

# IOT's Smart Home using TI Launch pad CC3200

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**Abstract:**— Developing the IOT's smart home system by gluing on the potential future technologies of IOT and cloud computing is the primary objective. For this purpose, we have used TI CC3200 Launch pad with Grove temperature and light sensors connected to the IOT service establishments. The graphical plot relating to the sensor value is observed in the IOT platform. Whenever there is a requirement, the user can control the electrical appliances from his/her mobile application. So using this system one can keep an eye on home energy consumption, even thousands of miles away with smart phone and smart Wi-Fi solution within major appliances and lightning controls, switches in your home, for great peace of mind.

**Index Terms:**— Smart, Sensors, CC3200 launhcpad, Cloud computing.

## I. INTRODUCTION

Smart Home automation refers to handling and controlling home appliances by using CC3200 simple link Wi-Fi launch pad developed by Texas Instrument and computer technology. Smart system is popular now days because it provides ease, security and efficiency. In this, a sensor senses the status of appliances and updates to web server through CC3200 launch pad. If user is far away from home, he can access and change status of appliances i.e. switches it on/off. User can use smart android. This paper will describe approach of controlling home appliances by using IOT in combination of CC3200 Wi-Fi launch pad.

## II. LITERATURE SURVEY

Back in 1923, brilliant Swiss-born architect Le Corbusier (1887–1965) described a house as "a machine for living in" and slowly, during the 20th century, that metaphor turned into reality. First, the arrival of convenient, electric power started to strip away the drudgery from all kinds of domestic chores, including washing clothes and dishes and vacuuming the floor. Then, when transistors made electronics more affordable in the mid-20th century, appliances started to control themselves in a very limited way, using built-in sensors and programmers. But it's only now, in the 21st century, that the vision of the fully automated, smart home is actually being realized. Due to the Internet, it's easy to set up virtually any electric appliance in your home so it can control from a Web browser anywhere in the world. And, before much longer,

All kinds of net-connected machines will be talking to one another, running much more of our lives automatically which is known as the Internet of Things. N. Sriskanthan [1] has implemented the model for home

automation using Bluetooth via PC. But, Bluetooth has range limitation. Hasan [2] has developed a telephone and PIC remote controlled device for controlling the devices. pin check algorithm was used to implement the system where it was with cable network but not wireless communication.

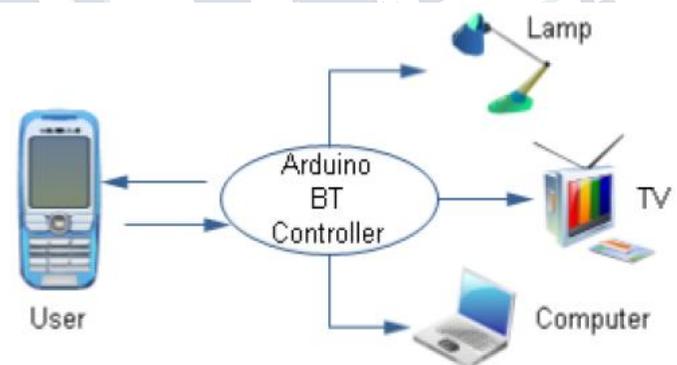


Figure 1. Home automation system block diagram

Amul Jadhav [3] has used universal XML format to design automation system which can be easily ported to any other mobile devices. R.Piyare [4] has introduced design and implementation of a low cost, flexible and wireless solution to the home automation. Jitendra R. [5] implemented a system with the ZigBee network and showed how to eliminate the complication of wiring in case of wired automation.

## III. METHODOLOGY

A smart home is one in which the various electric and electronic appliances are connected to microcontroller launch pad CC3200 and cloud computing so they can either be switched on and off as the sensor turn on and send feedback to the owner of house and owner will take action

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using mobile phone if required because this is smart system, Every operation will happen automatically. (for example, heating can be set to come on automatically at 6:00AM on winter mornings) or if certain events happen (lights can be set to come on only when a photoelectric sensor detects that it's dark).

The Simple Link Wi-Fi CC3200 Launch Pad development kit (with QFN-packaged device) is an evaluation development platform for the CC3200 wireless microcontroller (MCU), the industry's first single-chip programmable MCU with built-in Wi-Fi connectivity. The board features on-board emulation using FTDI and includes sensors for a full out-of-the-box experience. This board can be directly connected to a PC for use with development tools such as Code Composer Studio Cloud and Energia integrated development environment (IDE) and IAR Embedded Work bench. This Launch Pad has driver support and a software development kit (SDK) with 40+ applications for Wi-Fi protocols, Internet applications and MCU peripheral examples.

Developing the smart home system by gluing on the potential future technologies of IoT and cloud computing is the primary objective. For this purpose, we have used **TI CC3200 Launch pad** with **Grove** temperature and light sensors connected to the IoT service establishments of **IBM Bluemix** platform.

**A. CC3200 launch pad:**

- ♣ Wi-Fi development Board.
- ♣ CC3200 single chip Wireless MCU
- ♣ 40 pins booster pack headers
- ♣ Micro USB connector for power and debug
- ♣ FTDI Based JATAG emulation with serial port for Flash programming
- ♣ 8mbit/1Mb external serial flash
- ♣ Two buttons and three LEDs
- ♣ On-board accelerometer and temperature sensor
- ♣ On-board chip antenna and U.FL connector.

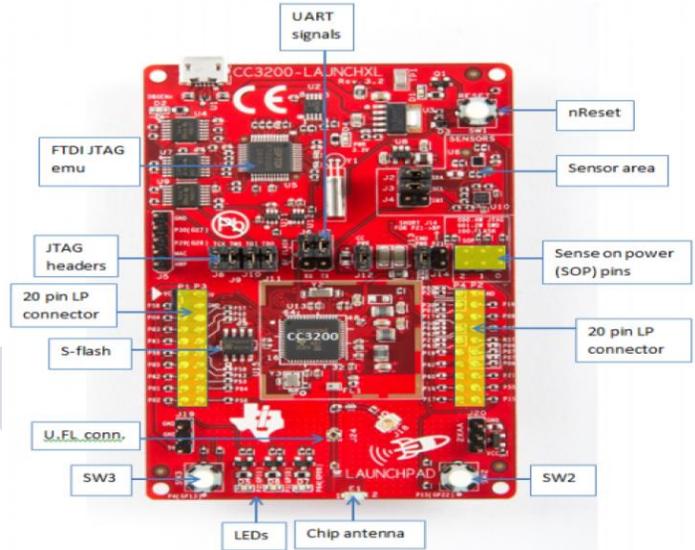
**B. Internet Of things Examples: Exosite**

- ♣ Uses Cloud services to control the CC3200 from a remote location
- ♣ Uses Cloud services to collect sensor and location data from the CC3200 from a remote location.

**C. Installation and Configuration:**

- ♣ Will need to flash the CC3200 Launch pad with the binary available on

- ♣ Alternatively the source code for the CC3200 Launch pad application is available on github.
- ♣ You will need to visit exosite side and sign up , at which stage you can add a new device
- ♣ The Exosite Cloud service uses CC3200 MAC address as an identifier; you will need to provide this when adding a new device.



**D. Features of TI CC3200 Launch pad:**

- ♣ CC3200 Wi-Fi wireless microcontroller (MCU) in QFN package
- ♣ Industry's first devices to be Wi-Fi CERTIFIED at the chip level by the Wi-Fi Alliance
- ♣ USB interface to PC for CCS/IAR using FTDI USB drivers
- ♣ Flash update over the USB using Simple Link Programmer
- ♣ 2 20-pin connectors enables compatibility with Booster Packs with added functions (Booster Pack headers)
- ♣ Standalone development platform featuring sensors, LEDs and push-buttons
- ♣ Power from USB for the Launch pad as well as external Booster Pack
- ♣ Operates from 2 AA alkaline batteries
- ♣ On-board antenna and U.FL connector selectable using a capacitor re-work
- ♣ Supports 4 wires JTAG and 2 Wire SWD GNU Debugger (GDB) support over Open On chip debugger (Open OCD) IoT and Cloud - Combine these potential technologies to effectuate an automation system at home!

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- With the code compiled on Energia IDE, the same is uploaded after connecting the required setup as shown in diagram.

**IV. BLOCK DIAGRAM**

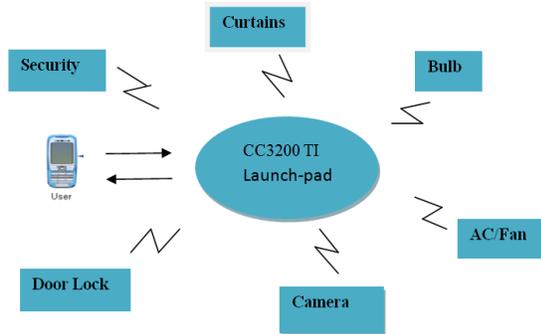


Figure2: IOT's Smart Home using CC3200 TI Launch-Pad system block diagram.

**V. OPERATION**

The IOT's smart home consists of CC3200 Simple link Wi-Fi Launch pad. The main advantage of this launch pad is that it is industries first Wi-Fi certified device so we can fulfill our IoT application. Because this Launch pad has inbuilt Wi-Fi along with cloud computing. The cloud computing evolution, supported by an increase in storage capacity. This launch pad works on the 3.6 to 3.8 v power. In this paper we are going to achieve smart home using following sensors which are interfaced to CC3200 Launch pad through Wi-Fi.

- 1) Door lock sensor.
- 2) Windows contact sensor.
- 3) Motion activated sensor.
- 4) Photoelectric Sensor.
- 5) Grove Temperature Sensor.

This IOT's smart home using CC3200 Launch pad controls home appliances using Wi-Fi. This system specifically designed for disable and handicapped people. They can operate this system using their phone. when you reach your home using Android application available in smart phone you can unlock the door by entering the password which is known to you only. The CC3200 is always connected to the Wi-Fi. When it will receive password and check whether this password is correct or not. If the entered password is right then it will take action itself by turning on the Door lock sensor. And the door unlocks and get open. So as you enter in the smart home it will sense your position and turn on light according to the outside light

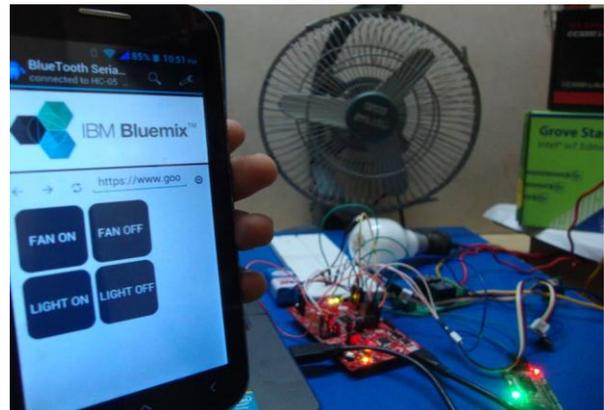
intensity. Accordingly it will turn on/off the light using photoelectric sensor. If the light is too high outside then the windows contact sensor turn close the curtains and vice versa.

This system of smart home not only controls automatic light on/off but also it will monitor the room temperature using grove temperature sensor place in the hall. This CC3200 Launch pad having its own on-board temperature sensor. So we can achieve multitasking. And monitor two places temperature parameters and turn on/off the air conditioner or heater in the winters.

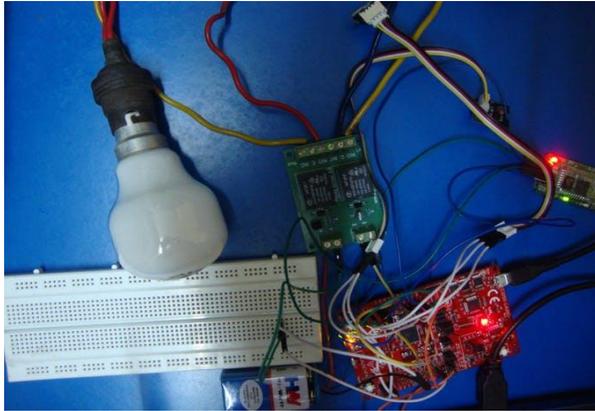
Security is one of the biggest reasons why many people are interested in smart homes. If you're away at work or on holiday, making your home seem lived in is a good way to deter intruders. You can keep an eye on home and also energy consumption you can monitor using smart sensors. If I put smart motion activated sensor on my front door that activates when it detects unexpected activity and sends me video using the camera installed on the front door. If the intruder known to you it will turn on the door and take care of the guest till you reach home.

**VI. HARDWARE**

1. CC3200 Simple link Wi-Fi Launch pad.
2. Door lock sensor.
3. Windows contact sensor.
4. Motion activated sensor.
5. Photoelectric Sensor.
6. Grove Temperature Sensor.



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### VII. SOFTWARE



*Seed Studio Grove Starter Kit for Launch Pad*



*TI Launch Pad Energia*



*IBM Blue Mix*

- i. Integrated Development Environment (IDEs) & Compilers:**
  - Code Composer Studio v6
  - Energia and Embed X-code-Based on Wiring and arduino frameworks
- ii. Operating systems, SDK and Muxing Tool:**
  - TI-RTOS and FreeRTOS
  - CC3200 Software Development kit (SDK)
  - Pin Mux Utility for ARM Microprocessors
- iii. Application and Firmware Flashing:**
  - UniFlash for cc3200
  - Provisioning and configuration
  - Simple link iOS and Android Apps
  - Web based configuration.
- iv. Testing:**
  - Simple Link Wi-Fi testing tools

### VIII. APPLICATIONS

- i. Lighting Control: Leaving the Dark Ages and Stepping Into the Light
- ii. HVAC Regulation: No Longer Burned by Your Heating Bill
- iii. To help Handicapped people
- iv. Where less energy consumption is major factor

### IX. ADVANTAGES

- i. Adds Safety Through Appliance and Lighting Control
- ii. Secures Home Through camera and Wi-Fi control  
Increases Convenience through Temperature Adjustment
- iii. Save time
- iv. Save money and increase convenience
- v. Allow to appliances control when out of town.

### X. CONCLUSION

This paper gives basic idea how we can control home appliances by using TI CC3200 Launch pad and fulfill IoT application. The main objective of this project is to help handicapped people. It provides security and saves energy. As we are accessing devices by Wi-Fi, we can access it even if we are far away from home where the Wi-Fi is available.

### REFERENCES

- [1] N.Sriskanthan and Tan Karand. "Bluetooth Based Home Automation System". Journal of Microprocessors and Microsystems, Vol. 26, pp.281-289, 2002.
- [2] E.Yavuz, B. Hasan, I. Serkan and K. Duygu. "Safe and Secure PIC Based Remote Control Application for Intelligent Home". International Journal of Computer Science and Network Security, Vol. 7, No. 5, May 2007.
- [3] Amul Jadhav, S. Anand, Nilesh Dhangare, K.S. Wagh "Universal Mobile Application Development (UMAD) On Home Automation" Marathwada Mitra Mandal's Institute of Technology, University of Pune, India Network and Complex Systems ISSN 2224-610X (Paper) ISSN 2225-0603 (Online) Vol 2, No.2, 2012
- [4] Rana, Jitendra Rajendra and Pawar, Sunil N., Zigbee Based Home Automation (April 10, 2010). Available at SSRN: <http://ssrn.com/abstract=1587245> or <http://dx.doi.org/10.2139/ssrn.1587245>

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[5] R.Piyare, M.Tazi “Bluetooth Based Home Automation System Using Cell Phone”, 2011 IEEE 15th International Symposium on Consumer Electronics

