESSORS



Microprocessors like the Arduino and the NodeMCU **use low voltages, around 3.3V to 5V**, in order to operate. This means that typical components they can control are only those of within these voltages. By adding a



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relay between the microprocessor and a high voltage appliance, it will help the low voltage microprocessor control a high voltage device appliance such as an air conditioning unit. Both the relay and microprocessor, coupled together, can convert electrical wirings to electronic devices. These two components are essential for home automation because it lets existing electrical devices to be electronically controlled. For example, a non-smart refrigerator can be converted to an electronic device by connecting a relay and a NodeMCU between the plug and the socket, then have a smartphone control it.

CHOOSING THE RIGHT SMART DEVICES

There are many ways to convert a house into a smart home. As mentioned earlier, automating a house is driven by the necessity of the tasks that needs to be smart. Cost also plays a huge factor. Since buying a readymade smart device and/or appliances can be the easiest way to create a smart home, but it can be quite expensive especially if you have identified many areas in your house that needs to be smart. Adding relays to an existing electrical wiring can be a lot cheaper than buying smart gadgets but changing the electrical wirings of a house can be daunting especially if it is not done by a professional. Nonetheless, relays and microprocessors are excellent ways to start a small smart home project. With the proper tools, a simple smart lighting fixture should be quite easy to wire.

