

The Perception of Randomness

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Abstract

In this brief note the authors make the observation that modifying the spatiotemporal scale at which perception occurs, often can lead to a modification in the apparent “degree” of randomness. This suggests that what we call the two worlds - classical and quantum - might in actuality just be a single world, but their “distinct” properties are consequences of the perceiving awareness and its inhabited spatiotemporal scale. Zurek’s image of a quantum-classical borderland may thus be a unifying vantage point: differing perceptual paradigms leading to differing interactions with the world, and sometimes a classical view and sometimes a quantum perception.

Brownian Motion as Scattering on a Modified Timescale

We find random events when we leave our day-to-day timescale and come down to the microscopic level of Brownian motion. When viewing a pollen or some other particle suspended in a liquid medium, under a microscope, we can find the apparently random zigzag motion of the suspended particle. If however we zoomed in really close to the particle and slowed down time a lot so that everything moved slowly enough, it would appear that the suspended particle was traversing a specific path, not random at all. Occasionally it interacted with the liquid medium and modified this path, but most of the time, it was moving along its own trajectory in a fairly normal way.

Vehicular Traffic from Two Vantage Points

Consider another example, when traveling in a vehicle in Delhi traffic, the driver makes numerous stops, starts and speed changes, to avoid various obstacles that may turn up from time to time. This combined with the road and weather conditions makes for often a bumpy ride. However, view this same scene at a distance from an airplane window and one sees a relatively smooth flow of a snake-like procession of traffic on the Delhi road.

These two examples involved changing the temporal scale (the first example) or the spatial resolution (the traffic example). This led us from a “the world

is random” perspective to a more calm “the world is regular” perspective. But when changing the spatiotemporal perspective is not an option then we must find a way to rationally approach randomness. This can be done in the probability space framework.