Instituto Tecnológico y de Estudios Superiores de Monterrey

Quantum Computing

Reading 3

Logical Reversibility of Computation by C. H. Bennet

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Abstract

In this text, that is based on the paper: "Logical Reversibility of Computation" by Charles H Bennet, two ideas are extracted arbitrarily and discussed, according to the interest of the author.

1 Idea 1

The evolution of evolution

As I was reading the paper, I realised that our of all the live beings, I am blessed that I am able to understand it, and all of the biological and cognitive aspects that it implies.

We can analyse the development of technology through the history of humankind, and we can see that as the time goes on, we have more and more sophisticated tools. Furthermore, we can do this thought exercise to see the tools that the first forms of life had to achieve their ultimate goal: to reproduce. In this context, one can argue that this ultimate goal of live beings is to make sure that the information that makes up a being (in the form of the genetic code) gets transmitted to a younger version of himself thanks to reproduction; in this case, the information would be encoded in the genetic code.

Evolution provided us with the ability to adapt to our surroundings in order to survive, and then we got to the point where reproduction is not a priority anymore, because we have that for granted, for instance, many persons of my age do not want to have kids because they have other priorities, and this happens because we know that we can reproduce at a later point in life. Of course this would not be true for an earlier version of live beings, where they had to mature, and as soon as their bodies allowed, just reproduce... That was their purpose, but what is ours? Should it be the same for ever? Should we aim to transfer the information we have developed in other forms?

2 Idea 2

Maths as the ultimate tool

There is literally no field in which we can not use maths, because it is a language that can be as universal or specific as the user wants to. A practical example is when I as reading though the paper, and I could understand the notations the author uses and what he wanted to represent. It was clear for me, and I did not have to talk to him to get to a common ground or understanding, but I had to learn a lot of maths beforehand, but well, the good news is that many more people can understand maths.

Do you want to describe the orientation of an object? Use quaternion maths. Do you want to describe its motion? It is possible using differential equations. As the complexity of a phenomenon increases, so do the mathematics that describe it, but the beauty of it, is that it gives us a framework of understanding our universe.