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The Artist and the Engineer

by Kevin Morris

My wife is an artist. I am an engineer.

She walks into a room full of abstract paintings and can immediately say, “I like that one and that one and that one - none of the rest.”

I walk into that same room and don’t know what to say. I haven’t got a reason for liking or disliking any of them yet.

Sometime, much later, after analyzing and thinking about them all and worrying that this one has too much orange and that one is overzealous in its use of lucid brush-strokes, I have narrowed my list of favorites down to four. After much additional consideration, I decide to eliminate the first one (although it was my early favorite), leaving me with a final “likes” list of three... the same three she chose immediately, it turns out. Yep, she took about a nanosecond to get the same answer that required my engineering brain a few hours.

Aha! you say - that was an Art problem. Of course she was better!

Not so fast there, engicheeringleaders. Let’s try an engineering example - say there is a strange sound in the rear of the car. “Sounds like we ran over some tape,” she inexplicably utters.

“What?”

“That sound... I think we must have run over some tape in the road.”

I’m pretty sure we must have a tire problem, but I get out, walk to the back of the car... and - there is a piece of duct tape stuck to one of the tires. Apparently it was flapping against the fender well.

“How did you know that?”

“I don’t’ know - it just sounded like tape.”

Checking the car’s diagnostic computer... nope, no status code for duct tape fragments stuck to a tire.

She has a keen intuition and trusts it to a fault. I need reasons, cause and effect, and data. My gut may occasionally tell me things, but I’m usually not listening. I don’t want to put something out there unless I’ve thought it through, pondered all the possibilities, and come to the conclusion that I’ve got it right. She’ll venture a guess based on the faintest wisp of nothing.

It would be easy to jump to the conclusion that we would not get along. On the surface, we are different in almost every way. But, there is some kind of yin/yang complementary cocktail cooked up here that works despite the datasheet disparity.

After living in the relationship for many years, I have come to the conclusion that our ways of thinking work together to form an impressive kind of heterogeneous muti-node processing system where her instinctive/intuitive computing engine can make high-quality decisions on certain classes of problems with incredible speed, and my deductive reasoning processor can accurately analyze cause and effect to filter and verify the answers from the inductive engine and come up with high-quality answers in cases when the inductive system fails to deliver a result. These years of analysis have further led me to conclude that this set of complementary capabilities forms the basis of a mutually-beneficial symbiotic relationship that we both find rewarding.

After living in the relationship for about two minutes, she decided we had “good chemistry.”

The thing my relationship has taught me about engineering is that our brains are incredibly complex and capable, and it’s easy to forget to use enormous portions of that capability. In some measure, our engineering training can work against us. We are taught top-down and bottom-up problem solving, relying on data, doing dimensional analysis, and preserving the chain of logic from problem statement through system specification to final solution - so that our thinking is clear and documented and our results are repeatable by the next person who comes along. We are trained to anticipate faults and to create robust designs that protect our solutions against the inevitable and unpredictable reality that awaits them in nature.

However, in just about any significant engineering achievement, the artist is as much at play as the engineer. Taking a new set of frequency constraints and cranking out an RLC filter for a specific application isn’t exactly inspired work. In fact, many of the skills we learned in engineering school can be and have been replicated in software. EDA tools today can vastly outperform human “engineers” doing design work that I toiled over in my early days - logic minimization, placement, routing, circuit analysis - it would be easy to come to the conclusion that engineers will someday be completely replaced by computers and we’ll all be out of a job.

But software has yet to approach the intuitive and instinctive spark of creativity and problem solving that the artist demonstrates. Behind every RLC filter cookbook is the engineer/artist who figured out filtering in the first place. No software ever devised will independently conclude that time domain problems can be much more easily solved in the frequency domain, or that it would be really cool if our mobile phones had connected computers in them.

Engineering is a blend of art and science, and the best engineers are artists, working in media like electronics or algorithms, strategically injecting the sparks of discontinuous change into the linear drone of evolutionary progress. Our creativity and intuition are complex products of our experience and our instincts - incredibly powerful analytical engines, cranking out answers and ideas with frustrating opacity - mysterious black boxes taking in the world and intermittently emitting a random mixture of wisdom and insanity.

We cannot reach our full potential as engineers with analysis and deduction alone. Truly inspired work requires us to drop our guards, engage our intuition, take risks, and clean up the mess afterward. Some ideas will be bad, and we have plenty of time to discover that in our analysis phase. A very few ideas will be pearls of genius. Our job is to recognize them when they appear, and to capitalize on them with all of the resources at our disposal.

Our intuition and creativity are there, waiting for us, often ignored and untapped. We just need to listen to them.

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