Abstract

Nowadays, a smart home has been developed to automatically achieve some services using sensors and actuators with the goal to improve the occupant experience, e.g., comfortable and easier life environment. Smart home system is one of Cyber-Physical System applications, which is defined as tight integrations of computation, communication, and control for active interaction between physical and cyber elements in which embedded devices, such as sensors and actuators, are wireless or wired networked to sense, monitor and control the physical world. It is an appropriate and efficient way to design the home control system. It is believed that in both the academic and industrial communities that CPS will have great technical, economic and social impacts in the future. CPS environment contains the different terms in its own elements e.g, sensors, actuators, communication media. In real scenario where users need a single result from whole system, handling the heterogeneity of sensors requires to manage the collaborative nature of sensors, that leads to difficulty in processing or estimating desired parameters in high accuracy. Heterogeneous data from heterogeneous and CPS-based oriented sensor, which are equipped on different appliances, have different sensing performance information(e,g. operating range, response time, accuracy, setting interval), that might cause by the unpredictable change of environment

This paper proposes a new framework, the heterogeneous data processing and estimating system (HDPES) that can provide a highly accurate sensed data and/or estimate a desired data using the CPS-oriented and heterogeneous sensors in the cyber-physical smart home environment. The design of HDPES is considered in heterogeneity of sensing performance and sensing data to increase the reliability and accuracy of the temperature control system in Smart Home

By using the raw data from experiments, we analyze and evaluate our proposed framework in the home environment by using R software, a useful program for statistical computing and data analysis. Through multiple data estimation methods, simulation results reveal that our proposed system HDPES is adaptable and feasible for satisfying normalisation sensing error and estimation the desired parameter at a particular estimating point in cyber-physical smart home environment.