technology focus

The future's in the numbers | By Richard Cadena

"With sufficient data, we can begin to figure out how Roy and Willie and Marc and Peter and all those top lighting designers knock it out of the park so often - and then we can teach the console how to do it . . ."

I think I was about 10 or 12 years old when I told my older brother I wanted to get a Ford Mustang when I was old enough to drive. But he was confident that technology had other plans for me. "By the time you're old enough to drive, we'll have flying cars," he said.

Not only am I still waiting for my flying car, I'm also waiting for my voice-controlled lighting console. The technology for both exists today, so where are they?

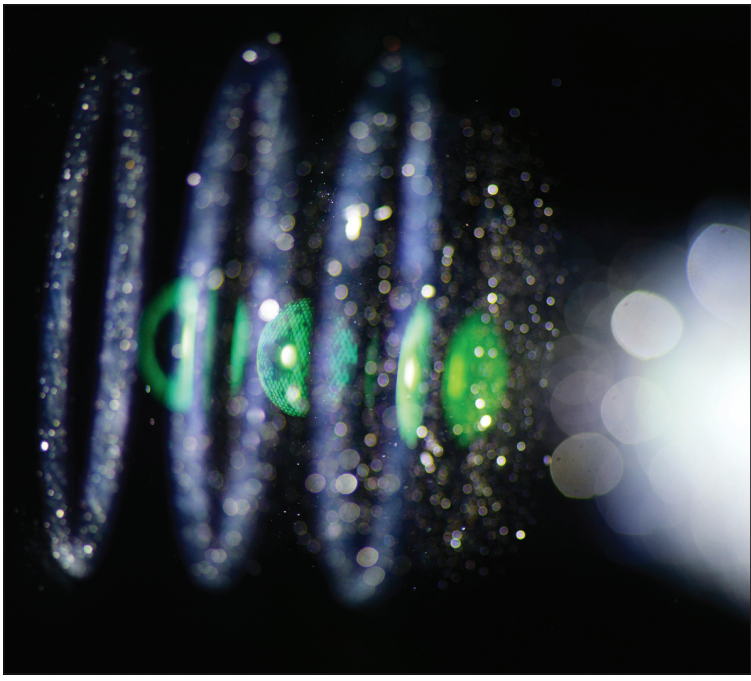
Many years ago, Lary Cotton, one of the software developers at High End Systems, developed voice control for a Status Cue lighting console. When he showed it to me, he wore a headset and spoke simple commands. The console obeyed, but the product never made it to market - and not because the technology wasn't capable.

We could use voice-controlled lighting consoles today, or, at the very least, consoles that are simpler to use. I recently came across a Facebook query that made me question the sanity of our approach to programming. The poster asked how to perform a relatively simple operation on a particular console, which was to copy the RGB colour settings from one fixture and apply them to another. The answer involved several keystrokes and was anything but intuitive.

In the defence of the software engineers who design and code lighting consoles, they are doing all they can to keep up with the requests from users. I get it - but lighting consoles have become so complicated that perhaps it's time to take a new approach. And as Clare Boothe Luce wrote, ". . . the height of sophistication is simplicity."

Voice control might help, but one of the challenges in using voice commands is that, in a noisy environment like a live concert or a rehearsal, it would be difficult for the console to distinguish the words from the background noise. However, the limitations of technology have more to do with the human capacity to apply them than its ability to perform a given function. In 1956, for example, Leon Theramin - the same Theramin who invented the musical instrument - realised that if he bounced a laser beam off of a window pane, the vibrations caused by the conversation in the room would modulate the beam enough to convert it back to sound. At the time, he was working for the Soviet Union developing eaves-dropping systems used to spy on the British, French and US embassies in Moscow during the Cold War.

Maybe the answer to voice control is using cameras instead of microphones. In 2016, researchers at the Department of Computer Science at Oxford University developed artificial intelligence that can read lips. If that technology finds its way to market and is cheap enough, it could be used with a lighting console even in the noisiest of environments . . .



Is that where the current technology will lead us? One of the first automated lighting consoles to really make a big splash in the industry was the original Wholehog in 1992; 25 years later, we have the Wholehog 4. The original grandMA lighting console was launched in 1997 and the current console is the grandMA2. What can we expect in another 20 years?

I think the Wholehog 8 or the grandMA4 will bear little resemblance to the lighting consoles of today. And that has nothing to do with voice control - the future of lighting consoles lies in artificial intelligence.

The proliferation of computers means that a huge amount of data is being generated and collected. It can be used to detect complex patterns and those same computers can be used to help make sense of patterns. Think about human DNA and genomes - there are three billion pairs of DNA coded into the human body, and scientists have only recently been able to take advantage of computer technology to make sense of them in a meaningful way. Equally big advances are being made in astronomy and other sciences. We're well into the age of big data . . .

So how can it be used to improve lighting consoles? By better learning the rules of lighting design and programming.

Years ago, I was programming a show

For Richard Cadena, the road to authoring books and magazine articles ran through High End Systems and Martin, took a left turn at designer, tech, and electrician, and is still under construction.

when a bystander who was watching over my shoulder asked me a question that, on the surface, seemed innocuous. He simply asked: "How do you decide which colours to use?"

My initial reaction was to think: "Well, that's a dumb question. I just pick colours that look good to me."

But the more I thought about it, the more I realised there had to be a better answer. That set me on the path to learning what makes a pleasing colour combination and whether it was universal or a matter of personal taste. That's how I discovered Johannes Itten's book, *The Art of Color*, and Josef Albers' *Interaction of Color.* Those books and a handful of others made me realise that there is a method to the madness, and that there are rules that apply, whether we're aware of them or not. The same is true for music. The western music scale is divided into 12 notes, not 13. Eight of those notes comprise a scale, and they can be used to create melodies, harmonies, and compositions. The application of rules has long preceded the age of computers. Try looking up the rules of counterpoint . . .

Lighting design also has rules, which are not always articulated, and sometimes not even understood by the designers, even among the best of them. One of my favourite lighting designers is Roy Bennett, and when I interviewed him several years ago, I asked a series of questions about his method of lighting design. He struggled to answer, and after a while, admitted: "I don't know how I do it, I just do it."

But we can learn how Roy does it by collecting and analysing data. If we look at a large body of work and find the most common colour combinations, the percentages of each colour, the amount and speed of movement, the intensity of each light, then we can catalogue them along with chases, sweeps, undulations, and more. With sufficient data, we can begin to figure out how Roy and Willie and Marc and Peter and all those top lighting designers knock it out of the park so often - and then we can teach the console how to do it.

I feel some of you cringing at the idea of using data to create art, and maybe there is a good reason for that. Maybe artificially-created lighting design *is* a bad idea. If it is, then the data will bear that out and we will have another data point. But then again - with some work - computers could be better at it than Roy Bennett. And at the very least, going down this road will help us better understand what makes great design with today's lighting instruments.

So, set your alarm for 1 January 2038, then fly your car over to your workshop, fire up your lighting console and let's see what happens . . . ⊗