

Software Development for Smart Home Process Control

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Vitalii Kopeliuk, Vira Voronytska

Department of applied math and computer science
Rivne State Humanitarian University
Rivne, Ukraine

Volodymyr Havryliuk

Department of Information Systems and Computing Methods
International University of Economics and Humanities
Academician Stepan Demianchuk
Rivne, Ukraine

Abstract—Smart home technology, an application of Internet of Things (IoT), provides households with e.g., comfort, control and convenience. The technology has been around for sometimes, but its prevalence is not yet widespread, and thus the potentials have largely been underestimated. The purpose of this paper is to develop a comprehensive model that can explain a large percentage of variance in the intention to use smart home technology.

Keywords — Arduino; Internet of things; microcontroller; Smart home; client-server architecture; sensors.

I. INTRODUCTION

Increasing of efficiency of industrial systems and infrastructure due to incorporating modern intellectual systems has become very popular now days. There is endless number of areas where so called “smart systems” are applied today: intelligent transportation systems, smart manufacturing, smart houses, smart cities and so on and so forth. Normally, these systems will always use words “smart” or “intelligent” in their name [1]. “Smart” environment is defined as a physical infrastructure (sensors, executive mechanisms and networks), that enable the external intellect to function. “Smart environment” is an electronic environment, that is able to receive and process information about surrounding reality, as well as adapt to the needs of users for improving their interaction with external environment. [2]

With increasing computational capabilities the concept of “smart house” has got its logical continuation: a system called “Internet of things”, which has led to the first standardization and regularization with recommendations regarding building the product as a whole as well as its components. After analyzing a large group of solutions for the “smart house” systems one can find a set of problems. And one of the largest and the most common one is a high price of such a system, which won’t help to create mass interest in this type of products. Another drawback is the absence of well defined standardization. Each manufacturer provides a solution of a “smart house” in its own way. That is why creating software package which tackles the problems mentioned above is still important and relevant task.

II. ARCHITECTURE OF THE DEVELOPED SYSTEM

In this work a set of solutions which can control a “smart home” system has been developed. It consists of firmware’s for microcontrollers and software solutions which interact with them (see figure 1).

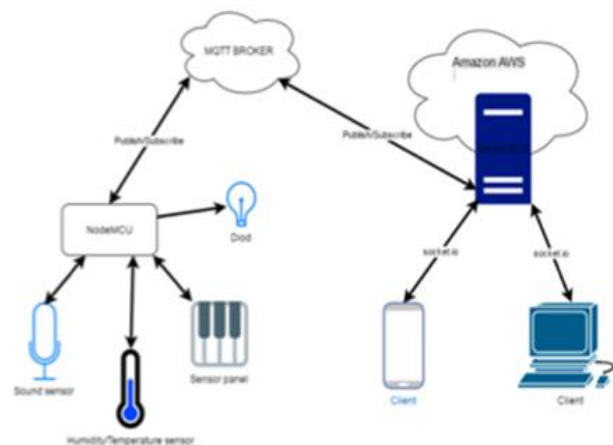


Figure 1. Interaction of the part of the smart home system

For better understanding how the device interacts with software we provide a description of every modulus.

Modulus “SmartDevices” - this is a set of software solutions that interact directly with on devices and give the information from sensors to server. It consists of the following components:

- inner modulus for reading data from sensors, which is attached to microcontroller;
- inner modulus of conversion and transfer of data obtained from sensors; this modulus enables input/output operations;

“Smart Device Tunnel” - server that works directly with devices of the house, organizes network interactions (sending and receiving data by a final clients, which include physical devices and software for data visualization). Server is scalable, which enables it to interact with large number of clients as well

as connect with various number of wireless devices. In consists of the following components:

- modulus of identifying all compatible devices. When server is starting, this modulus is responsible for its following behavior. If modulus find a compatible device, it will automatically initiate plugging and tuning instead of waiting such an initiative from the device.

- OSCListener and UDPListener - these moduli are responsible for communication with external clients: first one provides data for the following visualization and the second one works with real manipulators.

III. CONCLUSION

IOT brings a new age for IT technologies and can change our life and job to a more intelligent and modern stage. The research and application of component technologies and the

new application mode of IOT such as sea computing can facilitate the IOT to a more widely fields. Smart home, Intelligent Residential District and more other applications will appear in future.

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