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Performing Diagnosis in Building with Partially Valid Heterogeneous Tests

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Abstract : Building system is highly vulnerable to different kinds of faults and human misbehaviors. Energy efficiency and user comfort are directly targeted due to abnormalities in building operation. The available fault diagnosis tools and methodologies particularly rely on rules or pure model-based approaches. It is assumed that model or rule-based test could be applied to any situation without taking into account actual testing contexts. Contextual tests with validity domain could reduce a lot of the design of detection tests. The main objective of this paper is to consider fault validity when validate the test model considering the non-modeled events such as occupancy, weather conditions, door and window openings and the integration of the knowledge of the expert on the state of the system. The concept of heterogeneous tests is combined with test validity to generate fault diagnoses. A combination of rules, range and model-based tests known as heterogeneous tests are proposed to reduce the modeling complexity. Calculation of logical diagnoses coming from artificial intelligence provides a global explanation consistent with the test result. An application example shows the efficiency of the proposed technique: an office setting at Grenoble Institute of Technology.

Keywords : heterogeneous tests, validity, building system, sensor grids, sensor fault, diagnosis, fault detection and isolation
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