Building a high-level interface with ESP8266 for management of devices in IoT

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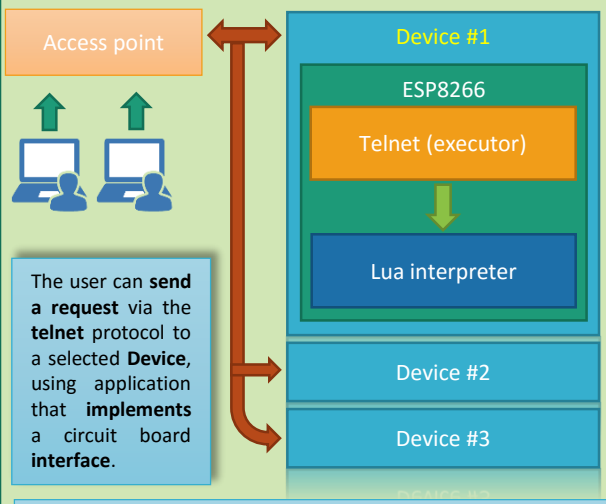
Introduction

We see the Internet of Things [IoT] as billions of smart, connected "things" that will encompass every aspect of our lives [1]. The IoT is comprised of smart machines interacting and communicating with other machines, objects, environments and infrastructures. The IoT is defined in many different ways, and it includes many aspects of life. Our poster is about the results of an in-depth research into IoT issues.

Main goals

- full distribution – lack of central point (of failure)
- responsive and stable system
- reliability provided by modules
- efficient Wi-Fi communication

System Architecture



The user can **send a request** via the **telnet** protocol to a selected **Device**, using application that **implements** a circuit board **interface**.

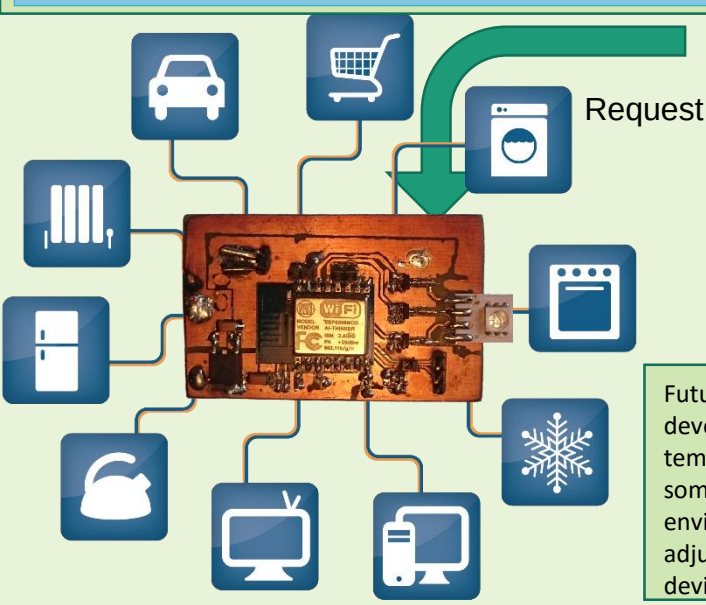
Our system consists of a number of elements. It represents a circuit board - **Device** communication with various types of **clients**, connected to the same network, like android applications or telnet clients running on a given operating system.

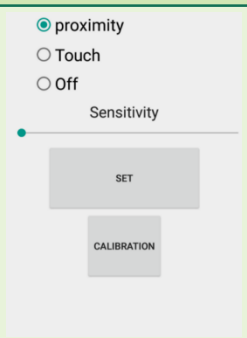
Telnet (executor)
- virtual terminal connection, features great **flexibility**
- each defined **command** can control a different functionality of the system
- commands are **interpreted** by Lua and **executed**

Lua interpreter
- language for embedded systems and clients
- it has important **functions** defined and loaded on startup
- controlling the system just by **interpreting** commands

ESP8266
- offers a complete and self-contained **Wi-Fi networking** solution
- It has powerful on-board **processing** and **storage** capabilities
- can be integrated with **sensors** and other **application-specific** devices

Device (circuit board)
- **prototype** of service provides a **high-level interface** to a set of IoT devices using **ESP8266**, which manage devices of **IoT**.
- **circuit board** integrated with ESP8266 and software ensures **management** of a set of **devices** communicating over **Wi-Fi** network.





Summary

By the current stage, we have developed:
- a working implementation of the system
- a set of circuit boards
- a suite of scripts and an android application.

Future work

Future work aims to extend the current API and allow the user to develop their own modules by involving various sensors, e.g., for temperature, humidity, etc. The management of devices requires some changes, with special focus on the configurability of the environment. We are going to make the circuit board more adjustable, so that the user could connect and manage various devices of their choice.

References

White Paper What the Internet of Things (IoT) Needs to Become a Reality. Global Strategy and Business Development, Freescale and Emerging Technologies, ARM, 2014.

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