Perfect Reproducibility Is Not Always Algorithmically Possible: A Pedagogical Observation

Jake Lasley, Salamah Salamah, Vladik Kreinovich
Department of Computer Science
University of Texas at El Paso
500 W. University
El Paso, Texas 79968, USA
jlasley@miners.utep.edu, isalamah@utep.edu, vladik@utep.edu

Users of computer-based based systems often want perfect reproducibility: when encountering the same situation twice, the system should exhibit the same behavior. For real-life systems that include sensors, this is not always possible: due to inevitable measurement uncertainty, for the same actual value of the corresponding quantity, we may get somewhat different measurement results, and thus, show somewhat different behavior. In this paper, we show that the above-described ideal reproducibility is not possible even in the idealized situation, when we assume that a sensor can perform its measurement with any given accuracy.