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Abstract:

The capability to identify potential system hazards and operability problems, and to recommend appropriate mitigation mechanisms is vital to the development of safety critical embedded systems. Hazard and Operability (HAZOP) analysis which is mostly used to achieve these objectives is a complex and largely human-centred process, and increased tool support could reduce costs and

improve quality. This work presents a framework and tool prototype that facilitates the early identification of potential system hazards from requirements and the reuse of previous experience for conducting HAZOP. The results from the preliminary evaluation of the tool suggest its potential viability for application in real industrial context.

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1. Introduction

An important aspect of the development of safety-critical embedded systems is the identification of safety concerns of a system and making adequate provisions to reduce the likelihood of occurrence of hazards. Consequently, it is important to identify hazards during the early stages of system development such as requirements engineering rather than at later stages when the cost of mitigation or error correction could be significantly higher. Hazard and Operability (HAZOP) study is one of the most widely used safety analysis techniques [1]. HAZOP is used to study hazards and operability problems by investigating the effects of deviations from prescribed design intent in order to mitigate the occurrence of adverse consequences. It involves a creative anticipation of hazards and operation problems, and recommendation of appropriate safeguard mechanisms by a team of experts.

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Keywords

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

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safety-critical software, case-based reasoning, embedded systems, natural language processing, ontologies (artificial intelligence)

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knowledge reuse-oriented safety analysis, hazard identification, requirements analysis, reuse-oriented HAZOP analysis, hazard and operability analysis, system hazard, hazard mitigation mechanism, safety critical embedded systems, KROSA tool

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natural language processing, HAZOP analysis, hazard identification, ontology, requirements, case-based reasoning

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