Causality in concurrent systems

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Abstract

Concurrent systems identify systems, either software, hardware or even biological systems, that are characterized by sets of independent actions that can be executed in any order or simultaneously. Computer scientists resort to a causal terminology to describe and analyse the relations between the actions in these systems. However, a thorough discussion about the meaning of causality in such a context has not been developed yet. This contribution aims to fill the gap. First, we analyze the notion of causation in concurrent systems and we attempt to build bridges with the existing philosophical literature, highlighting similarities and divergences between them. Second, we analyse the use of counterfactual reasoning in ex-post analysis in concurrent systems (i.e. execution trace analysis).

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