Abstraction

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Abstraction is a very domain specific technique from the field formal methods, where an object is associated with an abstract representation which is a simplified and easier to analysis. Abstraction is used in various forms like generalization, where we try to generalize the given data by a simpler model (for example Newton's laws), interpolation, where we represent the model as a predefined curve and try to interpret the next few points on the curve and formalization, where we formalize a nebulous set of ideas into concrete mathematical notations.

Abstraction plays a major role in managing complexity all around. When we drive a car, we rely on an abstract model of how the car works to easily navigate the car according to our desire. We rely on a mental model of the map of a city to navigate around the city. Even sophisticated algorithms within Google maps or other maps application relies on hierarchial representation where the higher representations abstract away the low level local roads and regions and only model the major highways and freeways in the region. Abstraction is the key to many successful algorithms and software all around us.

That said, often abstraction can be interpreted incorrectly and move away from the ground truth. For example, the abstraction that earth is flat worked for most folk, but was an incorrect representation of the earth. Such incorrect models create fear and superstitions like one should not travel or else they would fall off the face of earth. This phallacy was one of the primary reasons that prevented explorers to travel far and those who did to be heretics.

It is therefore necessary to be careful when working with abstraction and ensure that it is representing the ground truth. That brings another point in question which is what is ground truth? In most cases, the ground truth can be verified by exploration and questioning the abstraction. People are afraid to question the abstraction but often it only strengthens the model by incorporating subtleties overlooked previously. We have a name for this: 'counter-example guided abstraction refinement'. Here we start with a simple model of the world being represented and the model is refined when new counter-examples are encountered. Sometimes, the model is cleaned up to be simplified again while accounting for all the counterexamples seen in the process.

For many fields of science and technology, this is true. Many of the mathematical proofs have been posed and proved false and then reposed. This process is repeated until a definite answer is not obtained. The process is not fool-proof,

and infact, politics and collusion can lead to corruption and degradation of the process. In the networked world of today, we are faced by this challenge, where a group of connected users dominate individuals either to falsely prove them wrong or to absorb them into their own corruption. This is not good for science and the future of the world. We must resist this temptation and fight against such toxic manipulation.

Just like any other sport, sportsmanshp is needed in the field of science and technology, where people compete on right grounds and seek the truth in their endevours. Any competition must be healthy and with the aim of helping the fellow beings grow and develop in their individual pursuits. The abstractions of the world today are fragile whether it be the news we read, the media we consume everyday, or the people and relationships we work with everyday. We need to nurture these abstractions for them to grow into robust representations for the world and everyone to look up to.