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Computation and Quality Assurance of Internet of Things Based Applications

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DESCRIPTION

In the world of technological advancement and emergence, the Internet of Things (IoT) has opened doors of opportunity and connectivity. Massive and heterogeneous devices generate enormous data. Assessing the quality of data is an important aspect of today's IoT world. Conventional quality models were basically designed to assess the quality of the software applications. These cannot be as it is applied to IoT applications as they include wireless and mobile devices. Due to the inclusion of smart devices IoT applications show additional characteristics like intelligent hardware devices, software hardware collaboration model, networked, wireless and mobile connectivity, and remote monitoring of devices. This necessitates the enhancement of existing quality models. The quality evaluation approach presented in this work is based on the ISO/IEC 25010 quality model. Analytic Hierarchy Process (AHP) is used for pairwise comparison of the quality attribute. In comparison to existing models, the multi-attribute AHP-based quality analysis approach aids in determining the best suitable weights on various quality attributes mentioned in ISO/IEC 25010 model.

The Internet of Things (IoT) is a distributed network of autonomous, intelligent, and smart devices which are responsible for interpreting, and exchanging data in a context-aware way. IoT brings with it new possibilities, but it also raises new questions. One of the most critical questions has been raised in relation to data access, impacts, and data quality. The data is gathered from a wide range of IoT devices. The heterogeneous devices are interconnected, and software and hardware interact with them. As a result, detecting and diagnosing the issue becomes more challenging. Due to the inclusion of smart devices, the methods of determining the quality of IoT application varies. It makes changes in the functionality and domain of an application as well. Non-functional quality attributes play an equally important role in the evaluation of IoT applications. The non-functional quality characteristics such as compatibility, reliability, usability, security, and maintainability are equally important as the functional aspects of IoT applications. These aspects form the base of Quality of Service (QoS). According to a literature review in this era 50 billion devices are estimated to be a part of IoT. Thus, it necessitates emphasizing QoS while designing the quality evaluation approaches for the Internet of Things. A vital factor is that the quality of service is the best path to reach quality governance software of IoT. This paper has given thought to enhancing the existing Software Quality Analysis models and launching a better quality analysis model which can incorporate the additional IoT features. As compared to software applications IoT applications arise the additional characteristics such as the inclusion of smart devices, a software-hardware collaboration model, and limited battery, and memory. Due to these additional characteristics, the existing quality approaches are not well suited. In recent years, various works have been done for the software quality assurance of IoT-based Systems. An IoT software quality assurance is the methodical process to ensure whether the IoT-based product attains definite necessities and standards and attains its preferred level. We have observed that most the software quality assurance approached lack tool support and automation tools. Therefore, there is a need for a Generic Quality Assurance methodology to implement IoT which must be customizable to a specific domain. The generalization will encourage tool support for IoT in its implementation. Non-functional quality attributes are equally important to measure the quality of IoT applications. Authors have provided a software quality assurance model for embedded systems.

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CONFLICT OF INTEREST

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