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Test Driven Development for Embedded Systems

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Abstract

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The purpose of this thesis is to analyze the benefits and/or drawbacks derived from the application of Test Driven Development (TDD) as part of the software development lifecycle of Embedded Systems.

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2.1 Test Driven Development

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Embedded Systems (ES) can be defined as a combination of hardware components and software systems that seamlessly work together to achieve a specific purpose. Such systems can be dynamically programmed or have a fixed functionality set, and are often engineered to achieve a domain-specific, often critical, goal.

In recent years, such system have ... and have driven innovation forward in their respective areas of deployment; today everywhere, spanning from the agricultural field, to the medical and energy ones, ES of various size and complexity are ...

Given the high criticality of ES, ensuring their dependability over the course of their lifespan is essential.

Due to their high specialization, embedded software often deals with time and resource constraints

Furthermore, given the absence of a user interface in most cases, testing such systems can be particularly challenging, given the lack of immediate feedback.

2.3 Test Driven Development for Embedded Systems

Generally, the testing process of ES follows the X-in-the-loop paradigm; subcategories in this area include model-in-the-loop, software-in-the-loop,

processor-in-the-loop, hardware-in-the-loop, and system-in-the-loop. Reference the old survey papers (i.e. X in the loop) that provide a summary of the main techniques

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