FACULDADE DE CIÊNCIAS E TECNOLOGIA
UNIVERSIDADE NOVA DE LISBOA

Interacção Pessoa-Máquina

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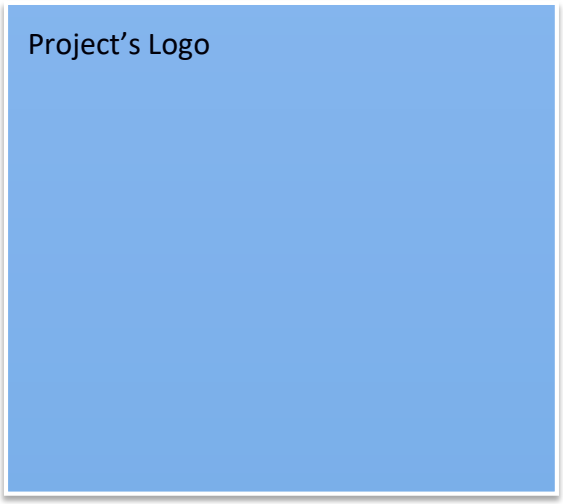
SmartDomotic

Stage 3: 1st Prototype



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1 Sketches and Scenario Storyboard

Adding my house with all the existing equipment to the automation system:

- **Login page**

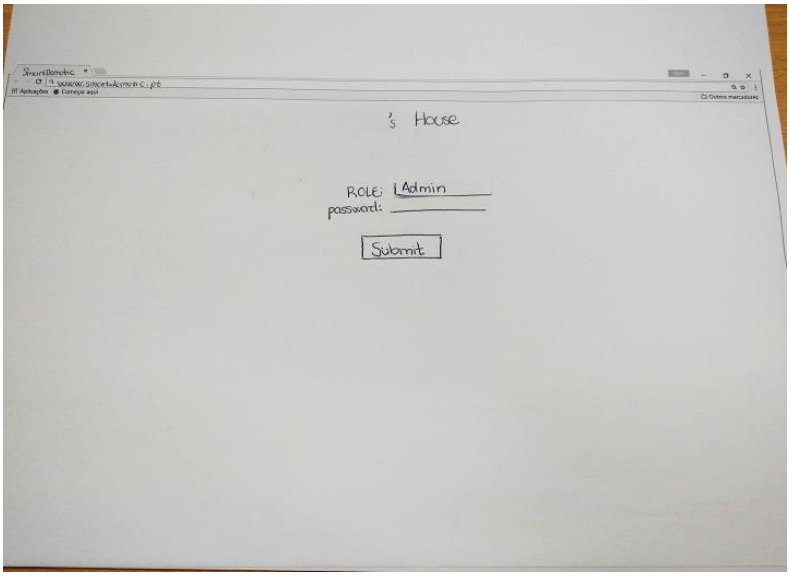

Figure 1 - Authentication page

- **Floors Page**

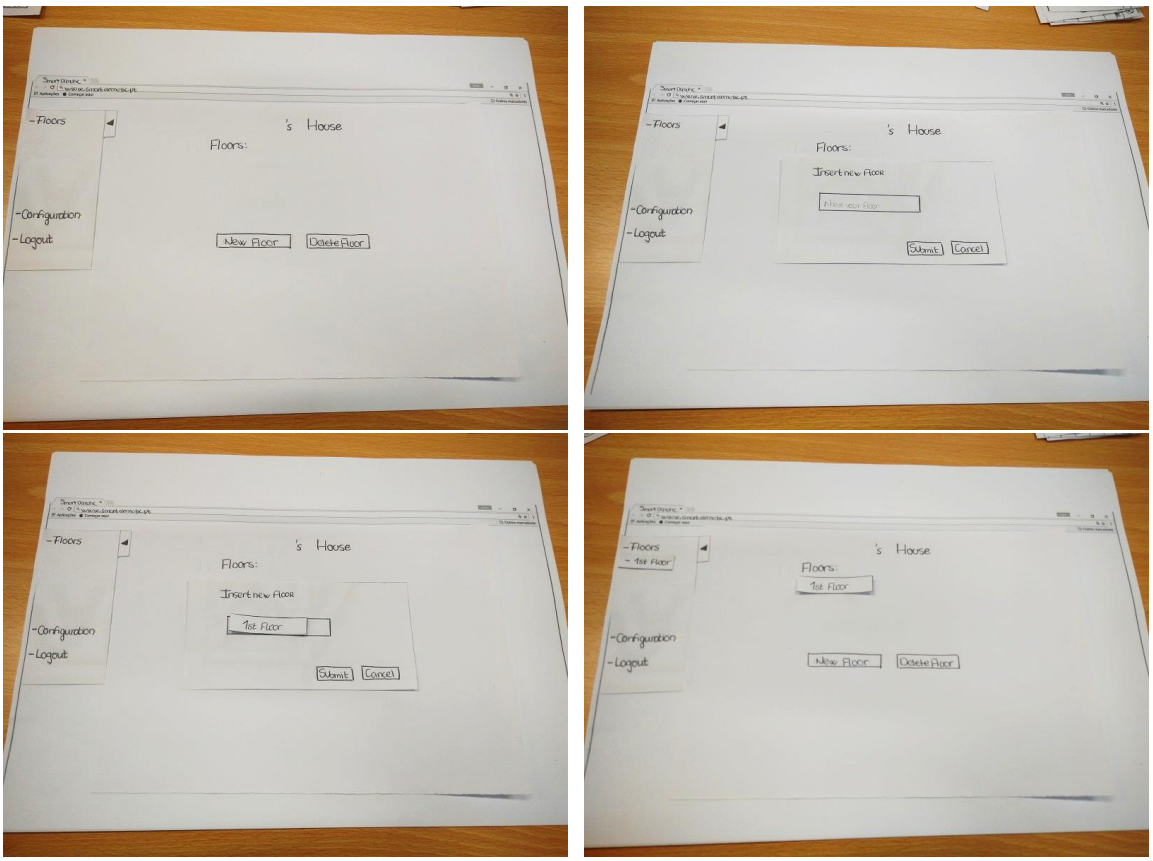

Figure 2 - Pages with the inserted floors and the form to insert floors

- **Floor page with no divisions**

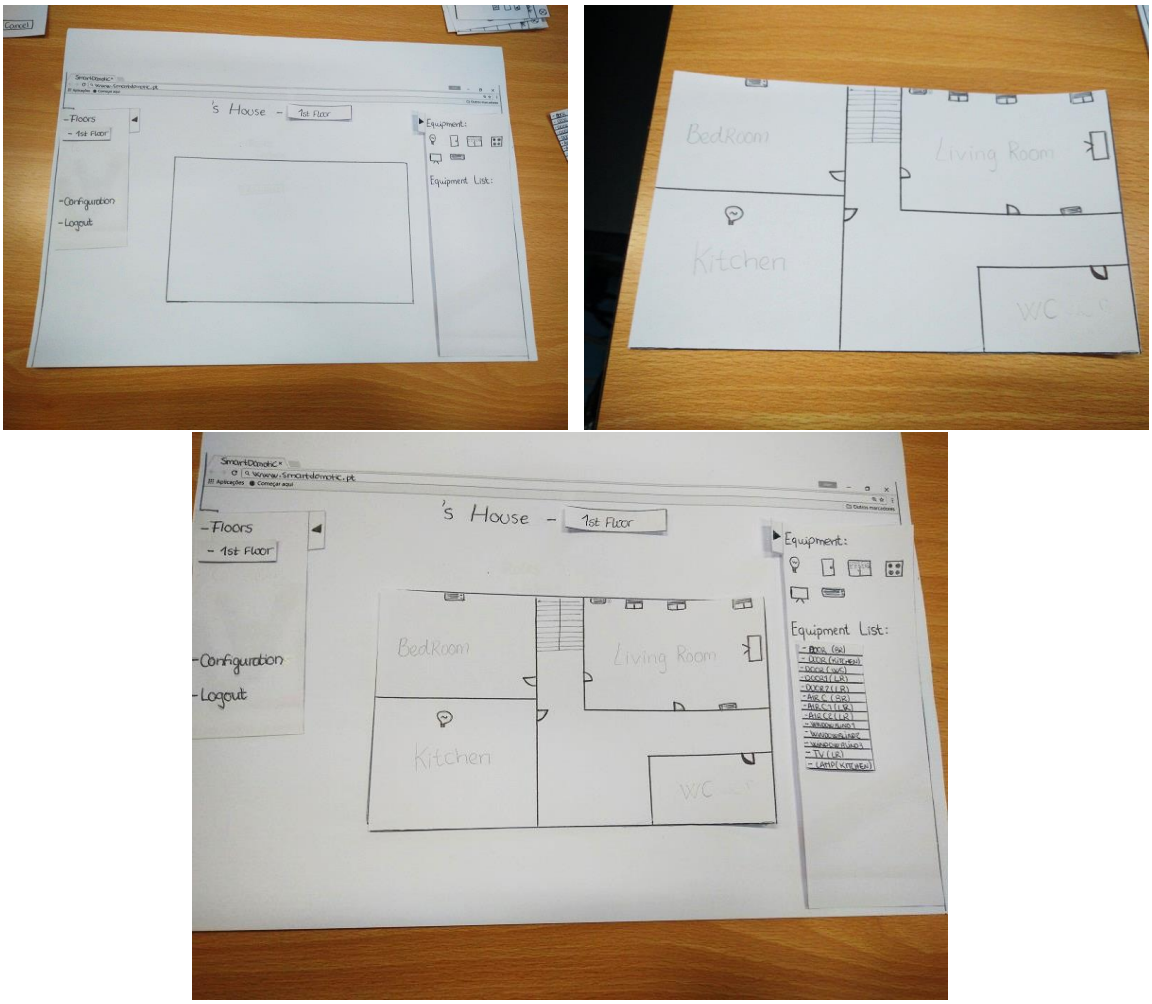

Figure 3 - Plan of the house and pages to add divisions and equipment

- **Toggling the first floor kitchen lights**

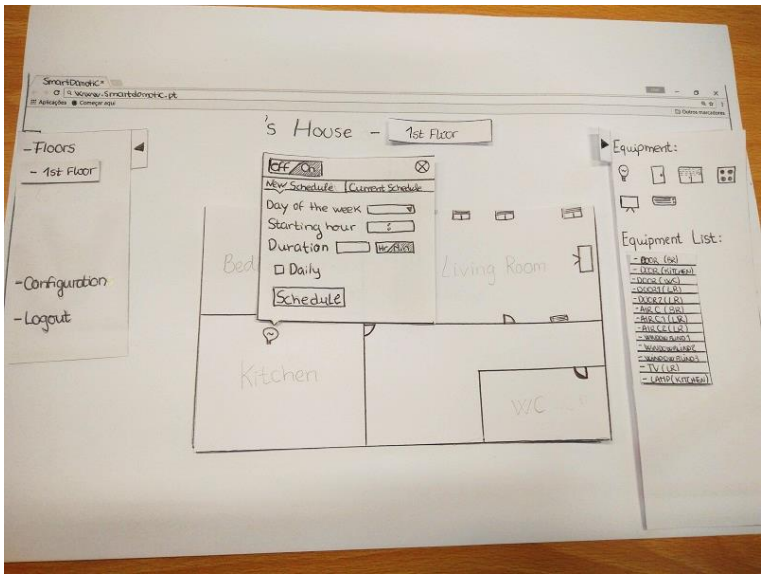

Figure 4 - Page with pop-up to turn on/off the lights of the kitchen

- **Scheduling the temperature of the AC.**

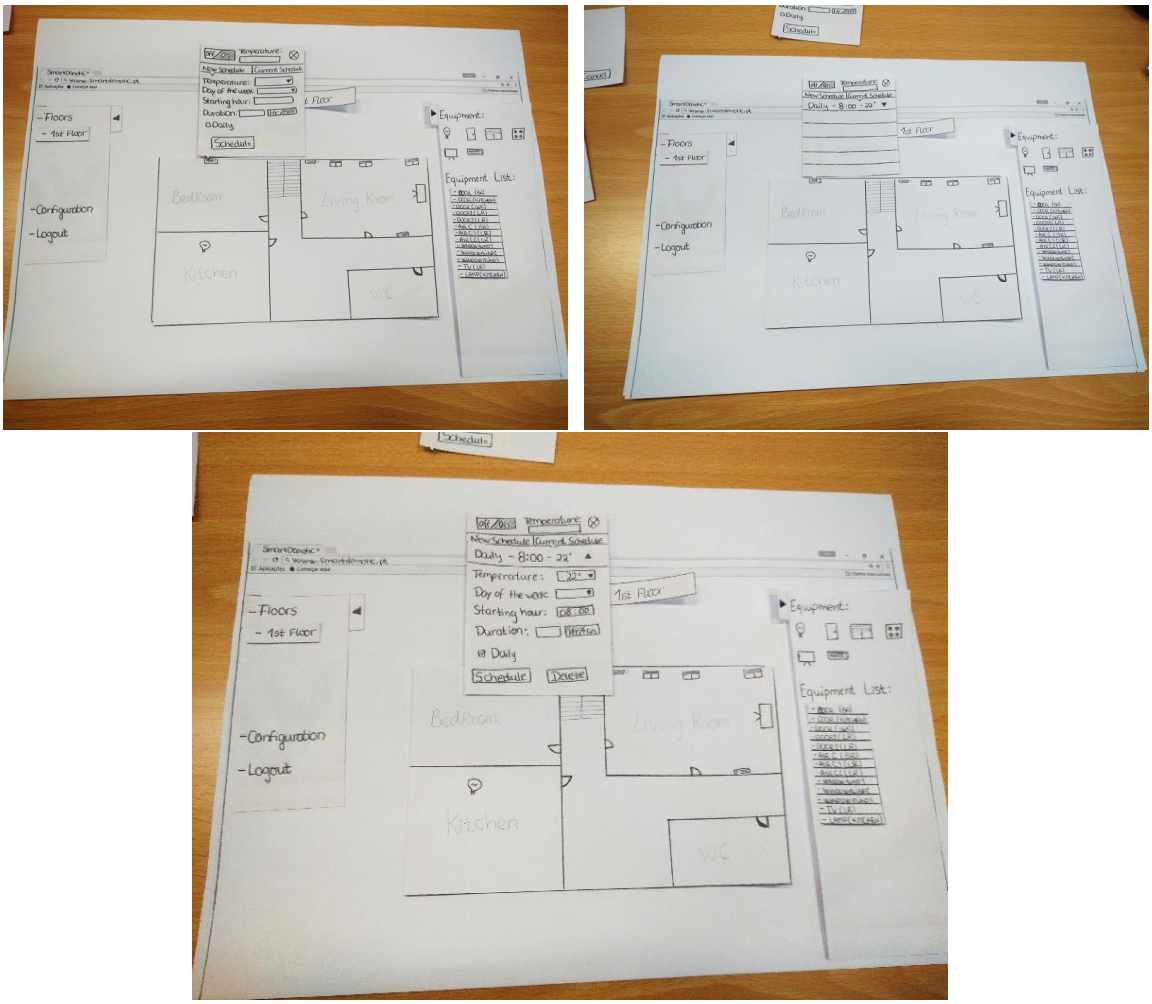

Figure 5 - Pages with the pop-ups to schedule the air conditioner and change actual schedules

- **Allowing children to control some equipment**

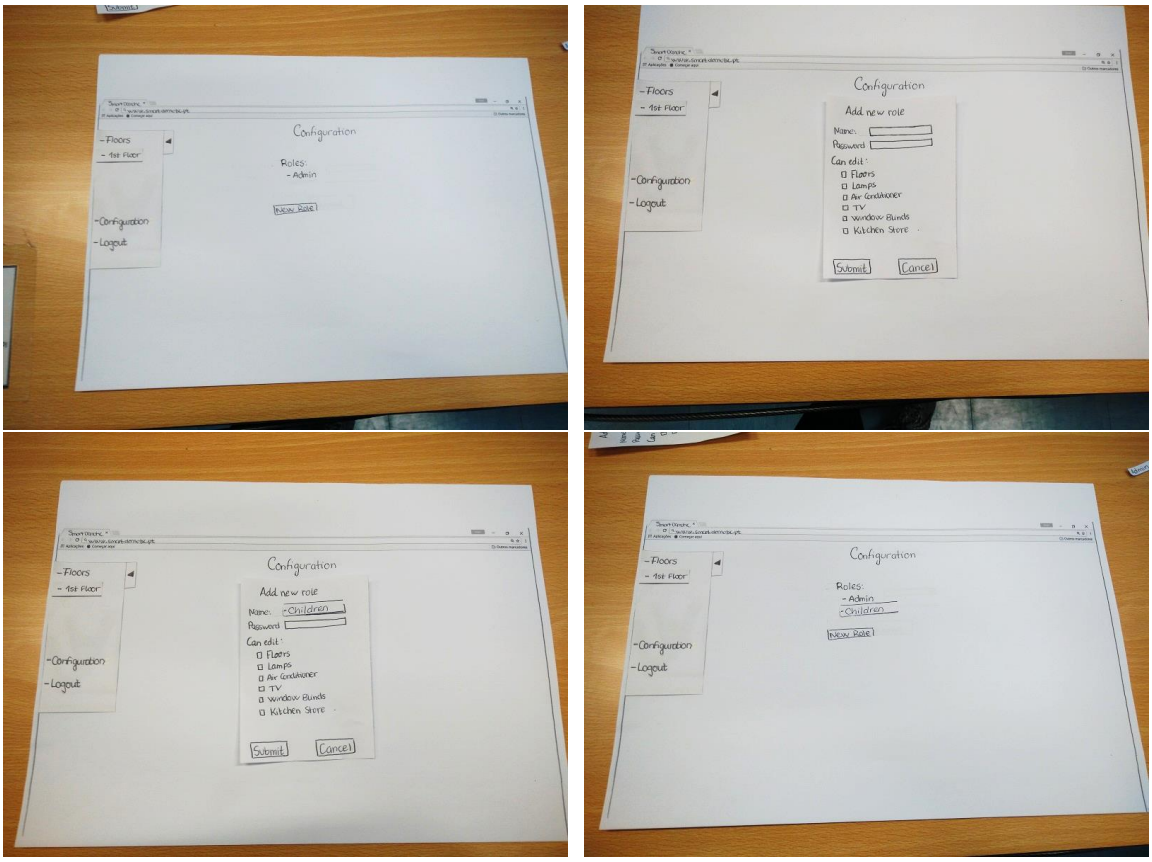

Figure 6 - Pages to configure the roles and their permissions

2 Briefing

This application's purpose is to provide the users with a simple and intuitive home automation system.

The users are able to control the floors, divisions and equipment by accessing the application from any platform by using a web browser.

The main user (the administrator) has full control over the system. He can add new floors to the system and modify/remove the existing ones. He can also customize each floor by splitting it into various divisions representing bedroom, kitchen, bathroom, etc. This whole process is as intuitive and simple as possible, and it resembles making a simple drawing in the MS Paint application. Lastly, the administrator user is able to add equipment to each division. The application comes with a set of controllable equipment that the user can choose from. The set includes such equipment as: Lamps, windows blinders, doors, TVs, air conditioners, and kitchen stoves, among others.

In order to control the access of different types of users like children, the administrator user can define new user roles, for which they can impose numerous restrictions, such as allowing the target user to control only a subset of available equipment while forbidding all other, or forbidding access to some device functionalities, such as scheduling.

3 Task and Scenarios

1. Adding my house with all the existing equipment to the automation system.

1.1. Firstly, I logged in as an administrator, with the password ‘admin’.

1.2. I decided to add my 2-floor house, with 4 divisions on the 1st floor and 3 divisions on the 2nd floor, to the automation system. I opened the application, and added two floors to the system.

1.3. Now I needed to add the divisions to the floors, so I proceeded to add various the divisions in accordance with the paper house plan. I repeated the same process for each floor, by adding 4 division to the first and 3 to the second.

1.4. After having the complete house plan added to the system, I proceeded to add all of my equipment to the appropriate divisions. I started by placing 2 air conditioners, 2 doors with electric lockers, 1 electric window blinds, and a TV in my living room. Then I filled all other divisions with the appropriate equipment.

2. Toggling the first floor kitchen lights

3. I decided to set the air conditioner in my bedroom on the 2nd floor to turn on every morning at 8 o’clock, at 22 degrees Celsius.
On the next day, I woke up a little bit cold and realized that I should set the room temperature higher, to 25 degrees.

4. In order to allow my children to access the application, I had to configure a user role for them, such that it would be only allowed for them to change the state of some equipment. In my case I wanted to let them control the lamps, the TV and the air conditioner.
After settings up the user role, my children are able to login into the automation system and make the changes that are allowed to them.

4 Observation

We tested the prototype with 4 distinct users. For each one we wrote down the time spent in each task, represented in table 1.

After the testing, we could conclude that the tasks 1.3, 1.4 and 2, took a lot more time than expected for the 1st, 2nd and 4th tester. This results are due to the lack of representation of the paper mockups, where some functionalities are not so evident, which leads to a longer time spent to realize some tasks.

		Time (min) for scenario						
Test	**Age**	**1.1**	**1.2**	**1.3**	**1.4**	**2**	**3**	**4**
1	22	0.18	0.50	1.06	3.43	0.36	3.30	0.35
2	22	0.15	1.30	1.00	0.50	1.24	5.05	1.15
3	24	0.24	0.39	3.38	1.14	2.27	3.00	0.42
4	-	0.40	0.33	1.29	0.37	1.06	2.15	0.20

Table 1- Comparative table with the time spent by each user in each task.

According to each test we could produce the second table. Where we analyze the difficulties of each user while accomplishing the asked tasks, and also some proposed improvements to the application, in order to make the most user friendly possible.

When we asked the user to perform the following task – “On the next day, I woke up a little bit cold and realized that I should set the room temperature higher, to 25 degrees”, we noticed that there was a certain difficulty finding the schedules already created, leading to the creating of new schedules, by assuming it would overlap the previous one. This problem was caused by two factors, firstly, the button to the tab “Current Schedule” was too small, and also, because it’s a paper prototype, the perception of being clickable of some interface components aren’t obvious.

Regarding the suggested improvements, only the second user proposed changes, in the configuration page. He suggested the creation of a similar page to the house plan, and then selecting each division to give permissions for each user for that division, allowing the permissions to be a lot more specific. For example, if an admin user wanted to give permission to a user just to change the lights in his bedroom, he couldn’t because it would permit to change in every division of the house.

Test	1	2	3	4
Difficulties	Couldn't interpret the house plan	Wasn't capable of notiing the button "Current Schedule"	Didn't notice the button "Current Scheduler" and the option "Daily"	Didn't know the equipment where cickable, and that it would open a pop by doing that. Also couldn't identify the button "Current Schedule"
Proposed Improvements	-	The user proposed that the permission were given by each division, instead of allowing the user to change the state of some equipment in all the divisions, let only change a specific one.	-	-

Table 2 – Comparative table with the difficulties and proposed improvements by each user that made the test.

By analyzing the presented tables, made with the results of the prototype testing, we can conclude that it was successful stage, existing only minor issues to resolve, in order to move to a more concrete and specific prototype(computational).

Even though, some users faced some difficulties, we think we can work around those problem, by fixing them easily to the next prototype. Being the biggest problem the lack of perception of the "Current Schedule" button.

The testers also shown interest in the application, stating that the system would the useful in their daily life.