The 3 Transformative Technologies in Building Automation and Control

From the Blackberry's release in 1998, to the iPhone in 2007, to the vast array of connected and powerful home and personal devices we have today, the past two decades have seen an incredible leap in our ability to communicate, control, and interact with our world as consumers. Indeed, it is these transformative technologies of innovation – communications, control, and human machine interface (HMI) – that drove this consumer revolution, motivating many of us to stand in line for hours every two years just to get our hands on the new iPhone. Unfortunately, despite intense pressure from the new consumer-driven baseline expectations of operators and business owners, the non-consumer, or "embedded systems" world has struggled to leverage and deploy these same capabilities.

Let's examine how these technologies are moving to transform the embedded systems you design.

Transformative Technology #1 - Human Machine Interfaces (HMI)

Human machine interfaces in embedded systems have traditionally been very basic. Many industrial products such as control panels, thermostats and building access stations use a simple 2x16 character display, LEDs, and a few buttons for human interaction. In the age of connected devices and the prevalence of smart phones with high resolution images and videos, many users expect improved human machine interfaces to more efficiently interact with devices. As soon as a system has a graphic/touch display on it, it can dramatically transform what can be done with the product. For example, add a graphic/touch display to a conference room environmental controls and suddenly you don't just have a way to adjust room temperature but also the ability to interact with the user and provide them with important information such as how long the conference room is booked, air quality status, lighting controls and building incident status. The HMI suddenly takes on a life of its own and can dramatically increase product value along with safety and security.

Transformative Technology #2 - Controls

A critical component in every embedded system is how it controls and interacts with its environment. When I hear the word controls, I often imagine old-school, big, failure-prone mechanical/mechatronic input sensors and output controls/actuators. But digital sensors, digital controls, solid state relays, optical switches (and much more) are revolutionizing the way electronics are interacting with the outside world. They're smaller, cost reduced, and increasingly "instrumented", meaning they don't just perform their assigned input/output function but have data and statistics (blown LED, stuck switch, overcurrent relay, etc.) built-in for preventative maintenance and systems operational efficiency. Control applications can now use these inexpensive and instrumented sensors and leverage their connections through communications and HMI's to provide ways to interactive with the environment that were never available. For example, a smart building may have not just had thermal sensors all over to efficiently heat and cool the building but may also include sensors for light control, CO_2 monitoring, air quality, fire detection, blind control and much more. These control systems will not just improve the comfort of the occupants but also improve the security and safety of the building.

Transformative Technology #3 - Communication

Adding communication interfaces to a building automation product can radically transformed how and what can be done with the product. Imagine a network of sensors through-out the building that used

BLE 5 mesh networking. Every sensor and actuator could relay information to gateways through-out the building separate from Wi-Fi that uses and energy profile that is unmatched. Suddenly that connectivity adds a plethora of capabilities and ways that the product can be used to innovate such as:

- Collecting run-time and performance data
- Performing predictive maintenance analytics
- Adapting to user comfort needs and schedules
- Managing device wear and tear to maximize life-time through-out the building
- Over-the-air/wire firmware upgrades for maintenance, security, and features

Another great example is if a fire or active incident is in progress, the network can communicate with all the building access points and monitors to direct occupants on where they need to go and how to get to safety. These are just a few examples and there is a nearly endless possibility on how a company can use communication interfaces to not just provide new capabilities to their clients but also to revolutionize the way that their business model works!

Conclusions

As we have seen in this post, the same three transformative technologies of consumer product innovation: HMI, control, and communications, can bring incredible value the building control and automation industry and help businesses to improve occupant comfort but also safety and security through-out the building. Engineering teams will have to rethink their development and technology strategies to overcome or avoid the inherent problems in adopting consumer technologies into their products if they want to bring this value to fruition.

To learn more about how to leverage HMI's, controls and communication to automate your food services products, join us on February 20th for the free one hour webinar "Transformative Technologies in building control and automation".