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APPLIFI
APPLIANCES CONTROLLED USING WIFI

Nayana Matta[1], BhuvanTej kanigiri[2]

1(Electrical and Electronics Engineering, ChaitanyaBharathi Institute of Technology,
Ocean Park Rd, Kokapet Village, GandipetMandal, Rangareddy District, Hyderabad, Telangana 500075, India.)
2 ((Electrical and Electronics Engineering, ChaitanyaBharathi Institute of Technology,
Ocean Park Rd, Kokapet Village, GandipetMandal, Rangareddy District, Hyderabad, Telangana 500075, India)

Abstract:

This paper presents the most economical and flexible solution to control and operate home appliances using Smart Plug devices. The Smart Plug is a power switch which functions via Wi-Fi connection. It consists a current sensor, two temperature sensors and an IR emitter. Users can plug devices into the Smart Plug to remotely switch power on/off, get information of device's power consumption and ambient temperature, and simultaneouslycontrol the nearby devices using the integrated IR-emitter. There are two ways to access Smart Plug that is, either connecting it directly in Wi-Fi Ad-Hoc mode or connecting it with a router in WiFi infrastructure mode and accessing online with IP-connectivity. The paper utilizes Restful based Web services in which the overall system architecture is Client/server model and the Web client use JavaScript and Ajax to transfer data. An Android-based Smartphone application employs standard operations such as Get and Post requests that return responses to communicate between the remote user and the Web server. It depends on the user how to use the smart plug, they can use smart plug as lighting switch, timing switch, infrared controller and temp regulator.

Keywords— **Smart Plug, REST, WiFi, Smart Home, Android Smartphone.**

I.INTRODUCTION

APPLIFI is a Wi-Fi enabled replacement to conventional switches and Power Strip giving the user a convenient way to control their lighting and appliances anytime from anywhere.

Appliances can be controlled irrespective of mobile in same Wi-Fi network, different Wi-Fi network or on 3G/4G data network. It gives user the advantage of multiple switches and multiple smart plugs into one without multiplying to cost.

II.APPLIFI SPECIFICATIONS

Input Voltage:- 200V-240V 50Hz AC
Max Current :-5A
Max Power:-1100W
Surge Protection:- Yes
Wi-Fi Enabled :- Yes
Wi-Fi Encryption Support:- WPA/WPA2
Cloud Controlled:- Yes
Over The Air Upgrade:- Yes (Automatic)
Outputs:- 3 Universal Sockets

III.WIFI CONNECTIVITY

For high data rate implementations, WiFi would be better solutions because there is no need for extra application layer gateway. WiFi is a local area wireless technology that allows an electronic device to exchange data or connect to the internet using 2.4 GHz radio waves. It has the advantages of high data transmission rate, wide coverage, wireless and strong anti-jamming capability. Compared to the traditional intelligent home furnishing system using cable network, the application of WiFi technology reduces wiring trouble and has better scalability, mobility. Therefore, the use of wireless intelligent control model is the inevitable choice of intelligent home furnishing development. This paper presents the design and implementation of a new type of home automation system that uses WiFi technology as a network infrastructure for connecting its components.
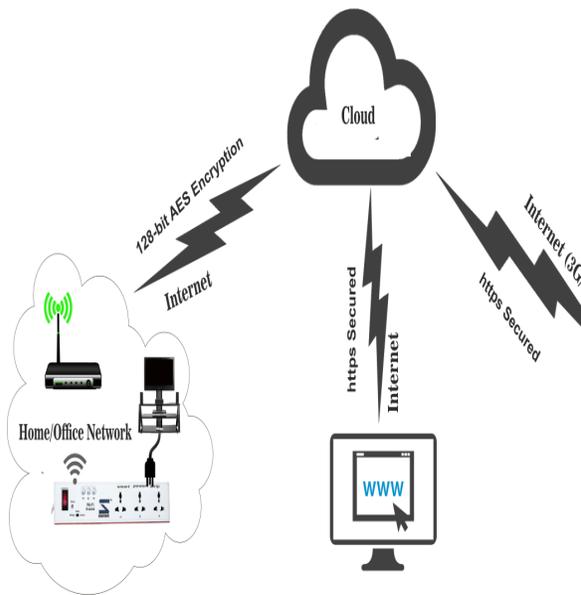

FIG 1:-CONNECTIVITY

IV.HARDWARE ARCHITECTURE AND IMPLEMENTATION

The complete Smart Plug hardware, packages and software suit with reference source code for the Smart Plug embedded application and Android based mobile applications will be described as follows. The Smart Plug hardware includes a microcontroller, a clock chip, a 1M byte EEPROM, a WiFi module, 2 temperature sensors, a current sensor, and buttons. Figure 2 depicts a block diagram of the Smart Plug.
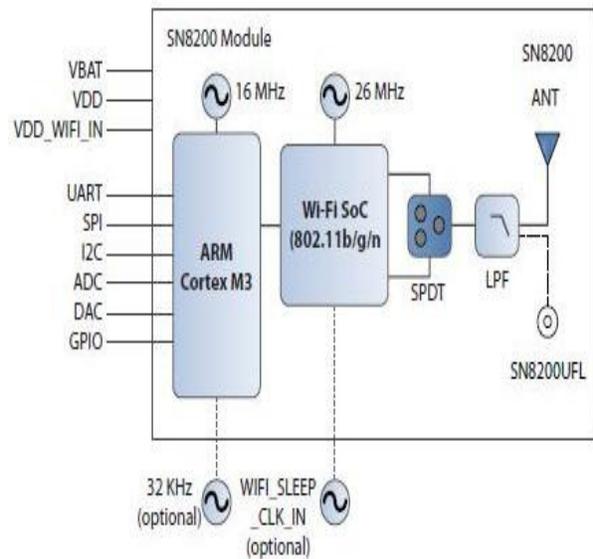
FIG 2 :-APPLIFI CIRCUIT

The WiFi module is designed to be used with Microchip's TCP/IP software stack. The software stack has an integrated driver that implements the API that is used in the modules for command and control, management and data packet traffic. WiFi module single operating voltage chooses typical 3.3V, ranges up to 400m. There are two types of WiFi network topology, Ad-hoc mode and infrastructure mode. WiFi module embedded on the Web server, its initial state is Ad-Hoc mode. Firstly, open WiFi settings, connect smartphone or tablet to the web server, when the connection is established, enter the URL in a browser address bar, select the MPFS2 pages storage path, upload file MPFS bin. When it's done, it will automatically jump to the index page, so user can control or monitor home appliances and devices using a web page.

If user connect web server to router in WiFi infrastructure mode, he/she has to redirect to configuration web page, click the button to scan wireless network, then manually joining the network. Once the server is connected to the network, smartphones need to reconnect to the local area network. Using the discovery function in Android app to find all nodes that correspond to the smart devices installed in the network.

V.SOFTWARE DEVELOPMENT

The proposed Smart home system consists of three main modules, the web server, the web page GUI and the software package (smart phone application). During the configuration stage, the WiFi module embedded in the Smart Plug makes a connection with a Local Area Network using a static IP address. To stabilize the operation of connection, we have used static IP address; instead, of acquiring an IP via Dynamic Host Configuration Protocol (DHCP). After the intilization of smart plug it remains inactive until any command is received from the user. On successful acknowledgments,from the smartphone app the smart plug will start decoding them and appropriate control actions will be implememted.These actions can be either actuation or sensing.
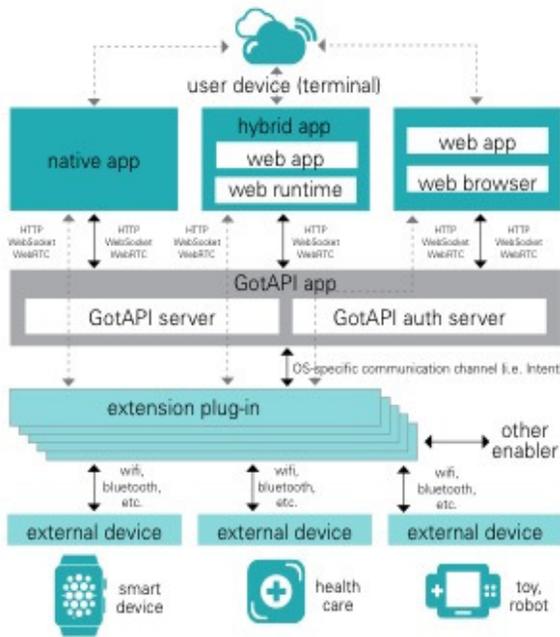
FIG 3:- APPLICATION FRAMWORK

VI.WORKING

An easy setup procedure allows changing Wi-Fi settings anytime. Power strip allow mobility that is from one location(e.g home) to another location (e.g office) without any diifulty in changing the wifi settings of different locations. A circuit breaker (SE315A) protects the connected appliances against current overload conditions.

This prevents the usage of purchasing additional fuse when blown during overloading condition.

By reducing the load and pressing the main switch in RESET mode manually applifi can be used as usual. This protects the devices and equipment from voltage fluctuations.

An Innovative microprocessor based solution dedicated to provide Monitoring of electricity before reaching appliances and prevent disturbances reaching them. At every start a predetermined delay time of 5 to 7seconds to ensure supply of quality power.

VII.CONCLUSION

This paper proposes and implements a novel "Smart Plug" related to "Smart Home ". The Smart Plug is cost-effective and flexible to use. Android App is capable of controlling the smart appliance in an entire house (lights, doors, temperature, TV etc.). The system is based on Restful web services which are applied to communicate between the remote users and home devices. To make our life and surroundings more charming and convenient, subsequent system function allows people to control the home appliances through voice, and achieve a true sense of "intelligent life".

VIII.ACKNOWLEDGMENTS

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