Future Hunting

A Globetrotting search for the year 2051 with Intel's Futurist Brian David Johnson

Brian David Johnson is an Intel future hunter. He travels the world to find out what people are doing, how they are using technology and where we are headed. In 2011, the 40th anniversary of the microprocessor, he circled the world to see if he could discover how we would be living 40 years in the future. What he discovered was truly surprising.

Stockholm

My journey into the future starts in Stockholm, where I catch up with Per Bjorkman, the head of distribution for SVT, Sweden's public broadcaster. Back in 2007, SVT made the decision to digitize the entire television cultural history of Sweden. According to Per, the entire cultural history of Sweden now sits on one of the broadcaster's 5 PETA byte servers. Most forecasts show that the kinds of servers that Per and SVT are using will grow over the next 40 years. The *Futurecasting Future Device Usage*[i] report projects that over the next decade the growth in computational power in servers could grow 499%.

As massive media files start whizzing around, we're going to need a more sophisticated approach to computational power. We can use multi-core and many-core processing depending on the type of computation or tasks needed. Instead of copper, what if we could use light beams or Silicon Photonics to move around all those TV shows? This could open up an entirely new range of possibilities.

But I didn't want to stop there. To inform a model for where this might lead us in the next 40 years and what this might mean for the next generation of chips, I pondered: now that SVT had gone through the considerable task of digitizing all this information … what next? What were the human and cultural implications of what SVT had done? How do you find something to watch when the entire history of TV has been digitized? How do you even begin to search it? Beyond just watching TV, what are the implications for education. If students have the entire cultural history of Sweden right before them and can literally search everything, surely that fundamentally changes the teaching process?

Rio

Next stop on my globetrotting adventure is Rio, to join a collection of international futurists from biology, cosmology and technology to envision a *living future*. At the conference I met Andrew Hessel, a synthetic biologist working to cure cancer. Synthetic Biology, or synbio, is the design and construction of new biological functions and systems not found in nature. Or, as I like to think, the science of trying to understand the software of life.

"It's like a smartphone and an app," Andrew explained as we sat, overlooking Ipanema Beach. "Imagine writing an app but that app is DNA. Then you load that app into a cell. If it's a GPS app and you load it onto your smartphone, your phone is now a GPS device. But here's the thing that's really interesting, synbio is talking about cells. They are living things and they multiply. These are self-replicating computational systems."

But how do we program these computational systems using synbio? As we look 40 years out and prepare the servers and workstations that we'll need, imagine the amount of information that makes up our genetic code. How do we write that code? Taking a cue from traditional software programming, what are the compilers we need to enable metabolic architects to write the code of life at a high level? How do we make tools so that anyone can do this programming just like anyone can now make a website?

Imagine what we could create! We could program grass seed DNA so that when it detects minute traces of explosive, the grass turns from green to red. Planting this grass seed in potential mine fields would help find landmines without risking human life.

Tokyo

Today, computation has found its way into our pockets, our TVs, our cars and even into the walls of our homes. People have become comfortable with computation spreading throughout their lives. Nowhere is this more obvious than in Japan, which is why I head to a trade show in Tokyo for my next glimpse of the future.

Clearly computation is not just for computers anymore. The global research firm iHS projects in its *Futurecast 2021* that in the next decade there will be seven billion small computational devices throughout our lives. As a culture we have become comfortable carrying around computation in our pockets and with computational devices that carry us around – cars. Over the next 40 years we'll become more comfortable with computational devices that carry themselves around – robots.

But what's interesting about robots is that because they can carry themselves around, they become social actors in our lives. We develop an emotional connection to them. Japan has always been a pioneer in the field of robotics. That's why I barely batted an eye at a six foot robot carrying an adult woman at the trade show. Over the next 40 years we'll see this spread around the world.

If we think about robots as 'laptops with legs' then the big question is: how do we program them? If these computational devices become part of the social fabric of our lives can we think about software programming in the same way that we have for the past 40 years?

Will the next 40 years see a new approach to programming? Will we even see a new form of user interaction with these machines? It is already quite natural to use gesture, touch and voice to interact with our gaming consoles, smartphones and cars. What happens when emotions and relationships become a new way of interacting and programming robots? What does it mean when simply living with a computer means you are programming it to better understand you?

Over the past 40 years we have seen social networking become not only possible but incredibly important for how we interact with our computational devices and our friends and family. But what happens when our robot friends need to talk to each other? What would a Facebook for robots look like? And would your robot befriend you?

Mumbai

The final stop on my research tour of the future is the FICCI Frames conference in Mumbai, a global convention covering media and entertainment. I had come to see what Bollywood had in store for the future.

Bollywood knows how to put on a show. And that show is the soul of India. Bollywood and entertainment continues to drive the adoption of new technologies. People want their entertainment and their stories on their screens. So what does this mean for 2051? Connections and connectivity.

India is massive and complex. Talking with government officials at the conference, it became obvious that laying fiber or other *in ground* infrastructure would be nearly impossible. So how do we get this entertainment to the people who can't live without it?

It became clear the future is not evenly distributed. The future of entertainment in Stockholm will be delivered on the back of an entirely different data infrastructure to that in Mumbai. People still want access to the entertainment they love, the people they love, but *how* they connect will be wildly different as we move towards 2051. The servers and networks that provide the next 40 years of data, movies and communication need to be a lot more intelligent. We will begin to see networks, servers and cellular towers that are aware of the data sent to our homes, handsets and cars. We need to understand that how we handle email, simple data and voice traffic is wildly different than that of video. The very nature of how we judge the quality of that connection will need to be redefined. How do we re-imagine how the networks, servers and cellular towers of the future are powered? What will it mean when we are surrounded by intelligence?

Berlin

After a year of *future hunting,* I'm back home and combining these questions and insights with the global ethnographic research conducted over the last 15 years by Intel's social scientists to develop my futurecasting models. Ultimately it's our job to deliver these models for how people will act and interact with technology to the various technical teams around Intel.

As I write this we are currently working on the 2019 CPU. We provide the requirements to the silicon architects so that they can understand the capabilities needed to develop technologies that will capture the imagination of consumers and make their lives better.

So what did I learn from my year of travelling the future? We cannot forget to let ourselves be surprised by innovation. We can't forget to be open to that silly idea that turns out to be brilliant and changes the world. Increasingly, these ideas will come from all over the world. Each year new innovators are born. I've been to universities all over the world and I'm impressed and wonderfully surprised with the passion and scientific power of our students. The future is theirs. Let them surprise us. That is my prediction for the next 40 years of computing—we will continue to be surprised and it will be awesome.

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(This piece was written on a smartphone)

[i] Thug Interactive