

M2M Communication for Smart home Services and Enabling Technologies

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Abstract---We present recent progress in m2m communication followed by the application of m2m communication in smart home. M2m Communication plays an important role in smart home network. We analyze smart home services and some enabling technologies with m2m and their application in smart home. We also discussed challenge and research keys for m2m communication.

Keywords: M2M, Smart Home

I. INTRODUCTION

Smart home network are recently developing to present a different types of devices, terminal and machines such that laptops, smart phones, TVs, speakers, light and electrical appliance[1].Machine to Machine (M2M) Communication is an automatic communication which enable machine to communicate backend information, in order to provide real time data. M2M communication for smart home network provide the various types of application such that heating control, electrical appliances, alarms and security, garas and garden. The rest of this paper is organized as follows: section 2 A Future concepts of smart home services, Section 3 Wireless enabling technology, section 4 challenges and research opportunity and section 5 has conclusion and future scope.

II. A FUTURE CONCEPT OF SMART HOME SERVICES

A smart home environment gives the easier services for the household which can easily access and control the whole home appliance by remotely, fig 1 shows the smart home services which will make the home is smart home

A. Security and Safety Services

This service gives the control to the user 's to control their smart home from remote area by personal devices like laptops and Smart phone, CCTvs cameras and sensor devices, and other security device fixed with door , windows and residential places. Using this services user could easily watch the whole situation of the smart home remotely [3]

B. Energy Services

Energy will be embedded with connected devices like automated light control, Automated meter reading and heating system , electric vehicle charging system so the user can serve this services by remotely and user will be able to control whole appliance using remote with on and off services.[4]

C. Wellness monitoring services

This service will be embedded with connected devices such that a heart rate sensor, blood pressure monitor. The sensor will be connected with patient's smart room environment

where the wellness information sends to conserving medical person. [3]

D. Utilities and Entertainment services

Utilities and entertainment services will be embedded with connected devices such that TV, media player, Game consoles and home automated utilities like kitchen appliances, electricity usages, water, and gas. These will be connected by alarm. So the housekeeper will have the information regarding these utilities. [4]

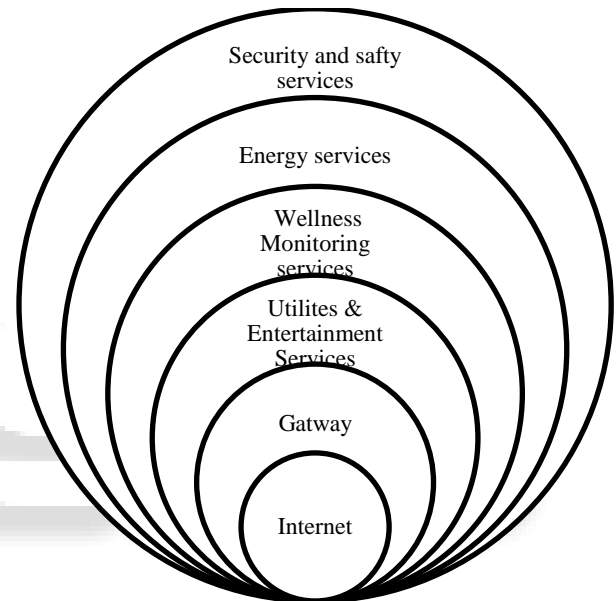


Fig. 1: Services of smart home.

III. WIRELESS TECHNOLOGIES FOR M2M COMMUNICATION

Here are the some Enabling technology for m2m communication which are using in smart home services like Bluetooth, radio frequency identification(RFID) these are the short range enabling technology are become more popular mobile broad band communication such that WIMAX and LTE, local area network like Wi-Fi. Wireless technology plays an important role for communication of m2m component with small or no human intervention. In figure 2 shows five types of different networks. Here we divided this network into two environment which have indoor environment and outdoor environment.

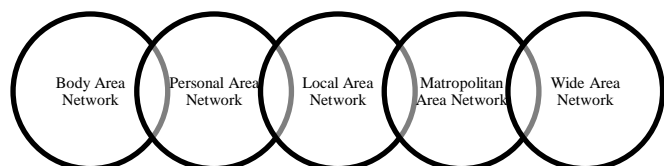


Fig. 2: five types of different Networks.

A. Indoor Environment

This include The body area network(BAN), Personal area network(PAN), Local area network(LAN), BAN network basically used in body of the user for example in wellness monitoring, with PAN network used for following technologies like Bluetooth, ZigBee, RFID, and personal device like laptops and smart phones. For LAN network used with Wi-Fi, and HyperLAN. [2]

B. Outdoor Environment

This includes WAN and MAN networks, for WAN network used with the following technologies like. UMTS, GPRS, EDGE which transfer data between devices and has the distance upto 30 kilometers. For MAN network WIMAX technology used and transfer data between devices which has the distance upto 20 kilometer [2]

IV. CHALLENGES & RESEARCH OPPORTUNITY

A. Security and privacy

For the deployment of m2m communication Security should be mandatory in m2m. Access control. Authorization, authentication and key management are the some essential components to make the m2m system in secure way [5]

B. Resource Constraints

Devices may be fully resource constraint with power supply, backup storage, and alarm and sensor node. The available resource should have reliability and flexibility Limited battery power is the main issues [1]

C. Gateway

The gateway is the central devices which connect all the interconnected devices through internet. Like Wi-Fi or LAN, WAN [6]

D. Standardization

For the communication of m2m very few standardization is specified but have to be need further specified all the standardization. Some are ZigBee, RFID, and UWB [7]

V. CONCLUSION & FUTURE WORK

We present in this paper the emerging technology for smart home with their services application. Then discussed some research technologies and challenge. Security should be kept as essential. The research of further work is how can deal communication with security and how analysis two way communication in secure way.

REFERENCES

- [1] Yan Zhang, Rong Yu and Shengli Xie, Wenqing Yao, Yang Xiao "Home M2M Networks: Architectures, Standards, and QoS Improvement," IEEE Communications Magazine • April 2011
- [2] Vincent Ricquebourg^{1,2}, David Menga², David Durand³, Bruno Marhic¹, Laurent Delahoche¹, Christophe "The Smart Home Concept : our immediate future," ICELIE 2006
- [3] Addisu Thomas Lodamo, "M2M Protocols, Solutions and Platforms for Smart Home Environments" M.Sc. Thesis within Computer Engg
- [4] Alex Sinclair Chief Technology and Strategy Officer, GSMA "Vision of Smart Home The Role of Mobile in the Home of the Future" GSMA, Utilities @gsm.org, www.gsma.com
- [5] Zhong Fan, Russell J. Haines, and Parag Kulkarni "M2M Communications for E-Health and Smart Grid: An Industry and Standard Perspective" IEEE wireless communication volume 21.
- [6] Siok Kheng Tan, Mahesh Sooriyabandara, and Zhong Fan" M2M Communications in the Smart Grid: Applications, Standards, Enabling Technologies, and Research Challenges" Hindawi Publishing Corporation, International Journal of Digital Multimedia Broadcasting, Volume 2011, Article ID 289015, 8 pages doi:10.1155/2011/289015
- [7] Dusit Niyato, Lu Xiao, and Ping Wang" Machine-to-Machine Communications for Home Energy Management System in Smart Grid IEEE Communications Magazine • April 2011