

Thesis Abstract

No. _____

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Thesis Title A State-Transfer-based Open Framework for Internet of Things Service Composition			
Thesis Summary <p>Current Internet-of-Things (IoT) applications are built upon multiple architectures, standards and platforms, whose heterogeneity leads to domain specific technology solutions that cannot interoperate with each other. It generates a growing need to develop and experiment with technology solutions that break and bridge the barriers.</p> <p>This research introduces an open IoT development framework that offers general, platform-agnostic development interfaces, and process. It allows IoT researchers and developers to (re-)use and integrate a wider range of IoT and Web services. A Finite State Machine (FSM) model was adopted to provide a uniform service representation as well as an entry point for swift and flexible service composition under Distributed Service Architecture (DSA). Leveraging this open IoT service composition framework, value-added, cross-domain IoT applications and business logic can be developed, deployed, and managed in an on-the-fly manner.</p> <p>As a typical implementation, a set of web development toolkit named Hyper Sensor Markup Language (HSML) has been developed. Several target domain applications, e.g. multi-source environmental monitoring, open automation systems and etc., have been built. Based on the HSML, the proposed framework has been evaluated by means of user experiment, expert interview and architectural comparison. Results have indicated a better overall performance on expertise requirement, customization cost, reusability and cross-domain interoperability, when compared with other mainstream open IoT service composition frameworks.</p> <p>The proposed framework has demonstrated its capability to greatly lower down the technical threshold of IoT application development and facilitate fast-prototyping and test over a variety of application domains, including but not limited to smart cities, public environment automation, and precision agriculture. And going hand in hand with other complementary technologies like semantic web, machine learning and block chain etc., it will hopefully become the primary step towards the equity of future IoT services.</p>			