Research and thinking of smart residential building technology

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ABSTRACT

Smart Residential Building is emerging technology growing continuously now. It integrates of the many new technologies through building networking for rising human's quality of living, therefore there have several comes researching in various technologies to use to the good home system. Accordingly, this paper reviews various topics on smart building/home technologies from surveying for smart residential building /home research project. This research paper also deals with the history and the concept of smart residential buildings. Smart buildings or at least discussion of the concept, originated in the early 1980s.

Keywords— Smart residential building, Organizational design, Smart residential building network, Smart door lock

1. INTRODUCTION

In this analysis we are going to target the actual side of good residential buildings which may be numerous building sorts as well as however not restricted to living accommodations blocks, asylums, condominiums, dormitories, duplex, numerous house types etc. The vital commonality between these styles of buildings is that they're habitats to folks and so should be able to befit their desires and behaviour so as to provide a pleasant living experience. Generally, once the electrical instrumentality is obstructed in however it's not in use, there still has the flow of electricity which means we are going to lose the concerning 5 to 10% of often usage, in order that waste cash for no reason, Moreover, accident like the fire from electrical short. Therefore, many folks UN agency continuously forgets to undo the device ought to prompt themselves each time they're going out. On the opposite hand, if they're going out with forgetting to undo, they have to get back to drag the plug dead set avoid the damaging things, so it is a waste of so much time. In order to solve these problems, smart home technology will be required with the advance of Technology, many researches concerning sensible home are developed so as to facilitate human and improve their quality of living. A home , that is wise, is that the technology wont to create all equipment round the home act "sensible" or "intelligent: or additional sensible is that the technology wont to create act sensible or intelligent or additional machine-controlled that's to mention sensible home has extremely

advanced automatic systems for lighting, temperature management , security and lots of different functions . A sensible device is a normal appliance with a complicated pc put in to offer it additional practicality which will monitor such a large amount of aspects of daily routines. a sensible house is helpful for everybody and might even be wont to enhance the daily life reception. Accordingly, smart home consists of many parts which are network, controlling device, home automation, smart door lock and elevators and stairs making our home smart. [1,2,3] The network is used for connecting the automation to the controlling device and it can be wire and wireless. The controlling device are used for managing the system, home automation are device which the physical environment, smart door lock for our safety of his own life. Automated look for door work on signals. And elevators and stairs are very useful for old man.
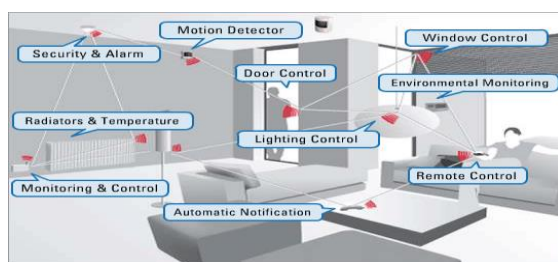
2. SMART RESIDENTIAL BUILDING TECHNOLOGY

Smart home network technology is classified into 2 main sorts, that square measure wiring system and wireless system. [4] In wiring system, the instrumentality is connected into the most power offer directly, that the knowledge are sent to the devices to activate or deactivate them. There are many types of wire that people may want to install in wall. Many homes – automation area unit connected through wiring system like new wire (twisted try, fibber), Power line, Bus line, etc. within the wireless system there should have 2 main parts that area unit sender and receiver. Several new appliances use wireless technology to speak with alternative devices.

The examples of wireless communication system are microwaves, infrared (IR), radio frequency (RF), Wi-Fi, Bluetooth, IEEE802.11, and so on furthermore some of smart home network standard can work using both wiring system and wireless system. In this smart home technology, we also use "Intelligent system "Technological concepts. The So-called intelligent system is a system that controls and maintops vital functions aspects of each apartments and its resident. The system will be self –made because there is not any existing system that exactly meet the requirements. You could opt to modify expand AN existing system, however this may be virtually even as arduous and take virtually even as a lot of

time as creating your own system, Besides that , not each corporation or business would really like it if you "stole" their plan or expand/modify it while not their consent. The most purpose of the intelligent system is monitor. The house and help the resident where needed. Many sensors that are placed within the house send information and signals to the system and therefore the system responds to that. . For example - If all residents have left the hose or are asleep, the system automatically turns off the all building lights, water and gas, this will greatly decrease the chance of calamities.

2.1 Smart home controller

Smart home dominant devices area unit used for managing the systems by causing information or signal to manage the actuators. The examples of the controllers are not only the remote control, but they can also be smart phones, tablets. Web browsers and short message service (SMS). Moreover, some of systems may have computer which works as centre of the evaluation unit. [4,5]

2.2 Smart door lock in our Building

Safety may be a basic demand of each living being. Be it a security of his belongings or safety of his own life. [24]

3. Objectives

(a) To make an automated lock for doors which work on signals
(b) Getting the locking device connect to the internet and also enabling the Bluetooth module for short distance signalling.
(c) Installing a camera in front of every door which will be used for face detection authorization.
(d) Making an App for phones which will use the phone's front camera for the authorization and can send unlocking signal via Bluetooth or the internet (add reference)
(e) Keeping the logs of by whose face the door has been opened.

A friend's list section in the app which can be used to grant other people temporary access to your doors (add reference)

4. SMART DOOR LOCK WORKING ALGORITHM

We have a small controller board that is that the core of the look interfacing the good phone with the door locks for lockup or unlocking an equivalent. Door lock is controlled by servo motors that are activated by the small controller on receiving the command from the act device with good phone. For gap and shutting the door 1st affiliation to the hosting server is checked. If the affiliation isn't found then it'll try and hook up with the hosting server. When this face recognition is door through pie camera via scilab if the person is standing ahead of the door.[16]

If the face matches with the image present in database than microcontroller command to open the door and notify the user. [21] A Wi-Fi /Bluetooth module is additionally provided for remotely dominant the door mistreatment Associate in nursing humanoid application for this information sent over the appliance are going to be wont to offer command to small

controller. Successively small controller activates the servo to lock/unlock the door lock.[24]

4.1 Design and Methodology

(a) Micro managementler board – to function the most control hardware of the project.
(b) A servo motor attached to lock bar will be the door lock which will act according to the microcontroller's signal.
(c) Designing of algorithms for interfacing the motors with the small controller
(d) Connecting the microcontroller to the internet so that signals can be sent to the microcontroller online
(e) Designing a mobile app which may authorize the lock victimization face detection and sends a symbol to the small controller to lock/unlock the door
(f) Enabling Bluetooth module on the microcontroller to pair up with any smart phone for short distance signalling

4.2 In Kitchen

The most detected regarding sensible technologies are that of the room. An example appliance that area unit sensible area unit refrigerators, microwaves, low manufacturers and dishwashers. In internet refrigerator applies the technology of smart home to make many works much easier. There is internet enabled and allows for users to communicate with it via the internet enabled and allows for user to communicate with it via the internet so it is ready to transfer recipes and so show them on its liquid crystal display screen. Moreover, the refrigerator also takes and automatic inventory of items inside of it and it can alert the users to what is there. What's a lot of, microwaves are good? microwaves will communicate with good iceboxes and counsel recipes supported the food item on the market within the refrigerator. The microwave will even be set to start out at sure times whereas users area unit aloof from home. [2,6]

4.3 In living room

Stepping far from the room, one a part of the house that has sensible home technology adoption resides space. Sensible devices like televisions and stereos can utilize this technology to boost the amusement experiences. The smart TV will have many functions like desktop personal computer so this leads to interactive TV and more interactive content will become available. Furthermore, lighting management systems are going to be accustomed management unit electrical lights by practice of motion detectors to automatically extinguish the lights throughout an area once people have left and turn on the lights if people enter an area. [2,6]

4.4 In Bedroom

The space has sensible climate management that the users will set the scene in dangerous space with single-touch heating and may opt for a singular night-time temperature and lighting profile for every bed room. The bed is additionally equipped

with device that may monitor movement of someone in bed for sleuthing health condition concern sleeping in typical routine of someone. Moreover, the sensible devices may be utilized in several aspects as an example in other hand also needs adjustable bad. The bad will be able to move up and down, so it is easier for people in wheelchairs to get in and out of the bad.[7]

4.5 Bathroom
The bathroom of each living accommodations can have a floor with additional grip. This can build it easier for folks in wheelchairs to form use of the bathroom and shower seat. Also, for all folks generally, it'll cut back the possibilities of slippery and falling. The ground are altogether flat with none obstacles the last thing is the toilet. The toilet will be adjustable in height also, so it is usable for everyone, also people in wheelchairs.

4.6 Balcony
The balcony is provided with a slippery protecting glass. The glass door is simple to open , therefore the residents will feel the breeze once they sit on the balcony and can even have the sensation that they're outside. For the individuals with insanity, however, it is often fast. this can solely be done if it's necessary for his or her safety.

4.7 Elevators and stairs
At first, it's vital to put in associate degree elevator within the middle of the steps within the house. This can be necessary for older individuals or individuals with limitations to induce to the higher flats or to induce to the Baltic. What is more there'll be a support raise additional to the steps at the most entrance. This can be an honest possibility as a result of it save space compared to a standard ramp. There's conjointly the likelihood to use the traditional stairs for individuals while not disabilities. Thus, it's a universal answer for the residents. It is required that in each apartment there should be enough space for a wheelchair to turn around without hitting the walls or doors.

5. SAFETY AND SECURITY CONCEPTS
5.1 Security system
The security system are going to be for the whole building however it'll even be split for individual residences. The alarm shall embrace perimeter protection and indoor police investigation. Monitored doors and windows shall be equipped with magnetic contacts. Movement detectors employed in indoor police investigation shall be sensitive enough for presence detection of one person, so they'll even be used for lighting controls and air-con controls. The lighting control is transitioned if desired particularly for folks with insanity this can typically be necessary. Unwelcome person alarms are going to be integrated on code level for each individual living accommodation. Once the resident leaves, the alarm can turn

on mechanically. Once someone leaves, the System sends an indication to the alarm and it goes on.[5] Granted access disarms the alarm automatically. In case of burglary the system gives an alarm, which is relayed through to the call patch it through to the police.

5.2 Smoke and heat sensors.
Off course there'll be smoke and warmth sensors offered in each lodging. These sensors won't solely alarm the resident once there's smoke however additionally the service table downstairs, so the folks at the service table will take immediate action. What is more they will see if the smoke and warmth sensors detonate in additional than one location. If this can be the case, they need the likelihood to alarm the complete building, begin the evacuation method and decision within the local department [8]

5.3 Smart home challenges
Another side is that the terribly high price of this sensible home. a lot of the instrumentation and also the adjustment of the floors square measure pricy. As an example, the communication and residential system that is in each flat, can price a great deal. Though sensible homes have several properties that produces human's lives convenient, these sensible properties square measure in a very higher tag. The price of Associate in nursing intelligent house is high as a result of a number of the technology is comparatively new. However, principally of home automation square measure simply a number of advances that square measure customary in a very new home, the price of different side will be pricy likewise. Sensible home conjointly comes with some security considerations. as an example, hackers will access the network system. They need the flexibility to regulate all sensible devices particularly the protection appliances. [11,15]

6. CONCLUSION AND FUTURE RESEARCH
This paper based on the meaning of smart resident buildings and the details of smart buildings elements. And the main objective of this paper is to administer a survey for these good home researches and summarily describe the main points concerning good home. Because the development of technologies grows, several analysis comes have conjointly been developed. Currently good house is over simply a home controlled by the central analysis unit like pc. With smart resident buildings, the way people live will obviously become more efficient and comfortable. All the time, our home may be saved from home automation, thus we are going to have abundant time to figure on different pursuits. However, good building technology may be a sensible choice for those that care concerning security and luxury however energy saving furthermore. During this paper we tend to delineate good resident buildings by borrowing ideas from organization theory and particularly the notion of a learning organization. it's been shown that there's abundant to be told from this specific organization kind this specific organization kind that might enrich the speculation and development of good buildings. So, if you really would want to realize this concept, still a lot of work needs to be down. However, these documents could provide a good basis of further research, design and eventual implementation. The overall conclusion is that all the adjustments that have been made are practical and efficient and will greatly improve the quality of life.

7. REFERENCES
[1] Jackie Craven, "What Is a Smart House?" [Online], Available:

http://architecture.about.com/od/buildyourhous1/g/smarth ous e.htm. [2012, October 18].

[2] Saisakul Chernbumroong, Anthony S. Atkins and Hongnian Yu, 2010, "Perception of Smart Home Technologies to Assist Elderly People", The 4th International Conference on Software, Knowledge, Information Management and Applications (SKIMA 2010), Paro, Bhutan, pp. 1-7.

[3] Li Jiang, Da-You Liu and Bo Yang, "Smart Home Research", 2004, Proceedings of the Third International Conference on Machine Learning and Cybernetics, August26-29, Shanghai, pp. 659-663.

[4] Manfred Huber, 2006, "Smart Home Technologies" [Online], Available: http://ranger.uta.edu/~huber/cse4392_SmartHome [2012, October 18].

[5] iT24Hrs, 2012, "Smart room, smart home" [Online], Available: http://www.it24hrs.com/2012/smart-room-smart-roomautomation. [2012, October 18].

[6] Barthold, Jim, 2005, "Changing the Way Houses Operate" [Online], Available: http://articles.castelarhost.com/smart_home_technology.h tm [2012, October 18].

[7] Smart3, "Rest easy with smart climate control in your bedrooms" [Online], Available: http://www.smart3.co.uk/rooms_smart_technology/ master_bedroom_suite.htm

[8] Christoffer Björkskog, "Human Computer Interaction in Smart Homes", Helsinki, Finland, p.1.

[9] Xiaojing Ye and Junwei Huang, 2011, "A Framework for Cloud-based Smart Home", International Conference on Computer Science and Network Technology, December 24-26, Chongqing, China, pp. 894897.

[10] Shang-Yuan Chen and Yi-Feng Chang, 2010, "The Computer-Aided Design software for Smart Home Device based on Cloud Computing service", Second WRI World Congress on Software Engineering, Taichung, Taiwan, pp. 273-278.

[11] Molly Edmonds, "How Smart Homes Work" [Online], Available: http://home.howstuffworks.com/smart-home4.htm [2012, October 19].

[12] Inji Ibrahim Attia and Hamdy Ashour, "Energy saving through smart home" The online journal on power and energy engineering [Electronic], Vol.2, No.3, pp. 223-227.

[13] Dae-Man Han and Jae-Hyun Lim, 2010, "Smart Home Energy Management System using IEEE802.15.4 and ZigBee", Korea, pp. 1403-1410.

[14] Yuan-Chih Yu, Shing-chern D. You and Dwen-Ren Tsai, "A Calendar Oriented Service for Smart Home", Taiwan, pp. 151-156.

[15] Paul Lin, "Disadvantages of a Smart Home" [Online], Available: http://www.ehow.co.uk/list_7631272_disadvantages-smarthome.html [2012, October 19]. International Conference on Systems and Electronic Engineering (ICSEE'2012) December 18-19, 2012 Phuket (Thailand)

[16] Ilkyu Ha," Security and Usability Improvement on a Digital Door Lock System based on Internet of Things" International Journal of Security and Its ApplicationsVol.9, No.8(2015), pp.45-54http://dx.doi.org/10.14257/ijsia.2015.98.05

[17] Ohsung Doh," A Digital Door Lock System for the Internet of Things with Improved Security and Usability Advanced Science and Technology Letters Vol.109 (Security, Reliability and Safety 2015), pp.33-38 http://dx.doi.org/10.14257/ astl.2015.109.08

[18] Hteik Htar Lwin, Aung Soe Khaing, Hla Myo Tun "Automatic Door Access System Using Face Recognition" International Journal of Scientific and Technology Research Volume 4, Issue 06, June 2015 ISSN 2277-8616

[19] Lia Kamelia, Alfin Noorhassan, S. R, Mada Sanjaya and W.S., Edi Mulyana" Door-Automation System using Bluetooth-Based Android Mobile Phone "ARPN Journal of Engineering and Applied Sciences, VOL. 9, NO. 10, OCTOBER 2014 ISSN 1819-6608

[20] Er. Laxman Singh, Er. Mauli Joshi "FACE DETECTION SYSTEM USING SCILAB IMAGE PROCESSING TOOL" International Journal of Engineering Technology and Computer Research (IJETCR) Volume 3; Issue 3; May-June 2015; Page No. 84-90ISSN: 2348 – 2117

[21] Ricardo Fabbri Odemir Martinez Bruno Luciano da Fontoura Costaar" Scilab and SIP for Image Processing" Xiv:1203.4009v1 [cs.MS] 18 Mar 2012

[22] Jeong-ile Jeong "A Study on the IoT Based Smart Door Lock System" Information Science and Applications (ICISA) 2016Volume 376 of the series Lecture Notes in Electrical Engineering pp 1307-1318Date: 16 February 2016

[23] Prof. Pratima Patel, Prof. Samir Ajani" The Digital Locking andUnlocking System Based on Android for Smart Phone" International Journal of Advanced Research inComputer Science and Software Engineering, Volume 6, Issue 2, February 2016, ISSN: 2277 128X

[24] Anuradha. R. S, Bharathi R., Karthika., K, Kirithika., S, S. Venkatasubramanian "Optimized Door Locking and Unlocking Using IoT for Physically Challenged People" International Journal of Innovative Research in Computer and Communication Engineering Vol. 4, Issue 3, March 2016ISSN(Online): 23209801ISSN (Print): 23209798