A Study on the Model-driven Development of Internet of Things Software based on Contiki Operating System

Abstract

Many developers prefer constructing software for Internet of Things (IoT) due to their low cost hardware requirements and variability of application domains. One of the popular operating systems underlying the IoT systems is Contiki operating system (ContikiOS). The unique lightweight thread structure of Contiki makes it more preferable in the implementation of new IoT systems instead of many other existing platforms. Although operating systems play the role of an abstraction layer for low level hardware, heterogeneity, distributed programming and network related concerns dominate the workload in software development. The separation of hardware-related and application-related concerns will improve the software engineering processes of IoT systems which may pave the way to deal with the system's structural complexity coming from the heterogeneity. One possible approach to cope with this complexity is to increase the abstraction level using system models, for IoT in a Model-driven Development (MDD) approach. MDD moves software development from code to models and may increase productivity and reduce development costs. Although MDD for IoT systems is being researched in several studies especially for the purpose of separation of concerns, most of them do not provide a complete and/or a systematic approach for their MDD solutions. Moreover, these studies do not consider the MDD of IoT on ContikiOS. Hence, in this project, design and implementation of a ContikiOS-based IoT system are realized according to MDD principles. The case study is the development of a smart library fire detection system.

Start Date: July 3, 2017

End Date: July 3, 2019

Total Budget: 26.696 TL (~$7,600)

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Related Publications:

1. Arslan, S., Tezel, B. T., Challenger, M. and Kardas, G. (2018) "*Design and Implementation of an Alarm System Software with Android Things Operating System*", In proceedings of the 2nd International Scientific and Vocational Studies Congress - Engineering and Natural Sciences (BILMES EN-NAT 2018), July 5-8, 2018, Nevsehir, Turkey, pp. 1215-1220 (in Turkish)