# Green Internet of Things for Automation of Smart Home

**Y.Bhuvaneswari, Mr.B.Venkateswar Rao**

*Abstract*— The project proposes an efficient implementation for IoT (Internet of Things) used for monitoring and controlling the home appliances via World Wide Web. Smart Living system uses the portable devices as a user interface. The main goal of this project is to remind the user whenever the relay (switch) is on in a house then it has to display the changes that are taken place due to that action performed. Nowadays human life is really machine dependant, so machines are important in human life.

In this project the Maker is the application for using the AllThingsTalk Cloud. You can use it on both your computer and smart phone. This means whenever the action performed it sends a notification to our smart phones. A web camera will continuously monitor the outside environment which is attached to out computers as well as smart phones.

Devices might be *directly* or *indirectly* (through a gateway) connected to the cloud.

The system consists of **Sensors** and **Actuators** are connected to the device (or integrated in its hardware). These sensors and actuators are called the Assets of the device and are graphically represented in Maker using Controls on a Pin board

**Many environmental control systems have been proposed in recent times but only few researches have done on smart living based systems. Sensors, Actuators, processing module, a simple control protocol, LCD display, Web Camera, USB Wi-Fi and a host system. By this we provide a climbable and price effective Smart Living system.**

***Index Terms*— Actuators, All thingsTalk, Pinboard, Sensors ,Smart Living,Smart Living System, USB-Wifi**

## INTRODUCTION

"**smart**" **living** or the Internet of Things, many of the physical objects around us are connected to the web in one way or another, a development that is radically transforming how we live. Even if you don't yet own a smart device in your home, chances are you will in the very near future: Cisco predicts there will be 50 billion Internet-connected devices in the world by 2020.

Smart Living enables consumers to enjoy the possibilities that life offers, through seamlessly and remotely managing their connected homes from anywhere, at anytime, on any screen in real time.

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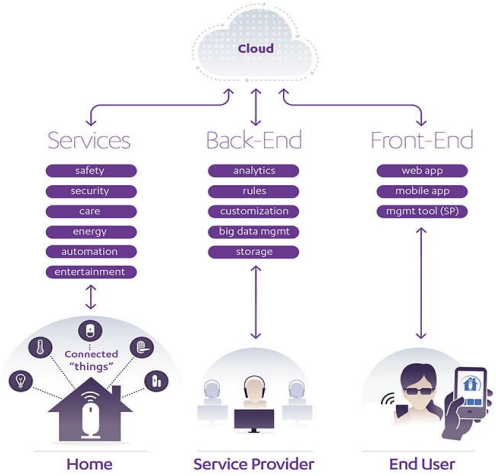



**Existing Technologies:**

**JITSI MEET:**

Provisioning is the feature that allows network and provider administrators to remotely configure Jitsi instances that they are responsible for.

Jitsi's provisioning module uses *http*. This means that, based on a few parameters like an IP or a mac layer address, or a user name and a password, a simple script on a web server or an advanced provisioning system like JitsiProvS can feed to a freshly installed Jitsi all the details that it needs in order to start making calls, downloading updates or configure codec preferences. If you happen to join a conference from the mobile app first, it becomes the owner. But it cannot fulfill the role because the UI does not have the options to kick people, set passwords etc.

The mobile app should be prevented to become owner until the mobile UI will have all the needed functions.

**PROPOSED SYSTEM:**

**Smart Living: the understated benefits of the internet of things:**

1. *Security & Safety* - IoT gives people the freedom to know their loved ones are "safe and sound": **62% of users use the IoT Smart Living platform to remotely manage their home alarms using their smartphones.** 1 in 5 people interact with their home system three times a day, mostly for home security.
2. *Remote home management - "Being home without being AT home"*: **72% of households using web cameras with motion detectors.**
3. *The IoT enables people to adapt the system to their daily lives* adding devices and using rules: 51% of users do not install only the basic kit offered by the

service provider, and expanded with an average of 3 more devices: cameras, and motion detectors.

**What makes it "smart"?**
Smart Living systems feature a number of innovations: digital technology, communications, control and better operation of networks. Smart living technologies will change the way that things works completely. They provide customers with much more information on how they use devices and enable those customers to make use of things perfectly.

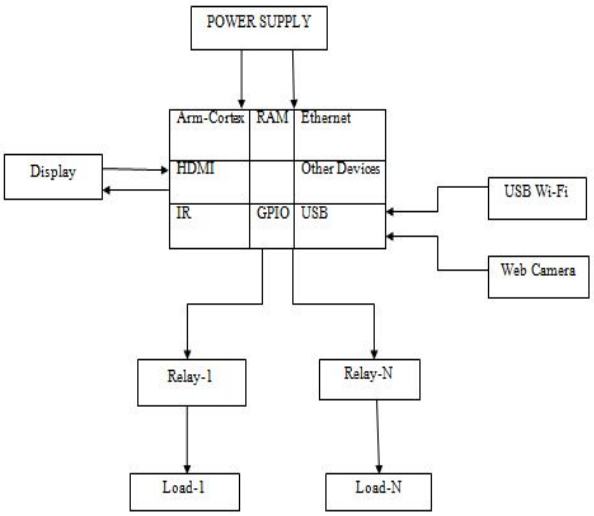
**AllThingsTalk Maker, the Cloud Instance for Prototyping** is free to use for developers and innovators. You can discover the accessible functionality
Smart Living Maker is an end-to-end Internet of Things solution for tech enthusiasts, developers and DIY smart-device makers.
With the Smart Living Maker IoT Platform you can connect Arduino, Raspberry Pi, Intel Edison or other DIY smart devices to their cloud services, then automate them with simple "when-then" rules. The Smart Living platform allows you to visualize data with smooth user interfaces.
SmartLiving seems to make their money by selling other hardware products such as motherboards, sensors and development kits.

**Smart living**
Get started with Maker
Maker is the application for using the AllThingsTalk Cloud. You can use it on both your computer and smartphone. For more insight into all the different components and how they are linked together, please check the concepts section.

**Concepts**:
Ground
The user who created the ground.
Add or remove other AllThingsTalk users as a **member** to or from the ground
Command a ground device
Add or remove devices to or from the ground
*+ all options a* **ground member** *has*
Ground member:
Receive ground activity notifications
*+ all options a* **regular user** *has*
Any AllThingsTalk user:
View any device serving the ground
View assets of devices
View members of the ground

*Devices*
A device is logical container of physical measurements. It includes hardware and software that directly interacts with the world. They connect to a network to communicate with each other or to cloud. Devices might be *directly* or *indirectly* (through a gateway) connected to the cloud.
**Sensors** and **Actuators** are connected to the device (or integrated in its hardware). These sensors and actuators are called the Assets of the device and are graphically represented in Maker using Controls on a Pinboard.
*Assets*
Assets are active components that hold value about a measure, either in physical or virtual space. Most important physical assets are **sensors** and **actuators**.

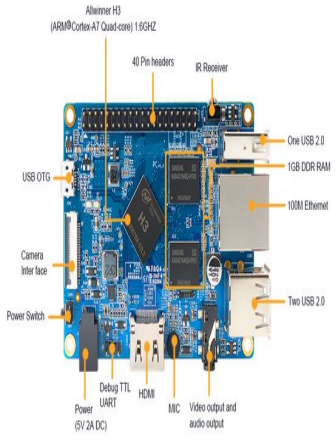
**BLOCK DIAGRAM**:



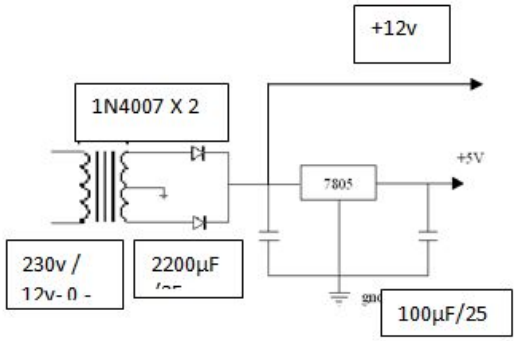

**HARDWARE:**

**ARM - Cortex Hardware Specifications**

| | |
|---|---|
| CPU | H3 Quad-core Cortex-A7 H.265/HEVC 4K |
| GPU | ·Mali400MP2@600MHz<br>·Supports OpenGL ES 2.0(GPU) |
| Memory (SDRAM) | 1GB DDR3 (shared with GPU) |
| Onboard Storage | TF card (Max. 64GB) / MMC card slot |
| Onboard Network | 10/100M Ethernet RJ45 |
| Video Input | ACSI input connector Camera:<br>Supports 8-bit YUV422 CMOS sensor interface<br>Supports CCIR656 protocol for NTSC and PAL<br>Supports SM pixel camera sensor<br>Supports video capture solution up to 1080p@30fps |
| Audio Input | MIC |
| Video Outputs | Supports HDMI output with HDCP<br>Supports HDMI CEC<br>Supports HDMI 30 function<br>Integrated CVBS<br>Supports simultaneous output of HDMI and CVBS |
| Audio Output | 3.5 mm Jack and HDMI |
| Power Source | DC input can supply power, but USB OTG input don't supply power |
| USB 2.0 Ports | Three USB 2.0 HOST, one USB 2.0 OTG |
| Buttons | Power Button(SW4) |
| Low-level peripherals | 40 Pins Header compatible with Raspberry Pi B+ |
| GPIO(1*3) pin | UART, ground. |
| LED | Power led & Status led |
| Key | IR input, POWER |
| Supported OS | Android Ubuntu, Debian, Rasberry Pi Image |

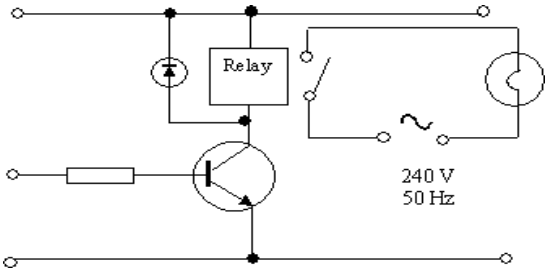



POWER SUPPLY:
CIRCUIT DIAGRAM:




The Power Supply is a Primary requirement for the project work. The required DC power supply for the base unit as well as for the recharging unit is derived from the mains line. For this purpose center tapped secondary of 12V-012V transformer is used. From this transformer we getting 5V power supply. In this +5V output is a regulated output and it is designed using 7805 positive voltage regulator. This is a 3 Pin voltage regulator, can deliver current up to 800 milliamps.

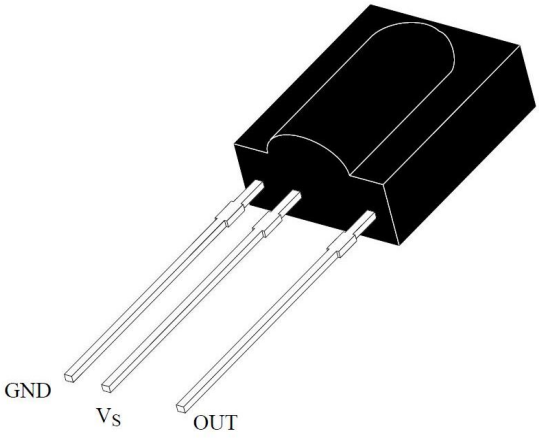
RELAY:



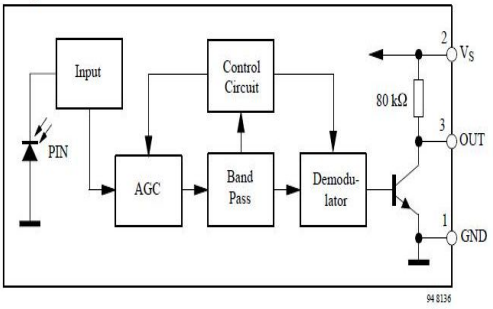

Relays are electromagnetic devices which have a certain amount of **inductance**. When they are turned off, the collapse of the magnetic field can produce a momentary "spike" of **high reverse voltage** that can wreck a transistor or integrated circuit. Therefore a **reverse biased diode** is placed **in parallel** to short out the voltage spike, thereby protecting the circuit.

IR RECIEVER TSOP1733:

The TSOP1733 are miniaturized receivers for infrared remote control systems. IN diode and preamplifier are assembled on lead frame, the epoxy package is designed as IR filter.
The demodulated output signal can directly be decoded by a microprocessor. TSOP1733 is the standard IR remote control receiver series, supporting all major transmission codes.




Block Diagram




Here the IR receiver receives IR frequency from transmitter generates a bit 0 while IR frequency focused on the IR detector, generates bit 1 when there is no IR signal. This IR data is given to the RXD pin of the micro controller used in the receiver.

SOFTWARE:
PYTHON IDLE:
IDLE is Python's Integrated Development and Learning Environment.
IDLE has the following features:

- coded in 100% pure Python, using the **tkinter** GUI toolkit
- cross-platform: works mostly the same on Windows, Unix, and Mac OS X
- Python shell window (interactive interpreter) with colorizing of code input, output, and error messages
- multi-window text editor with multiple undo, Python colorizing, smart indent, call tips, auto completion, and other features
- search within any window, replace within editor windows, and search through multiple files (grep)
- debugger with persistent breakpoints, stepping, and viewing of global and local namespaces
- configuration, browsers, and other dialogs

- Menus

IDLE has two main window types, the Shell window and the Editor window. It is possible to have multiple editor windows simultaneously. Output windows, such as used for Edit / Find in Files, are a subtype of edit window. They currently have the same top menu as Editor windows but a different default title and context menu.

Startup and code execution

Upon startup with the -s option, IDLE will execute the file referenced by the environment variables IDLESTARTUP or PYTHONSTARTUP. IDLE first checks for IDLESTARTUP; if IDLESTARTUP is present the file referenced is run. If IDLESTARTUP is not present, IDLE checks for PYTHONSTARTUP. Files referenced by these environment variables are convenient places to store functions that are used frequently from the IDLE shell, or for executing import statements to import common modules.

In addition, Tk also loads a startup file if it is present. Note that the Tk file is loaded unconditionally. This additional file is Idle.py and is looked for in the user's home directory. Statements in this file will be executed in the Tk namespace, so this file is not useful for importing functions to be used from IDLE's Python shell.

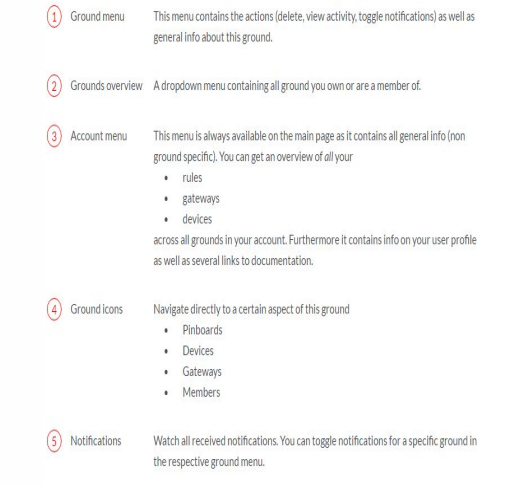
Command line usage

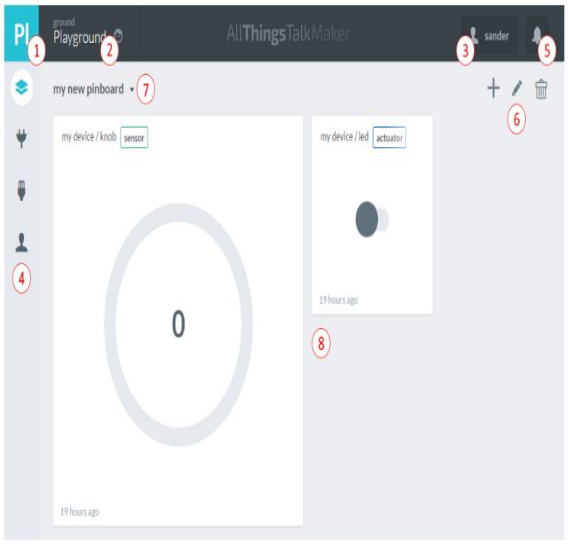
idle.py [-c command] [-d] [-e] [-h] [-i] [-r file] [-s] [-t title] [-] [arg] ...

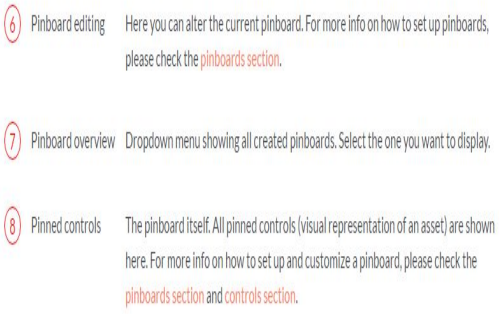
-c command run command in the shell window
-d enable debugger and open shell window
-e open editor window
-h print help message with legal combinations and exit
-i open shell window
-r file run file in shell window
-s run $IDLESTARTUP or $PYTHONS
in shell window
-t title set title of shell window
- run stdin in shell (- must be last option

**Maker web**

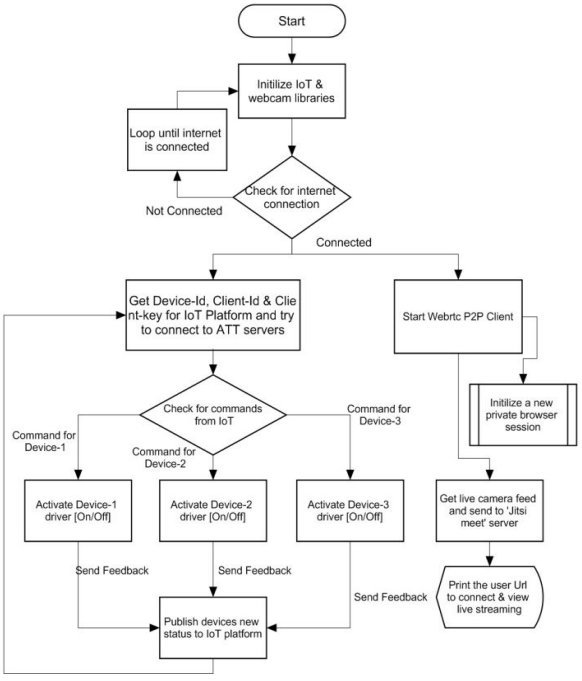
After you have created an account and logged in, the landing page will give you an overview of all the Grounds you own or are a member of. Once you enter a certain ground, you have several menu's available to you to navigate and interact with all the devices in that ground.




**FLOWCHART:**



## CONCLUSION

Smart Living is an important new area of research and practice. we studied smart living from a software performance perspective. We proposed a performance benchmark for iot based smart living common tasks. It includes all features related to the execution of commands and actions taken place in the outside environment with the possibility to be integrated with commercial systems, management of communications and network settings.

## REFERENCES

[1] C. Zhu, X. Li, H. Ji, and V. C. M. Leung, ''Towards integration of wireless sensor networks and cloud computing,'' in Proc. 7th IEEE Int. Conf. Cloud Comput. Technol. Sci., Nov./Dec. 2015.

[2] D. Bruneo, A. Lhoas, F. Longo, and A. Puliafito, ''Modeling and evaluation of energy policies in green clouds,'' IEEE Trans. Parallel Distrib. Syst., vol. 26, no. 11, pp. 3052–3065, Nov. 2015.

[3] C. Zhu, V. C. M. Leung, L. T. Yang, and L. Shu, ''Collaborative locationbased sleep scheduling for wireless sensor networks integrated with mobile cloud computing,'' IEEE Trans. Comput., vol. 64, no. 7, pp. 1844–1856, Jul. 2015.

[4] Y. Liu, Z. Yang, R. Yu, Y. Xiang, and S. Xie, ''An efficient MAC protocol with adaptive energy harvesting for machine-to-machine networks,'' IEEE Access, vol. 3, pp. 358–367, Apr. 2015.

[5] J. Chen and T. G. Pratt, ''Energy efficiency of space and polarization MIMO communications with packet erasures over wireless fading channels,'' IEEE Trans. Wireless Commun., vol. 13, no. 12, pp. 6557–6569, Dec. 2014.

[6] K. W. Cameron, ''Energy efficiency in the wild: Why datacenters fear power management,'' Computer, vol. 47, no. 11, pp. 89–92, Nov. 2014.

[7] C. Zhu, L. T. Yang, L. Shu, V. C. M. Leung, J. J. P. C. Rodrigues, and L. Wang, ''Sleep scheduling for geographic routing in duty-cycled mobile sensor networks,'' IEEE Trans. Ind. Electron., vol. 61, no. 11, pp. 6346–6355, Nov. 2014.

[8] F. T. Chong, M. J. R. Heck, P. Ranganathan, H. M. G. Wassel, and A. A. M. Saleh, ''Data center energy efficiency: Improving energy efficiency in data centers beyond technology scaling,'' IEEE Des. Test, vol. 31, no. 1, pp. 93–104, Feb. 2014.

[9] Y. Tawk, J. Costantine, and C. G. Christodoulou, ''Cognitive-radio and antenna functionalities: A tutorial [Wireless Corner],'' IEEE Antennas Propag. Mag., vol. 56, no. 1, pp. 231–243, Feb. 2014.

[10] C.-S. Lee, D.-H. Kim, and J.-D. Kim, ''An energy efficient active RFID protocol to avoid overhearing problem,'' IEEE Sensors J., vol. 14, no. 1, pp. 15–24, Jan. 2014.

[11] L. Sun, H. Tian, and L. Xu, ''A joint energy-saving mechanism for M2M communications in LTE-based system,'' in Proc. IEEE Wireless Commun. Netw. Conf., Apr. 2013, pp. 4706–4711.

[12] Basma M. Mohammad El-Basioni1, Sherine M. Abd El-kader2 and Mahmoud Abdelmonim Fakhreldin3, "Smart Home Design using Wireless Sensor Network and Biometric Technologies" at Volume 2, Issue 3, March 2013

[13] T. Li, S. S. Wu, S. Chen, and M. C. K. Yang, ''Generalized energy-efficient algorithms for the RFID estimation problem,'' IEEE/ACM Trans. Netw., vol. 20, no. 6, pp. 1978–1990, Dec. 2012.

[14] N. Xiong, W. Han, and A. Vandenberg, ''Green cloud computing schemes based on networks: A survey,'' IET Commun., vol. 6, no. 18, pp. 3294–3300, Dec. 2012.

[15] Nicholas D., Darrell B., Somsak S., "Home Automation using Cloud Network and Mobile Devices", IEEE Southeastcon 2012, Proceedings of IEEE.

[16] Das, S.R., Chita, S., Peterson, N., Shirazi, B.A., Bhadkamkar, M., "Home automation and security for mobile devices," IEEE PERCOM Workshops, pp. 141-146, 2011

[17] D. K. Klair, K.-W. Chin, and R. Raad, ''A survey and tutorial of RFID anti-collision protocols,'' IEEE Commun. Surveys Tuts., vol. 12, no. 3, pp. 400–421, Apr. 2010.

[18] K. Choi, M.-H. Kim, K.-J. Chae, J.-J. Park, and S.-S. Joo, ''An efficient data fusion and assurance mechanism using temporal and spatial correlations for home automation networks,'' IEEE Trans. Consum. Electron., vol. 55, no. 3, pp. 1330–1336, Aug. 2009.

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He has published several research papers in various national and international journals