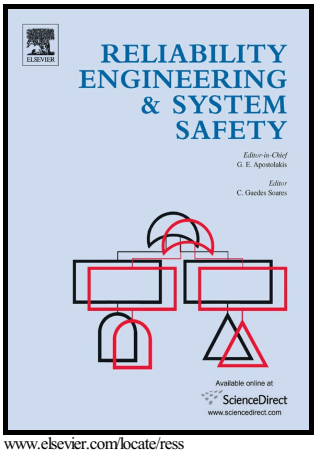

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The integration of expert-defined importance factors to enrich Bayesian Fault Tree Analysis

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Abstract

This paper proposes an analysis of a hybrid Bayesian-Importance model for system designers to improve the quality of services related to Active Assisted Living Systems. The proposed model is based on two factors: failure probability measure of different service components and, an expert defined degree of importance that each component holds for the success of the corresponding service. The proposed approach advocates the integration of expert-defined importance factors to enrich the Bayesian Fault Tree Analysis (FTA) approach. The evaluation of the proposed approach is conducted using the Fault Tree Analysis formalism where the undesired state of a system is analyzed using Boolean logic mechanisms to combine a series of lower-level events.

I. Introduction

Uninterrupted service supply, due to faults, plays a crucial and a vital role for the successful of system's functioning. Generally speaking, a system failure occurs when this system deviates from the specified behavior. Fault tolerance constitutes a major requirement for complex systems. It is defined as the set of techniques allowing a system to tolerate internal faults and to continue performing its function correctly. It is worthwhile to stress the fact that fault tolerance does not provide explicit protection against faults. In this paper, our main concern is related to Active Assisted Living (AAL) systems architecture that can be described as a distributed system