# SMART HOME USING ARDUINO

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**Abstract:** This work is being developed in a research institution to use home automation with mockup as a prototype, as well as low-cost equipment and applications. Greater convenience, practicality, and safety will be achieved at a house to support and minimize the day-to-day activities. Thereby, it will be built a model using Arduino microcontroller to automate some routines. It is intended to control some functions of luminosity and light activation, opening gates, doors and windows, keyboard to access the house, as well as controlling the humidity and temperature of the environment. All equipment will be installed in the model and its functions will be controlled with the aid of a mobile phone due to its great use today.

**Keywords:** Home Automation. Arduino. Practicality.

## 1 INTRODUCTION

Home automation is a set of technologies that allow the automation of some routine tasks at home, as well as provides security, manages energy consumption, allows comfort and integrates services to system users, among others (PINTO, 2010).

Thus, this work has as its general goal to build a residential model to automate the use of equipment and devices within a residence, such as: automatically triggering doors, gates, pumps, motors, lights, as well as opening doors and gates, among other functions.

The Arduino microcontroller will be used as an open-source hardware and single-board electronic prototyping platform with inputs and outputs and standard C/C$^{++}$ programming language (EVANS; NOBLE; HOCHENBAUM, 2013).

## 2 MATERIALS AND METHODS

The main equipment used in the partial results presented so far are: i) Arduino Mega microcontroller; ii) LEDs; iii) Bluetooth module; iv) resistors; v) servomotor; vi) alphanumeric keyboard; and vii) Blynk software (BLYNK, 2019).

All equipment listed above will be installed in the model and connected to the Arduino board for proper drives. The Control of the equipment will be done by using the mobile phone through Blynk software (BLYNK, 2019). Some process variables will be automated, such as luminosity, gate opening, and closing, doors, pump drive and control of temperature and humidity in the environment. Thus, the final product is a model with sensors installed and monitored, as Figure 1 presents:

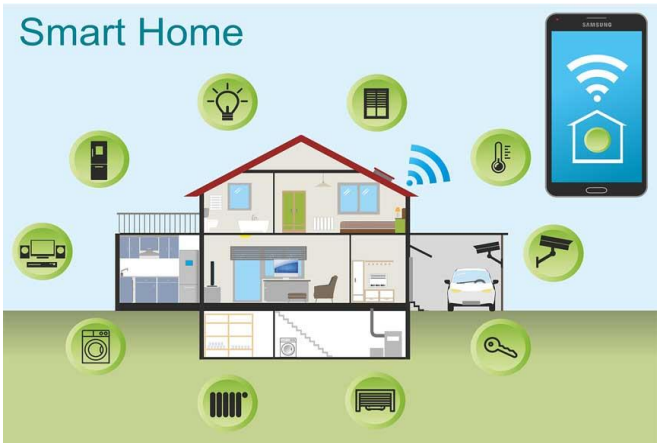


Figure 1 - Illustration of the smart house
Source: Andrade (2018).

## 3 RESULTS AND DISCUSSION

Initially, a single line diagram was made to represent the energy points and equipment allocation in a floor plan. From this electrical scheme, implementations were performed on the Arduino microcontroller, as illustrated in Figure 2. In this case, the light control assembly (represented by LEDs) was made to activate the internal and external lighting of the residence. The first tests were performed using a Bluetooth module that establishes communication between the microcontroller platform and the smartphone.

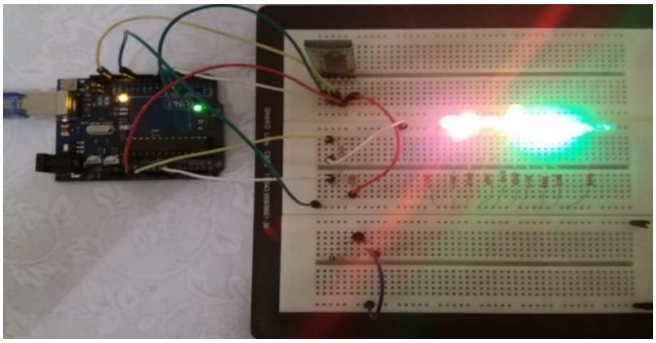

Figure 2 - Mounting for control and activation of external lighting
Source: Own author (2019).

The servo motor drive block has also been assembled for a safety system as shown in Figure 3. In this case, it has been programmed so that opening or closing the servomotor depends on a password entered on the alphanumeric keypad by the user so that the engine is started.

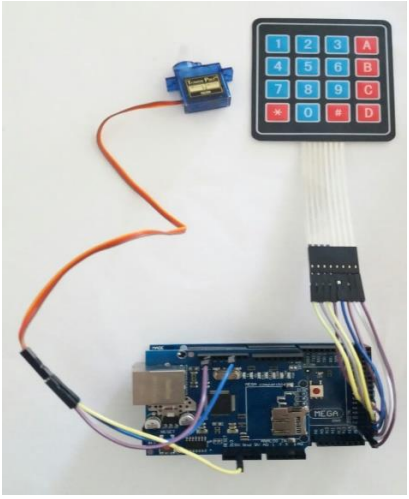


Figure 3 - Drive servomotor for a keypad security system
Source: Own author (2019).

This implementation was triggered by the application commercially known as Blynk, which integrates the microcontroller platform and the mobile device (smartphone). This application is a tool designed to connect equipment in the prototype plant to Arduino over a specified network. It allows the house to be controlled remotely so that sensor data can be obtained and displayed in the smartphone application, as shown in Figure 4.

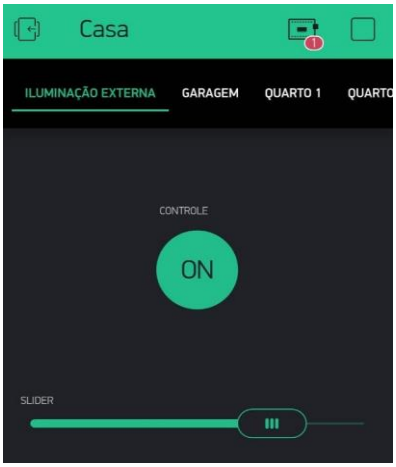


Figure 4 - Blynk Software Interface
Source: Own author (2019).

## 4 CONCLUSIONS

From the initial tests performed in the research, it is expected to create a tool capable of automating most of the functionalities of a residence, besides the tests presented above: luminosity control and opening and closing doors and gates. Other functions will also be implemented during the research such as: controlling access of people, turning on and off pumps and controlling the temperature and humidity of the environment, etc. Thus, you can provide greater comfort, practicality, and safety for its users, to optimize their daily tasks, all with the use of a mobile phone to control these main tasks.

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