

Smart Home System using IOT and Android

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Abstract— In current smart home system, using android app we can control the loads through IoT only in online mode with the help of a data service provider. There is no universal remote in the smart home android application, to control the IR accessed device through the available wireless network, and the security lock for the door entry is accessible only through a static pin code lock also only by the parental person. In the proposed system, it is possible to access the load through online and offline mode through a local wireless routing network. The universal IR remote schema also introduced to the android application. The security lock system to the door entrance also done using a 32bit encrypted dynamic QR code, both by the parental person and the parental authenticated person also.

Key words: IoT, Automation, Android, Arduino, Server

I. INTRODUCTION

Each smart home technology that exist now does not provide an all way android controlled access. This include the universal infrared remote control without any hardware components. Every existing IR controlled device need a hardware remote to change the state of that particular device. Security schema of the existing smart home consists of a constant pin combination that should be remember by every member who tries to enter into the house.

To overcome the hardware usage and its production cost, our current system introduces a virtual remote to control the IR controlled devices. The security system also includes a parental authentication using a dynamic QR password. This will ensure that the passcode remains dynamic on each instance of getting into the house.

II. EXPERIMENTAL STUDY

The smart home technology consists of a virtual load switch using android mobile. This done by generating a PHP put request to the IoT server through an android application. This PHP put request will post a ON status response value to the database. The Arduino board will get the value in the database and make the corresponding change to the load. Thus providing a virtual solution to activate and deactivate the electrical load without much physical effort and hardware usage.

The universal IR remote application works by using the database that consists of some unique IR patterns for each control switching for that IR controlled device. The pressing of the virtual button of the virtual remote in the android application generates a wifi signal that consists of an ID. This request will reach the PHP database that consists of the equivalent IR pattern for that ID received from the android application.

Still, this signal from the wifi module will not be compactable with the IR device. The wifi to infrared adaptive concept will be used to covert the wifi signal into equivalent infrared pattern. This infrared pattern is now ready to switch the status of the IR controlled device.

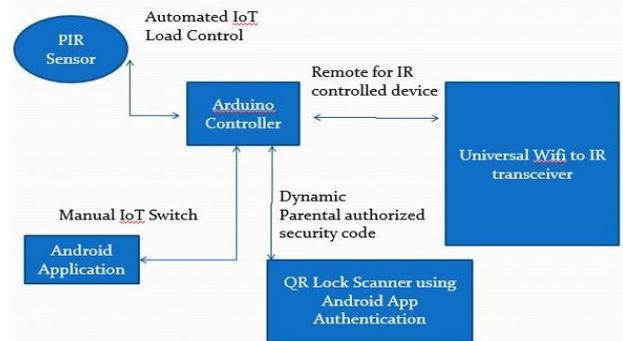


Fig. 1: Architecture Of Smart Home Using Iot And Android

The dynamic security key concept includes a parental authentication for each entry into the house. This will remove a static concept of providing a constant pin combination to the door. This done by a request and authenticated response from child to parent respectively. The request to enter the house will be send by child to parental controlled person. The parental person generates a response message that consists of a passcode request in order to authenticate the child. The above scenario can be applied if the parental controlled is not available in the house, thus ensuring a dynamic security authentication to enter the house.

III. EXPERIMENTAL RESULTS

The activity screen shown below consists of prototype of switching command that changes the value from on to off or vice versa to the PHP database. The simulated circuit diagram shows the corresponding load change with respect to the value in the PHP database.

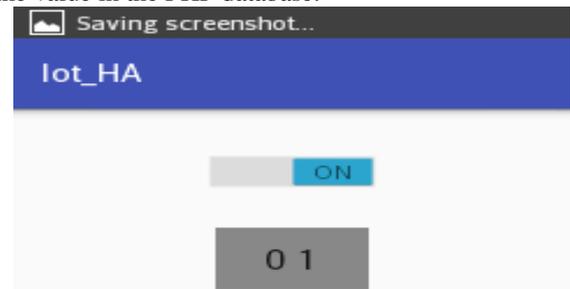


Fig. 2: Virtual Load Switch Activity

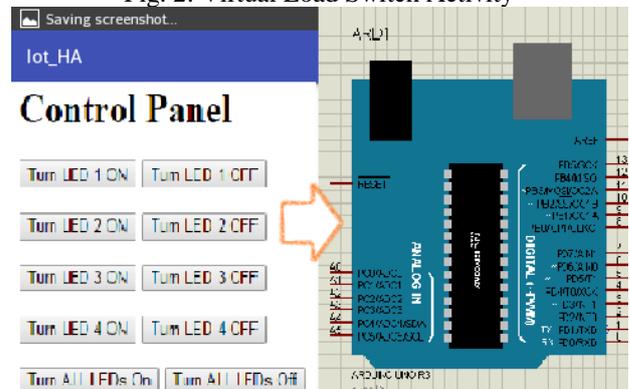


Fig. 3.a: Wifi Command to Uno board

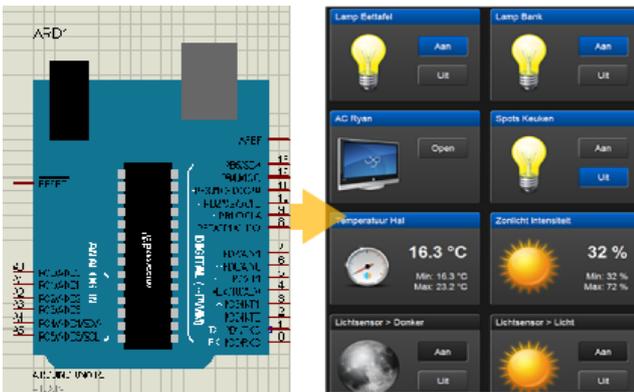


Fig. 3.b: UART Command to the Loads

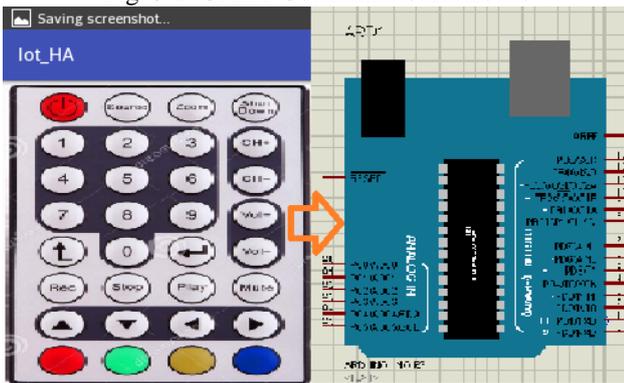


Fig. 4.a: Virtual Remote to Board through Wifi

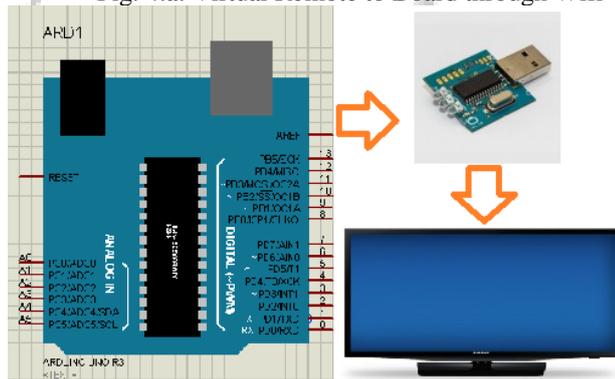


Fig. 3.b: Wifi to IR converted and sent to IR Device

IV. CONCLUSION

As said earlier the smart home system will improve in virtualization and dynamic authentication concepts. Thus resulting in reduced number of hardware wastage and human effort to switch the load status and IR commands. Also ensuring the security authentication, other than the parental controlled person.

V. FUTURE ENHANCEMENTS

The future of the smart home system can be improved by using sensors for improving the atomicity, that will reduce even the involvement of an android device. Because of this future implementation the electrical and electronic gadgets will seem to respond to every natural action of a human being.

REFERENCES

[1] Y. Liu, "Study on Smart Home System Based on Internet of Things Technology," in Informatics and

Management Science IV. vol. 207, W. Du, Ed., ed: Springer London, 2013, pp. 73-81

[2] M. A. Al-Qutayri and J. S. Jeedella, "Integrated Wireless Technologies for Smart Homes Applications," in Smart Home Systems, M. A. Al-Qutayri, Ed., ed: InTech, 2010.

[3] C. Chiu-Chiao, H. Ching Yuan, W. Shiau-Chin, and L. Cheng-Min, "Bluetooth-Based Android Interactive Applications for Smart Living," in Innovations in Bioinspired Computing and Applications (IBICA), 2011 Second International Conference on, 2011, pp. 309-312.

[4] Anushri Aware, Sonali Vaidya, Priyanka Ashture, Varsha Gaiwal, "Home Automation using Android App and Cloud Network", International Journal of Engineering Research and General Science Volume 3, Issue 3, May-June, 2015.

[5] Intel, "Wireless LAN standards study," <http://www.intel.com/content/dam/www/public/us/en/documents/case-studies/802-11-wireless-lan-standards-study.pdf>, [Online; accessed 03Sept-2014].

[6] W. Alliance, "How far does a Wi-Fi Direct connection travel?" <http://www.wi-fi.org/knowledge-center/faq/how-far-does-a-wi-fi-direct-connection-travel>, [Online; accessed 22-Apr-2014].

[7] I. Bayram and I. Papapanagiotou, "A survey on communication technologies and requirements for internet of electric vehicles," EURASIP Journal on Wireless Communications and Networking, vol. 2014, no. 1, p. 223, 2014. [Online]. Available: <http://jwcn.eurasipjournals.com/content/2014/1/223>.

[8] D. Namiot and M. Sneps-Sneppe, "Geofence and network proximity," in Internet of Things, Smart Spaces, and Next Generation Networking. Springer, 2013, pp. 117-127.

[9] IBM, "System of Interaction," <http://www-01.ibm.com/software/solutions/systems-of-interaction/>, [Online; accessed 19-Sept-2014].

[10] Apple, "Getting started with iBeacon," <https://developer.apple.com/ibeacon/Getting-Started-with-iBeacon.pdf>, [Online; accessed 11-Nov2014].

[11] Infsoft, "Infsoft Wireless Positioning Solutions," <http://www.infsoft.com/>, [Online; accessed 14-Sept-2014].

[12] Google, "SearchTrend," <https://www.google.com/trends/explore#q=Internet%20of%20Things%2C%202Fm%20F09g9zkw%2C%20Smart%20Grid%2C%20Sensor%20Networks&cmpt=q>, [Online; accessed 04-Oct-2014].