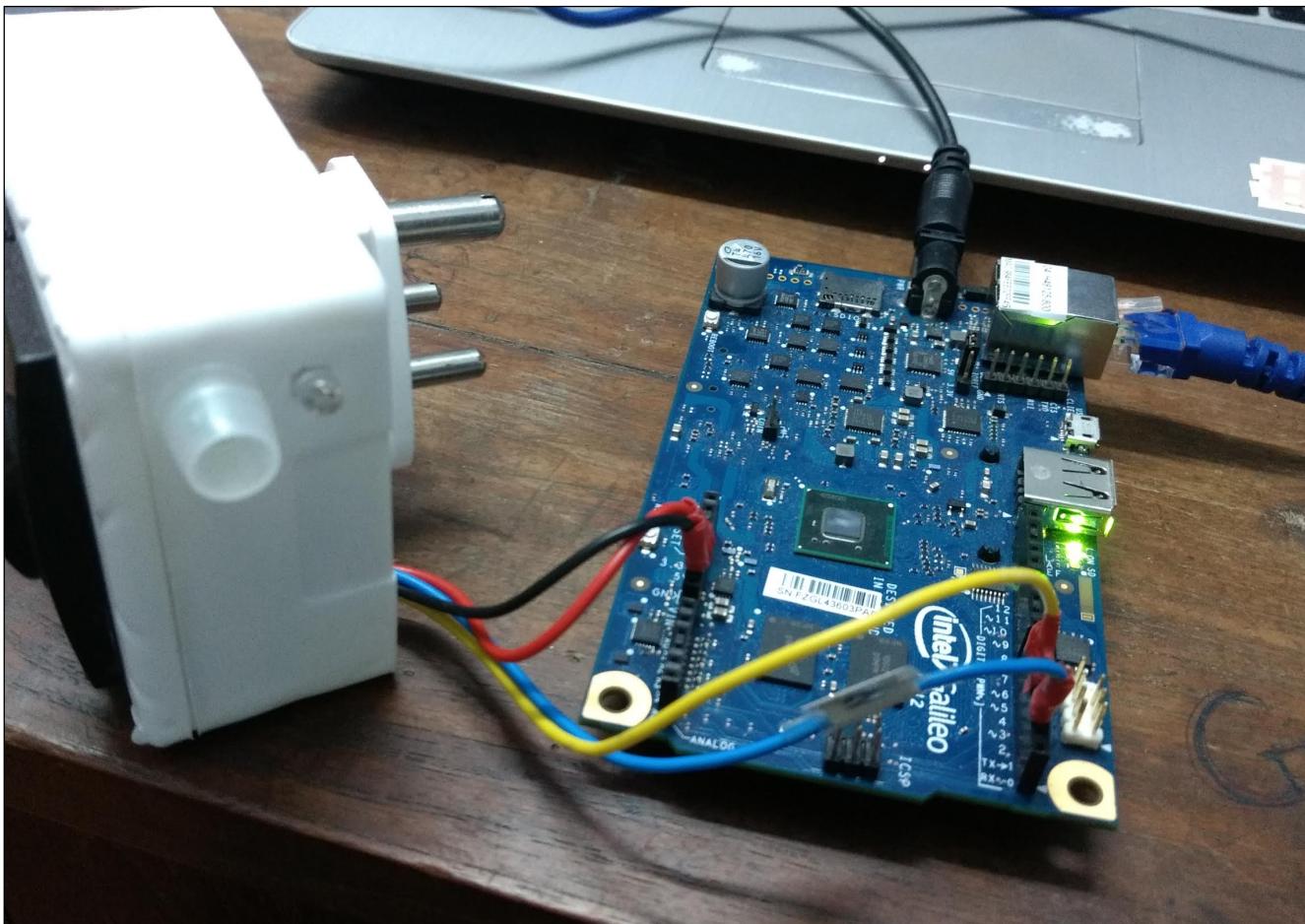


Smart Plug System

Project based on Intel Galileo Board

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Abstract

Smart home is rising innovation developing persistently now. It coordinates of numerous new advancements through home systems administration for enhancing human's nature of living, so there have numerous activities exploring in differing advances to apply to the smart home framework. In like manner, this paper reviews different subjects on smart home innovations from looking over for smart home research projects. This paper also implements a smart home which is energy efficient based on wireless sensor network. We used Firebase which is the realtime database used in this automation which makes us to access our home from anywhere around the world. We implemented this automation through node js using java script as programming language. The framework can screen the temperature, light, fire and criminal caution of the house and have infrared sensor to ensures the family security. The observed information is automatically stored into an excel sheet record. The framework can be associated with web to monitor the security of home from anyplace on the world. Android application designed to control this frame work.



Smart Plug System

Introduction

Usually when the electrical equipment is stopped in yet it is not being used, there still has the stream of power. That implies we will lose the electrical energy around five to 10% of frequently utilization, so that wasting money for no reasons. In addition, that may likewise be reason for numerous accidents, for example, the fire from electrical short circuit. Therefore many people who dependably neglect to unplug the electrical device need to remind themselves each time they go out. Then again, on the off chance that they go out with overlooking to unplug, they should go home to pull the attachment out to avoid the dangerous circumstances, so it is a misuse of so much time. In order to tackle these issues, smart home innovation will be required. With the progress of innovation, numerous exploration extends about smart home have been created with a specific end goal to encourage human and enhance their nature of living. A home, which is smart, is the innovation used to make all electronic appliances around the home act "smart" or "intelligent" or more automated, that is to say smart home has highly progressed programmed systems for lighting, temperature control, security and other function in home.

A smart device is a common appliance with a complex PC introduced to give it more usefulness that can screen such a variety of parts of day by day schedules. A smart home is valuable for everybody and can likewise be utilized to upgrade the regular daily existence at home. The idea of "automation" has existed for a long time. It started with an understudy associating two electric wires to the hands of a wake up timer so as to close a circuit of a battery and light. Later, organizations created mechanized frameworks of their own to control alerts, sensors, actuators and camcorders and, in this manner, made the first automated buildings.

The Objective

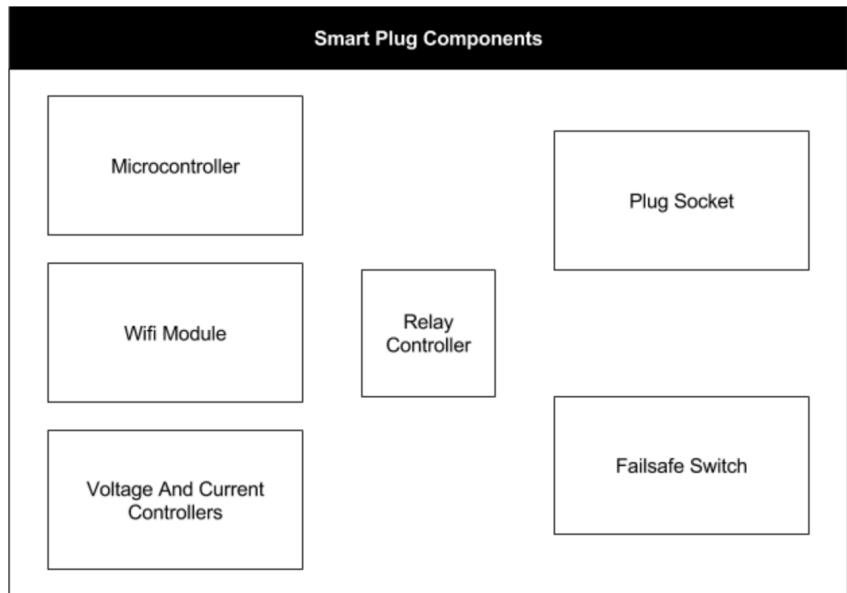
The objective is to develop smart home advancements that can benefit the common man in a very effective and efficient manner. As everything these days is connected to the cloud, there was a need for an extend Cloud-based smart home system. In this project, we will blend smart home into smart home-oriented cloud which is simple, extensible and fit for future demands. We will be designing a software for smart home device in view of cloud computing administration extend, that helps designer select a smart home device and assemble a smart living space. This project in its future stages will also offer visual stimulation by applying the interface to build a genuine smart home. Besides, operation of smart home gadgets has various smart modes. In this way, it is useful in quotes and budgeting.

The Proposed Solution

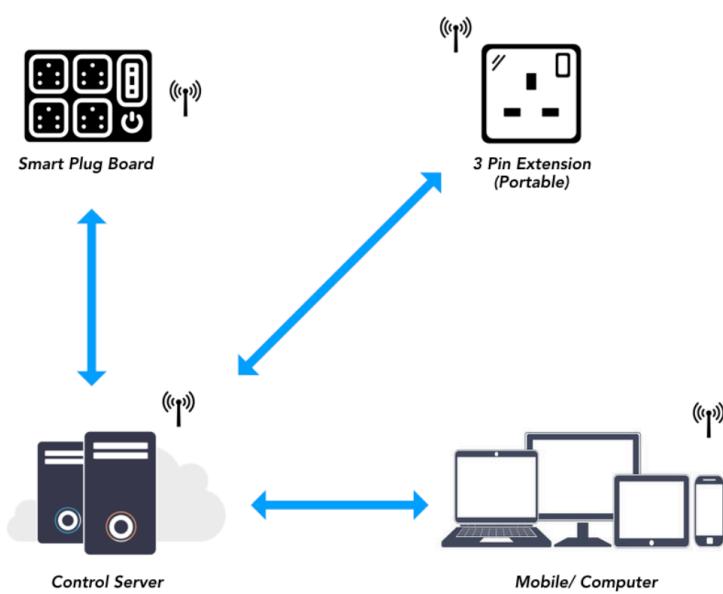
Our initial system in it's beta stages will be able to control the existing Non- Smart Devices, enabling us to convert any device into a Smart device.

This Smart plug will comprise the following components:

- Microcontroller
- Wifi module
- Voltage and current controller
- Relay driver
- Plug sockets
- Fail-safe switch



The Micro-controller is the heart of the project, controlling all the other components by responding to the inputs received by the wifi module sent from the remote control. This smart plug will be portable and would be compatible with all devices. This plug will be integrated with a voltage and current controller, in order to provide the required supply by the plugged in devices, thereby increasing the efficiency and reducing the power wastage. A Fail-safe switch will also provided to cut off the power for any critical situation.



The architecture of the system will be a client server architecture. There will be a back end server to which the remote control device for example a mobile phone, will send a request and then the server will process the request. The server will send the appropriate signal to the Micro-controller based on the request and then it will send a feedback response to the remote control device. This way the smart plug will trigger the relay driver to start the AC supply to the attached appliance.

Ubidots

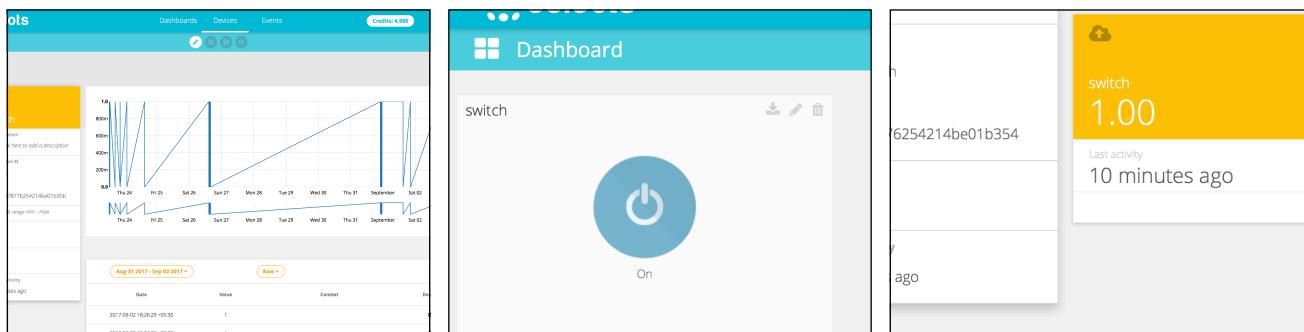
Ubidots is a technology that allows us to make web applications with no server-side programming so that development turns out to be easier and quicker. Ubidots offers a platform for developers that enables them to easily capture sensor data and turn it into useful information.

Use the Ubidots platform to send data to the cloud from any Internet-enabled device. You can then Configure actions and alerts based on your real-time data and unlock the value of your data through visual tools. Ubidots offers a REST API that allows you to read and write data to the resources available: data sources, variables, values, events and insights. The API supports both HTTP and HTTPS and an API Key is required. Applications using Ubidots can control and use data, with no need to think about how data will be stored, and synchronized across variety of examples of the applications in real time. Writing server side code is not necessary when using Ubidots, or to deploy a complex server framework to get an app started with Ubidots.

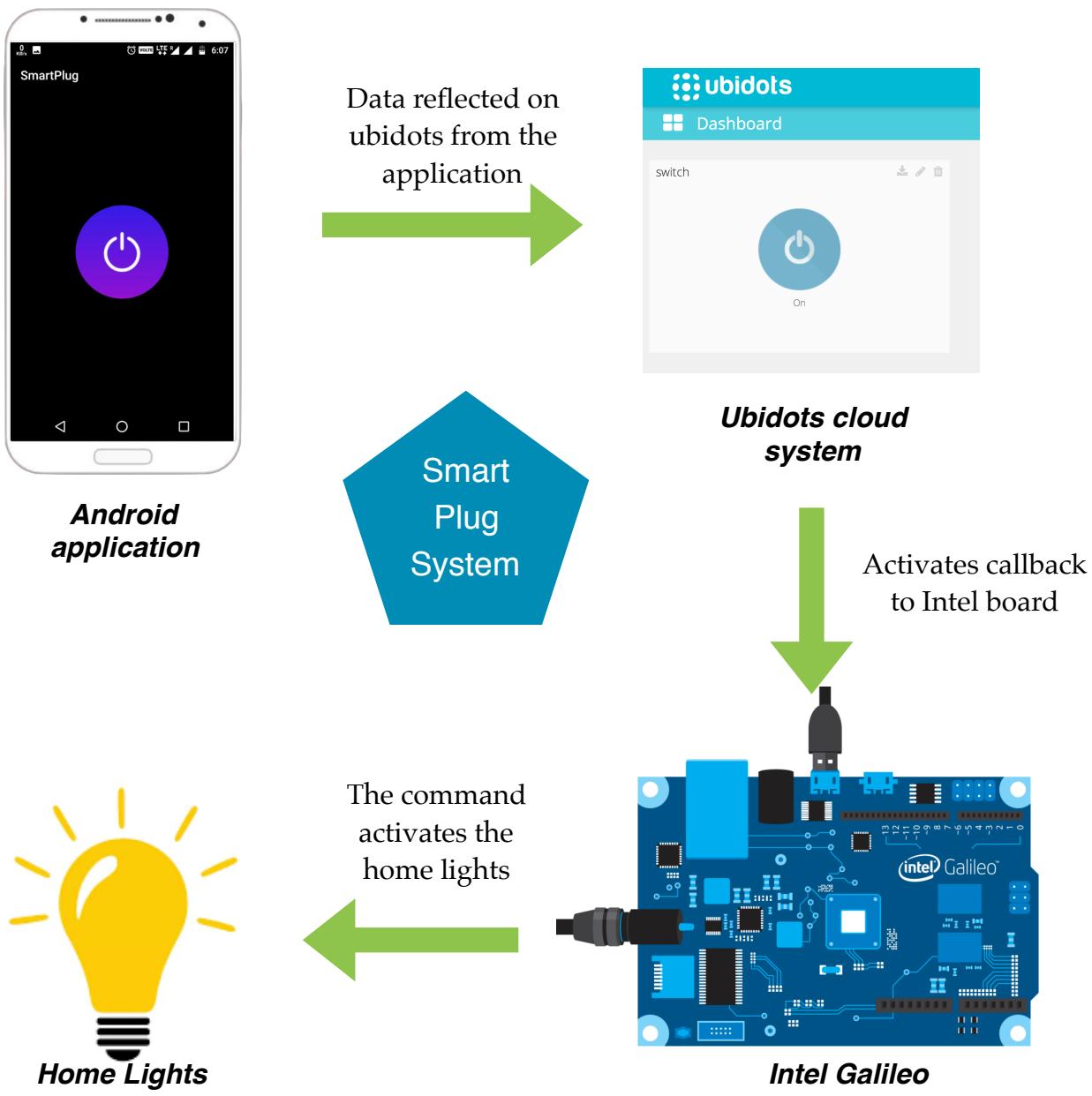


Working Design

This smart plug needs an android application which has buttons to perform appropriate actions in home. This application can be modified with required components in the future so that it shows the auto brightness and temperature with regard to outside temperature and light intensity. On clicking the button in android application it immediately reflects in the Ubidots(database) the status for every action in the Ubidots. Suppose if the user turns the switch on in android application it immediately reflects the Ubidots switch status to TRUE otherwise FALSE. After the changes in the Ubidots there is a system which is connected to the internet. This system connected to Intel Galileo hence regulates the switch in the smart plug.



Ubidots in action



System Architecture of Smart Plug System

Future Scope

This project serves as a model for a larger home unit at its helm. Beyond that the concept can be used to implement various other features and implementations. This pattern has a very huge scope and is the key to an automated future. At a time when Robots and Drones are getting into the daily dynamics, this project will add a dimension above all of them. Few of the features that be developed upon this project as basis are listed down below.

Wake Up to Smart Plugs

What is the first thing you do in the morning? Perhaps you like to listen to the radio, or enjoy a cup of coffee? You might like to heat up a croissant, spread some butter and jam on it, and start your day off with all three. Rather than stumbling out of bed as your alarm goes off, walking into the kitchen door and electrocuting yourself on the toaster, before burning your fingers with the kettle and getting the radio antenna up your nose, why not employ smart plugs to switch all of these on for you? With less to concern you in the morning, you'll be able to focus on getting yourself dressed and looking presentable.

Parental Controls

With these installed between the appliance and the power outlet, you can have the devices shut down based on a predetermined time, using a timer.

Remotely Recharge Device Batteries

You're at work, and you notice what a stunning day it is outside. Obviously there is little you can do to enjoy it now, but if you had a smart plug connected to your garden trimmer's rechargeable battery, you could get the device topped up mid-afternoon, and have it ready to use by the time you pull into your driveway.

Integrate with smart watches

Everyone has smart watches these days. They can detect when user falls asleep using sensors. Detect this and switch of pre determined list of devices.

IR Device Controller

Now easily interact with various devices using IR technology inbuilt with the your Smart Plug device.