

# A Unified Interactive System for Controlling a Smart Home

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## Introduction

Smart home technology promises a brave new world where people control everything through smartphones. Recent surveys confirm that home automation is an emerging field with a current revenue of 30 million that will outreach 70 million by 2020, without yet reaching its full potential [2]. In general, smart environments users are expected to manage multiple places simultaneously (e.g., residence, office, etc.) that incorporate a wide range of connected devices and artificial services, which they will have to monitor and control efficiently in a timely manner, regardless of their functional diversity. Despite, the abundance of mobile applications and frameworks that enable a user to control individual smart devices (e.g., lights, locks, etc.), there is still the need for a unified interactive system that will aggregate them under a common roof and facilitate interaction through a simple, intuitive and consistent user interface. Therefore, the envisioned application aims to deliver a unified control center for the intelligent environment that focuses on enabling effective manipulation of a multitude of smart devices.

## Our Approach

Despite compound annual growth rate, actual sales lag behind the household penetration; amongst various reasons, limited usability of the mobile applications is an important influencer. This work presents the preliminary findings of the requirements elicitation process along with a few alternatives UI designs that accommodate the functionality of a technologically-equipped two-storied smart home. To improve perceived usability of the “umbrella” application, an iterative User-Centered Design process was followed involving mainly the expected end-users of such systems (i.e., members of Generation X and millennials) [1]. In more details, brainstorming sessions provided a set of ideas and a general feel for the home automation domain through an extensive state-of-the-art review (e.g., commercial and research

products, visionary sci-fi movies, etc.). Then, personas were created to serve as actors of the scenario in order to help communicate and reason design ideas and requirements. Upon personas’ generation, several focus groups sessions revealed different approaches towards devices and services categorization (e.g., by type, by room, by status, by frequency of use, based on the location of the user or his/her habits, etc.) to accommodate different user preferences. Based on the findings yielded from that process, a set of alternative interactive prototypes were created and examined using the A/B testing method to determine the most favorable ones. The goal of that process was not only to select which alternative(s) the end-users might prefer the most, but mainly recognize the UI aspects that influenced their selections as the best candidates for the proposed environment. Specifically, 17 users participated in an A/B testing experiment where the alternative designs for 3 scenarios were studied. The first two scenarios concern the type of dashboard the users’ desire when they are inside or outside the home, while the third investigates the way they prefer to control a device (e.g., a smart TV). The findings suggest that the users, while being at home, prefer their dashboard to show details of their current room (52.9%) through which they can directly manipulate its facilities, instead of a general house overview. In contrary, while away from home, they prefer to get a home overview to ensure that everything is in place (58.8%) over a list of active devices (41.2%). The poster will present the rationale of the designed alternatives and explain how they aim to assist the users.

## REFERENCES

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- [2] McKinsey&Company. 2016. There’s No Place Like a Connected Home. (2016). Retrieved April 28, 2017 from [http://www.mckinsey.com/spContent/connected\\_homes/index.html](http://www.mckinsey.com/spContent/connected_homes/index.html)

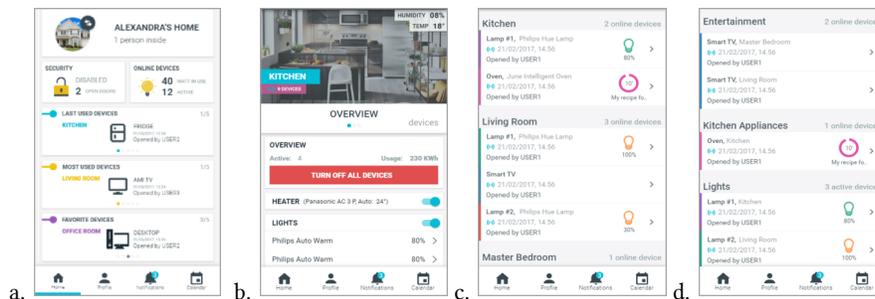


Figure 1: (a) General Overview of the house (b) Room details (c) Active devices per room (d) Active devices per type