A conceptual framework for semantic case-based safety analysis

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Abstract:
Hazard and Operability (HAZOP) Analysis and Failure Mode and Effect Analysis (FMEA) are among the most widely used safety analysis procedures in the development of safety-critical and embedded systems. These analyses are generally perceived as complex and time-consuming, hindering an effective reuse of previous results or experiences. In this paper we present a conceptual semantic case-based framework for safety analysis, which facilitates the reuse of previous HAZOP and FMEA experiences in order to reduce the time and effort associated with these analyses. We present the core technologies of the conceptual framework and evaluated a prototype of the framework, KROSA, in an experiment with domain experts at ABB Norway. Initial results confirm the viability of the conceptual framework for industrial application.

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1. Introduction

Safety analysis is an important aspect of embedded systems development, which is concerned with the identification and mitigation of potential hazards, faults, and failure modes of a system. Prominent safety analysis procedures, such as Hazard and Operability (HAZOP) Study or Failure Mode and Effect Analysis (FMEA), are iterative procedures that are time consuming, costly, and typically require a lot of human involvement [1][2][3].

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Keywords

- **IEEE Keywords**

  Ontologies, Semantics, Natural language processing, Libraries, Hazards, Humans

- **Author Keywords**

  natural language processing, Safety analysis, HAZOP, FMEA, ontology, requirements, case-based reasoning

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