

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Website: www.ijirset.com

Vol. 6, Issue 5, May 2017

Controlling and Monitoring of Home Appliances through Social Networking Site in a Smart Home Environment

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ABSTRACT: Social networking on the Web has become an integral part of our lives. Merging of computing with physical things enabled the conversion of everyday objects into information appliances. This merging allows Smart Homes to offer new automation possibilities to their residents. We propose utilizing existing social networking infrastructures and their Web-based APIs in order to integrate Smart Homes to the Web, offering social status to physical devices. We exploit the functionality and the Web 2.0 technologies provided by Facebook to transform the interaction with the Smart Home into a shared, social experience. A preliminary technical evaluation indicates that our approach is feasible and it offers acceptable performance. In such a context, we focus on the smart home domain and propose a framework called eDomus that leverages functionalities by a popular social network, i.e., Facebook, to allow a user to remotely interact with the home network. In this paper, we present our framework and our preliminary prototype, by also providing some hints on future work.

KEYWORDS: Smart Home, Social Networking Sites, Facebook, Embedded Devices, Web server

I. INTRODUCTION

In this modern era, the combination of Internet of things and the social network make it possible for us to interact with environment and other people; this leading to the social Internet of things concept. In order to expand the idea of human to human connectivity to include everything in the real world, a suitable social model acts as a key factor to expand basic communication functionalities to include services discovery, push messages, subscribe channels and execute orders. Existing solutions do not mention about the relationships between entities or limit the relationships within the physical entities range. Therefore we are trying to propose a social model of Internet of things to organize everything in the physical world including both entities and human. And a smart environment prototype including sensors, hardware middleware, cloud server, social network platform, and mobile clients along with service discovery functions and reminding functions.

The system is divided into three parts: the Gateway, Facebook, and Smart device. The gateway identifies home appliances and extracts the status information of the home appliances, and transmits the extracted data to a Facebook. Facebook stores data classified by the user and provides home appliance monitoring services to users using the virtualized status information of the home appliances. It also offers a distributed computing function and data storage service to users. The smart device allows users to monitor and control home appliance functions from the Facebook. The smart device receives the virtualized data of the home appliances from the Facebook. All of the components communicate with each other using HTTP and transmit data using XML. The system provides home appliance monitoring service to users via a home appliance virtualization function supported by a social network.

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II.LITERATURE SURVEY

This is the [1] case of smart metering/sensing applications allowing the user to remotely monitor the smart home and its appliances (e.g., through temperature, light, humidity, energy consumption sensors). Users mainly ask for simplicity and user-friendliness in the interaction with everyday smart objects. Popular online social networking (OSN) services, like Facebook (FB), can meet such demands by effectively supporting the social interplay between things and humans [2] two-thirds of the world's Internet population visit social networking or blogging sites, accounting for almost 10% of all Internet time. Currently, Facebook is the world's most popular SNS with more than 400 million active users. Social networking has become a fundamental part of the global online experience, transforming the Web 2.0 into a social Web, in which human social capabilities are boosted. In this paper, [3] They proposed a novel architecture for SWoT-based gateway, called smart home gateway (SHG). It bridges various non-IP protocols to IP protocol so that objects can be presented to Web and post to social network sites. SHG is efficient and scalable. In particular, it supports some novel functions such as SNS-based authentication, object mobility, dialogue between users and objects and multimedia handling. Some message flows have been presented to illustrate how SHG works. Finally, a SHG prototype was designed and results showed that SHG works well and can flexibly bridge physical devices to virtual world of SWoT and improve interaction between users on SNS with the attached physical objects.[4] In this paper, they proposed a novel model where friends in a social network can share device capabilities with their peers in an access controlled manner. They develop a theoretical model of such a peer-to-peer network in which devices can search for remote capabilities, and elaborate on the trade-off's of different algorithms in terms of capability searching and execution. Also, they propose a model for social network based sharing of device capabilities in the Internet of Things. They introduce M4M abstract model and propose algorithms for efficiently searching in such device networks while satisfying constraints regarding requester and provider privacy.

III.METHODOLOGY

The home network has various number of appliances connected to the Ethernet gateway, for example light, fan, T.V etc. All the appliances are connected to the router through microcontroller. The router is connected with the Ethernet gateway. Serial communication interface place a vital role between the gateway and cloud server. The information are passed to the cloud server from the gateway, the cloud server stores the information and provides a virtualized notification for the user. The user can view the status of their home through the cloud network.

The operation of this block diagram is simple using the microcontroller Arduino UNO and its features and parameters are given in the introduction column of the microcontroller. The device switching circuit is comprised of relay which is used to switch the home appliances, the number of relay to be used will depends on the number of home appliances to be controlled and switched between. The serial interface transmits and receives data simultaneously and transmits to the Ethernet device

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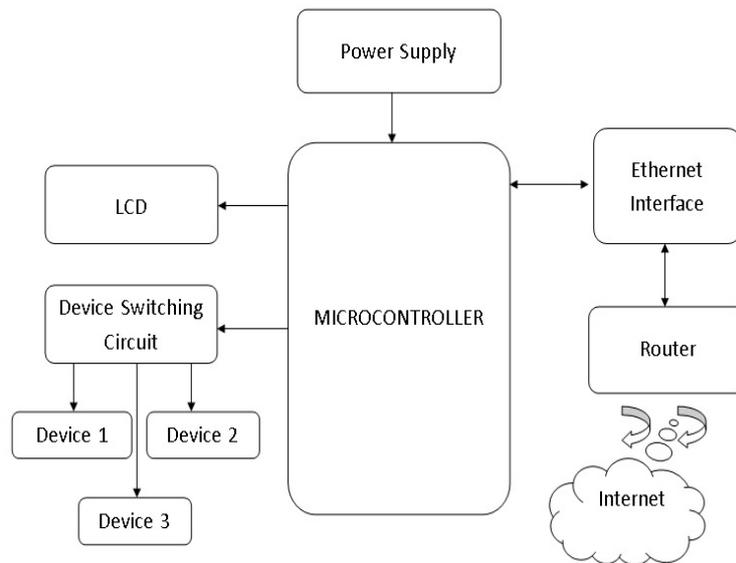


Fig.1: Block Diagram

IV RESULTS AND ANALYSIS

1. Detection of Fire

If accidentally fire occurred in the user home, when the user is not available, the temperature sensor detects the room temperature continuously. If the temperature of the room is high means i.e. above the normal temperature, it detects and sends the status to the microcontroller. The microcontroller passes the status to the Ethernet gateway via serial communication interface and finally the status is posted on the Facebook. The output screen shot of temperature detection is given below.



Fig.2: Temperature Detection

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Once fire occurred in the user home, immediately the electrical appliance in the home can be switched OFF or the entire power supply to the home can be turned OFF by sending commands to the device Facebook account from the user account.

2. Detection of LPG



Fig.2:LPG Detection

If accidentally LPG is leaked in the user home, when the user is not available, the MQ5 sensor detects the smoke content i.e. gas content in the home continuously. If the LPG content of the room is high means i.e. above 750ppm, it detects and sends the status to the microcontroller. The microcontroller passes the status to the Ethernet gateway via serial communication interface and finally the status is posted on the Facebook. The output screenshot of LPG detection is given below.

Once LPG leakage occurred in the user home, immediately the electrical appliance in the home can be switched OFF or the entire power supply to the home can be turned OFF by sending commands to the device Facebook account from the user account.

V.CONCLUSION

The system i.e. Facebook based home appliances security control and monitoring using microcontroller is used to provide real-time home appliance monitoring and control services. The Facebook server stores and manages a large amount of the status data generated by home appliances in smart homes. For transmitting Facebook server status data of home appliances, a gateway is designed to support data communication between the Facebook server and smart homes. The status data of home appliances in the Ethernet device is transferred to the Facebook. Users monitor and control home appliances through the Facebook using the virtualized status data from the home appliance controlling Ethernet device. However, if many users connect to the Facebook server at the same time, a high amount of network traffic will occur in the server. Therefore, we will develop an effective method to reduce heavy traffic in the server. Similar to Facebook update, twitter can also be made as a platform for controlling and monitoring home appliances. On a large scale, a cloud data can be maintained to collect the details from various automation devices installed in various houses and it can be verified and checked by police and fire department at any time.

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