Smart Home Box

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Abstract:
Whether you are rich or not, the luxury of having smart devices in your home controlled over the internet is no longer as costly as it was, because Smart Home Box introduces a new approach to the traditional
The concept of Smart Home. In fact, each wired connection involving refurbishing and mason intervention on your house will imply just a handyman to connect wireless module to the designated devices and one box connected to the WiFi to have a Smart Home as functional as ever.

Keywords:
- SmartHome
- Wirless Connexion
- Xbee
- Arduino
- Galileo,
- Internet of Things
- Domotic

Remote control
I. Introduction:

The concept of smart home existed long ago through time with the rise of technologies. However, it’s not designed and conceived for a large public, the home in concern must have essential requirement in addition of its cost the targeted public are just those with big bank account.

As we’ve mentioned, the main problem is the cost to adapt the solution to any home, refurbishing the infrastructure is one of the most important step to get your home to another definition level. For this, our solution is made to give them users the opportunity to keep the traditional construction without any mason intervention, and evolve with their vintage home to a modern one. Thus, even the known concept of smart home connected through cables is going to get a step further by introducing the notion of wireless connected objects.

II. State of the art:

Competitors are dispatched all around the globe mainly offer two services:

- **Groupe LEGRAND (in France) & Domotique Tunisie (in Tunisia)**:
  
  Get a smart home as costly as you’ve got rooms.

  refurbish every single room from its electric infrastructure.

- **Orange (in France)**:
  
  Buy to every single object a module to control a specific item in your home. (very expensive solution)
III. Solution Architecture

a. Presentation:

Nowadays, technologies is part of our daily existence and connected devices such what is introduced by internet of things is getting to our heads as a necessity and no longer considered as a luacy. Due to all these circumstances “Smart Home Box” is brought to you for a better daily life.

Our product keeps you connected to your home no matter where you are thus giving you the ability to control your house at any time. Easy to install, it requires basic do it yourself knowledge.

This product was designed for people who either already have a smart home and want to upgrade it or for people who want own a smart home at minimum cost.

b. Schema

![Diagram of Smart Home Architecture]

III.c Technical description:

To make it easier to understand, let’s follow this example:
Mister X uses the smart home box, he wants to change the state of the modules via our application. If his smartphone is connected to his wifi signal, the data will be directly transferred to the Smart Home Box, or else they will be stored in the cloud. The smart home box will then activate or deactivate the embedded modules according to his choice.

### III.d Communication Protocol:

- **Zigbee protocol:**
  - Connect the smart home box and the embedded module

- **TCP/IP protocol:**
  - Wireless connection between different components and the application
  - Internet connection to maintain connection between the user and his house using Cloud services

### III.e Development phases

Our project is made of four main parts:

1. Cloud service, which is for storing the users data
2. The mobile application which will allow the user to control everything
3. The smart home box, which is the heart of our project: it controls the hardware according to the data received from the application.
4. The embedded modules which function according to the data received from the smart home box

### III.f Technical Hardware References:

*Intel Galileo Gen 2:*
Galileo 2 is a microcontroller board based on the Intel® Quark SoC X1000 Application Processor, a 32-bit Intel Pentium-class system on a chip. It’s the second generation of the board which is based on Intel® architecture designed to be hardware and software pin-compatible with Arduino shields designed for the Uno R3.
XBee and XBee-PRO 802.15.4 OEM RF modules are embedded solutions providing wireless end-point connectivity to devices. These modules use the IEEE 802.15.4 networking protocol for fast point-to-multipoint or peer-to-peer networking. They are designed for high-throughput applications requiring low latency and predictable communication timing. XBee modules are ideal for low-power, low-cost applications.
IV. User Scenarios

**Scenario 1:** Every Morning Melissa Wakes up At 5 Am, one hour before work, to prepare the breakfast for her little child Bobby, so she needs to turn on the coffee maker and prepare the toasts, With Smart Home Box Melissa can directly via her Windows Phone Application control the kitchen so everything is done without efforts so she can prepare herself and dress up quickly to be ready to leave for work without wasting time.

**Scenario 2:** Tony invited his Girlfriend Friday night for dinner at a beautiful restaurant. During dinner, he remembered that he forgot to close the garages door after leaving, with his windows phone application and without leaving his date, the garage is closed by a simple action and tony can enjoy his night.

**Scenario 3:** Life chose to take from John his ability to move freely. He’s now labeled as handicapped person and this because he became dependent from others to get to his needs. Until he discovered Smart Home Box, a product, which gave him the opportunity to get what, he wants without the need to be helped. John can open the door with a single tap on his mobile application, he can also enjoy sunrise from his window without disturbing the sleep of his wife. He’s quiet.
V. Screenshots and photos:

V.I. Android Application Screenshots:

- SplashScreen Interface
- Main Interface
- Settings Interface

V.I. Windows Phone Application Screenshots:

- Login Interface
- Main Interface
- Change state interface

VI. Test and Results:

VII. Marketing strategy | Business Plan:
Competitive Analysis

<table>
<thead>
<tr>
<th>Solution</th>
<th>Cost</th>
<th>Connectivity</th>
<th>Deployment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Le Grand : MyHome</td>
<td>&gt; 100 $</td>
<td>Wired Connection</td>
<td>Complicated</td>
</tr>
<tr>
<td>Orange : My Plug</td>
<td>= 116 $</td>
<td>Wireless Connection</td>
<td>Average</td>
</tr>
<tr>
<td>J2MC : SmartHome Box</td>
<td>&lt; 100 $</td>
<td>Wireless Connection</td>
<td>Easy</td>
</tr>
</tbody>
</table>

Potential Revenue

*money that comes from the sale of boxes and their modules and mobile applications*
**Swot analysis:**

**strengths:**
we do not have competitors in the local market. 
Smart home box with its modular design, Trivialize the implementation of the solution in any home in minutes. 
The user does not need the intervention of an expert in electricity or masons to implement the solution at home, he just need to follow the guide provides with the solution, and it can make her home smart in a few minutes. 
Gaining in term of time and cost, comparing with wired solution, Smart home box saves us time, since we do not need Electric expert to modify installation of electricity in the house, nor masons to restructure the house, or that these two actions require much time.

**Weaknesses:**
We are a young and new team in the field of home automation.
The user should not give his access id to anyone suspicious

**Opportunity:**
We can target other markets such as hospitals, enterprise, city ...
Thus control objects in the house, we plan to modulate lighting

**Threats:**
The emergence of new technologies That better meet The Needs of our project.
The appearance of competitors Offering less expensive solution.

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**VIII. Perspectives:**

Indeed the concept of Smart Home Box was born targeting only houses and the daily lifestyle. However, considering the ease to use our product, our targeted market is getting wider; in fact our solution can be adopted by private shops, markets, oil stations and even enterprises.

Smart Home Box will remain but as a product from a list of many other.