International Journal of Research and Applied Technology

1(2)(2021) 362-369
Journal homepage: https://ojs.unikom.ac.id/index.php/injuratech

Effectiveness of Smart Home System Technology on Property

Praymoedya Alramadhan Bahroun[1], Kurnia Tsani Alamsyah[2], Khaira Ummah[3], Herry Saputra[4*], Hanhan Maulana[5]

[1,2,3] Departemen Desain Interior, Fakultas Desain, Universitas Komputer Indonesia, Indonesia
[4]Departemen Sistem Infromasi, Fakultas Desain, Universitas Komputer Indonesia, Indonesia
[5]Departemen Teknik Informatika, Fakultas Desain, Universitas Komputer Indonesia, Indonesia

Email: *herrysa53@gmail.com

Abstract. The purpose of this study is to find out how effective the use of smart home system technology is on properties; smart home systems can make it easier for users to control functions automatically. The research method used is a qualitative method in order to find out in depth how effective the use of the smart home system technology is. Along with the development of the times, technology also accompanies the property in terms of security, comfort, convenience, and cleanliness. Since the COVID-19 pandemic came, we have found that facilities that use *smart home system* technology are urgently needed at this time, because during the pandemic, work and learning activities turn into online activities. This research shows that the effectiveness of *smart home system* technology can make work and study activities more effective.

Keywords: Smart Home, Technology 5.0, Modern Property.

1. Introduction

Smart home system technology is a technology-based home, assisted by the technological sophistication of this era. This technology enables the user of the home to control and control users home anytime and anywhere. It's through remote devices or mobile phones that are already set up with technical home. Thus, creating a home that is both practical and comfortable because it is easy to engage in some activities both remotely and closely using only Internet connections that can be controlled in mobile devices. Visually, homes that use the *smart home system* look no different from the conventional or ordinary houses. This kind of breakthrough is ideal for modern society.

In the use of *smart home system* there are several advantages and also certainly have some hurdles that may occur outside the control of the system. As is well known, in a technologically advanced era, there are now many big technological firms providing highly sophisticated products based on *smart home system*. The various forms of technology now in fact can be configured through *smart home system* technologies with varying variations. Such as organizing light intensity, room temperature, home security, and also some entertainment

International Journal of Research and Applied Technology

1(2)(2021) 362-369

Journal homepage: https://ojs.unikom.ac.id/index.php/injuratech

facilities. Included are a few other items of furniture. Therefore, smart home system technologies are able to generate and create comfortable and secure living conditions for its users, besides of course being more efficient because it is easily accessible through connectivity by the hand.

Smart home system technology certainly has benefits that are able to reassure residents of the house. How not, users of this technology are able to control various kinds of home devices such as lights and air conditioners without the need for their respective remotes. But with just one device, everything can be done quickly and precisely. In addition, the smart home system allows users to know a danger that is at home remotely.

One example is a *smart door* that allows homeowners to monitor and communicate with guests, even when the homeowner is not in place. Or smoke detection technology that will instantly appear on the device screen to notify that there is a fire threat. A few of these small examples certainly have very significant advantages. Especially in terms of cost savings, because household electronic appliances can be used wisely and as necessary. This results in a decrease in the use of electric power.

In line with the explanation of the background, and as a generation living in modern times, we are interested in compiling a paper with the title "*Effectiveness of Smart Home System Technology on Property*". This research is expected to be useful for readers, and able to provide intellectual contributions in the field of interior design.

2. Method

This research uses qualitative methods to find out in depth how effective the use of *smart home system technology* on property. The source of the data is obtained by conducting a literature study. This research will focus on the effect and effectiveness that is obtained when using a smart home system on the property.

3. Results and Discussion

In this era, technological developments are developing rapidly and modern. Where all elements of current human needs lead to efficiency and speed in their use. One of the concrete pieces of evidence is the use of wireless-based technologies such as *smart home systems* that are able to provide efficient value to the needs of human property. In this study, what is meant by property is what refers to a person's place of residence or residence.

3.1 Smart Home System

Smart Home can be said to be a house that has a sophisticated automation system to provide information to homeowners. So that homeowners are able to control and monitor the condition of the house. One example is a *smart home system* capable of detecting and controlling the intensity of light, room temperature, security systems, door or window operations, and various other functions [1].

Actually, this *smart home* technology has been around since the early 21st century or the 2000s. At that time, mobile phones or gadgets were widely used by the public. One example is *smart home*-based SMS (*Short Message Service*) gateway. This system is a technology to control and monitor several electronic equipment at home using SMS service via GSM network.

Unfortunately, this SMS-based *smart home system* is rarely used in the current internet era. This is because SMS-based technology is considered inefficient and less effective [2]. How not, in the midst of this rapid technological development, people prefer to use SMS to use internet-based applications. The use of internet-based applications is considered to be more attractive,

International Journal of Research and Applied Technology

1(2)(2021) 362-369

Journal homepage: https://ojs.unikom.ac.id/index.php/injuratech

faster, and has many functions. Apart from that, internet-based technology is considered cheaper and more flexible than SMS services [3].

Before adopting the smart home system at home, we must first identify some reasons for developing the *smart home system* that runs away from the flaws in the conventional home concept. First, in conventional homes, homeowners often ignore electronic devices such as lights, TVs, refrigerators, or other devices that they forget to turn off before leaving the house. This causes the use of electric power to be excessive or wasteful. Second, the security system in conventional homes tends to be quiet or lacking, for example, the door of a house that is forgotten to be locked so that it has the potential to cause harmful criminal acts [4].

Then the *smart home system* came as the correct answer to some of these problems [5]. As explained earlier, this *smart home system* provides users with a comfortable and safe environment, especially in terms of room coding, such as ambient temperature Settings, light intensity, home security, and electronic control. Further, David Bregman [6] describes it this way,

"A smart home is one that has a highly sophisticated automated system to control multimedia equipment for monitoring and enable the security forces (alarm and alert) associated with the windows and doors, lighting and temperature and many other functions. A smart home appears "intelligent" because of a computer system that can monitoring many aspects of daily life."

This definition explains that *smart home systems* have highly advanced automation systems to control multimedia devices, monitor, and activate alarm-based security systems that are connected to Windows and doors, lighting, room temperature, and so on. A smart home system or a smart home would seem smart because its computer system monitors many aspects of daily life.

In line with some of these definitions, it may be concluded that the *smart home system* is a system that integrates several devices that normally exist in a room, house or property. With connections to many of the devices of this home, *smart homes* are expected to increase security, ease, efficiency, and comfort for the householders. The smart home system on a property or interior is generally a security system, temperature control and ventilation system, lighting or lighting system, and entertainment or entertainment system.

3.2 Properties

Property in the broad sense means a mention of land or building owned by a person. In a sense the property is not restricted to the landscape of a building that is already established but also a legend with a building or building standing on it. In the English lexicon, the term property is defined as property of land, building and means and prejudicial which cannot be separated from the property or property property.

Meanwhile, rafitas [7] explained that *property* is *something that is expendable*. In the sense that anything that can be property or anything that can be held as an object of ownership. Submits to some of these insights, and it may be inferred that property is a property that belongs to an object belonging to it. In this study, the object referred to was the property of a building or rather a residence or home. But to be clear, here's some kind of property.

a. *Tangiable Property*

- *Real Property*, consisting of buildings, land, facilities and infrastructure
- *Personal Property*, such as motor vehicles, household appliances, equipment.

International Journal of Research and Applied Technology

1(2)(2021) 362-369
Journal homepage: https://ojs.unikom.ac.id/index.php/injuratech

b. *Intangible Property*, such as certificates of ownership, personal guarantees, francises, trademark, patent, copyright *francises*, merek dagang, hak paten, dan hak cipta.
c. *Marketable Securities*, such as stocks and savings [8]. These several types of properties indicate that the presence of properties in the joints of daily life is very important. This is of course as a support for the necessities of life and a provider of comfortable housing, as well as some of the assets owned by a person. However, in this research, the term property will refer more to the *tangible property* in the form of buildings or houses. This residential property will be closely related to smart home technology which starting to spread in this modern era.

3.3 How the smart system works

The Smart Home System is a mixed application of technology and services focused on residential properties or houses with specific functions. Smart Home System aims to increase efficiency, comfort, and security for its occupants. Yurnama revealed that usually smart home systems consist of control devices, automatic devices, and monitoring devices that can be accessed via computers or gadgets [9].

The workings of a smart home system on residential properties or residences are composed of a specific process, namely the preparation of system devices, and then its implementation on hardware so that it can then be accessed via computers or internet-based smartphones. Web and Android-based software systems can be composed of elements such as the Internet of Things (Iof), network control systems (NCS), Raspberry Pi, sensors, relays, webcams, smartphones, buzzers.

- Internet of Things (IoT)

Internet of Things allows for contact or interaction between one machine and another, or what is known as machine to machine. As in household electrical appliances, sensors, and mobile phones/computers. There are three things that are able to operate IoT quite well, namely a common understanding of users and their applications, software architecture and communication networks to process and transmit information, and analytical tools for automation needs and intelligent capabilities [10].

- Network Control System (NCS)

NCS is a control system whose control signals and feedback use internet media [11]. Actually, the workings of IoT and NCS are almost the same, but in NCS the analysis is about system response so that the system remains consistent, stable, and remains good. Because the internet sometimes has various obstacles such as delays, this system will be greatly affected by its work and become unstable [12].

- Raspberry Pi

Raspberry Pi is a single-board computer that is relatively small in size with a credit card. This technology was developed in the UK by the Raspberry Pi Foundation which aims to improve computer science in schools [13].

- Passive Infra-Red Sensor (PIR)

International Journal of Research and Applied Technology

1(2)(2021) 362-369
Journal homepage: https://ojs.unikom.ac.id/index.php/injuratech

This sensor is a sensor system that can be applied to detect infrared rays. This PIR sensor is only capable of receiving infrared light, but it is not capable of emitting its own infrared

light, which means that this PIR sensor is passive. The slightest movement will definitely be detected by this PIR sensor, because all objects -in this case humans - emit radiant energy. The following is shown in **Figure 1**. movement diagram of the PIR sensor.

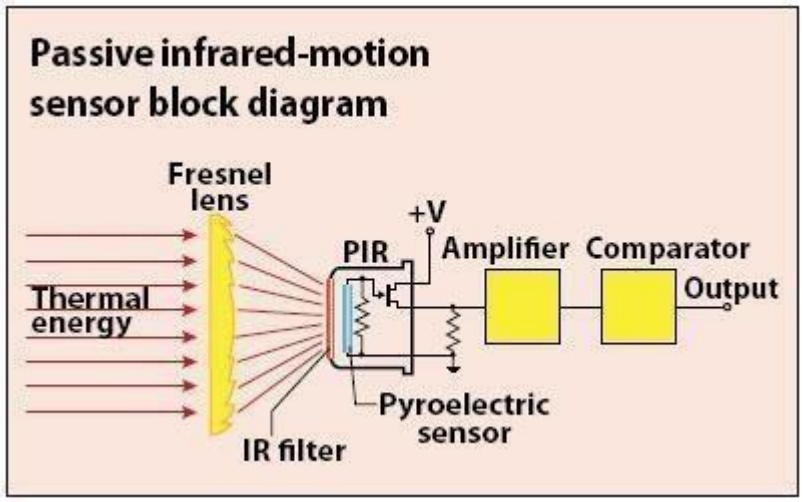


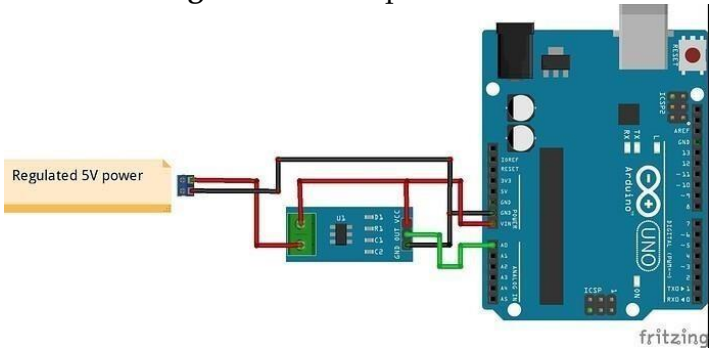
Figure 1. PIR sensor movement diagram

- DHT 22 Sensor

This sensor is a sensor that can detect basic temperature and humidity with digital input. This DHT 22 sensor has the ability to read air conditions in the room, and works on a 5V DC power supply. In addition, this sensor had advantages suc as: precise accuracy, sharpness of reading, and wider coverage compared to other temperature reading sensors.

- ACS721 Sensor

This sensor has a function to read electric currents both AC and DC circuits in an electrical wiring system. In addition, this sensor can produce a qualified signal beam according to the detection results. The signal it produces can be digital or analog. This sensor can be used as a data store for analysis results from a data acquisition system for control purposes. In other words, this sensor is capable of being designed to generate information from the measured electric current. This is shown in **Figure 2.** The shape of the AC712 sensor is *shown.*



International Journal of Research and Applied Technology

1(2)(2021) 362-369

Journal homepage: https://ojs.unikom.ac.id/index.php/injuratech

Figure 2. AC712 Sensor

- Relay

The relay module is a device that uses electromagnetic force to operate a switch system. This relay is composed of a coil of electrically conducting wire wrapped around an iron core. If the coil of wire is energized, then the magnetic field generated will attract the shaft which is used to leverage the magnetic switch mechanism. **Figure 3**. The following shows the shape of the relay module.

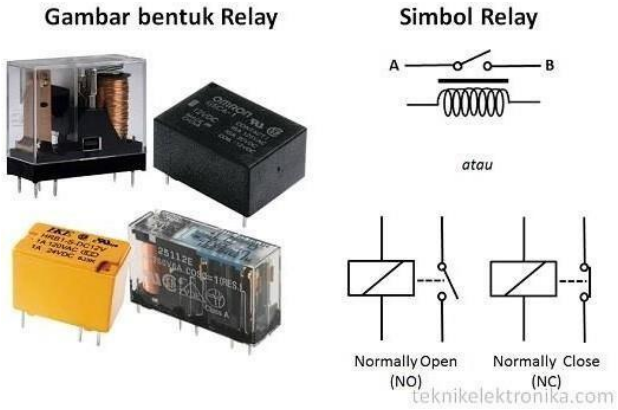


Figure 3. Relayed shape module

- Webcam

Web and camera, which is shortened to webcam, is a real-time camera whose visualization can be viewed directly, online via the internet. Webcams have a small form, like digital video cameras, webcams are connected to a computer and generally via a USB cable or PORTCOM cable. Usually, the webcam does not require a data storage area. Because the recorded data that can be monitored live is directly transferred to the computer.

Unfortunately, this webcam is only capable of being connected to a computer system, so it cannot be carried anywhere, but for now, the webcam monitoring camera is capable of connecting via the internet. So that homeowners can monitor the state of the house through a webcam. Notice in **Figure 4**. the following is a form of a webcam.

Figure 4. Webcam

International Journal of Research and Applied Technology

1(2)(2021) 362-369
Journal homepage: https://ojs.unikom.ac.id/index.php/injuratech

- Buzzer

Buzzer is a device capable of converting electrical signals into sound signals. Usually, the buzzer is used as a home security alarm, because its application is relatively easy, that is, by

simply providing an input voltage, the buzzer will produce a kind of sound. In its application to a smart home system on property, the buzzer can function as a home security system that is able to detect the threat of criminal action, because the alarm system will sound immediately if there is an attempted theft. Of course, after the buzzer is integrated with gadgets, homeowners can monitor the condition of their home.

- Smartphone

Smart phone is the last essential element of a smart home system. Because all smart home technology movements can be integrated on the phone screen so that homeowners are able to control, manage efficiently and quickly. Smart phones since the beginning of their emergence have even provided various advanced technologies such as portable media players, Global Positioning System or GPS, touchscreen, Wireless Fidelity or Wi-Fi, and so on. A variety of operating systems on smart phones can be found on iPhone OS or iOS, and Android. Currently, even smart phones have a working system that is almost the same as a computer.

3.4 Effectiveness of Smart Home System in Interior

Some of the descriptions above regarding what devices are capable of operating a smart home system show that this smart home system has many advantages. Especially in terms of efficiency and effectiveness in the interior, because homeowners can control, adjust, and monitor remotely and anytime. So that the condition of the house or property will always be safe. The following are some of the benefits of the effectiveness of the smart home system that we have summarized,

a. Provide a safe and comfortable residence. Homeowners with a smart home system do not need to worry when they are not around, because with a smart home system the homeowner can monitor the condition of his property remotely.

b. Facilitate various household activities. With a smart home system such as an automatic air temperature controller or a lamp lighting intensity controller, even monitoring home security systems makes it easier for homeowners to carry out their daily activities.

c. Guaranteed security system. The smart home system allows homeowners not to have to worry anymore if there is a criminal act that threatens the property. With smart home systems such as automatic alarms, and monitoring cameras that are integrated on the cellphone screen, home security is guaranteed.

d. Reduce the use of excessive electrical power. Sometimes homeowners ignore or forget the performance of electronic devices such as lights, refrigerators, televisions, and others.

Usually when going out of the house, homeowners may forget to turn off various electronic devices. However, with a smart home, homeowners are able to remotely control the settings So that the use of electricity is not excessive.

4. Conclusion

Smart Home can be said as a house that has a sophisticated automation system to provide information to home owners. So that homeowners are able to control, and monitor the condition of the house. One example is a smart home system capable of detecting and

controlling light intensity, room temperature, security systems, door or window operations, and various other functions.

The implementation of a smart home system on a residential property or residence has various advantages. After carrying out the elaboration of the smart home system with a

literature review obtained from scientific journals, scientific articles, internet and book sources, it can be concluded that the smart home system has a significant effectiveness value on residential property. Furthermore, the research results show that the smart home system is very suitable for use on property, especially in the modern era like today. Because the existence of a smart home system will be more effective and efficient in human activities. Apart from that, of course, its use is based on a wise attitude and not excessive.

Acknowledgement

We would like to thank the Universitas Komputer Indonesia for guiding us in the process of making this paper.

References

[1] Georgoulas. (2009). Wireless Sensor Network Management and Functionality: An Overview Dimitrios; Blow, Keith. *Wireless Sensor Network,* 1(4), 257-267.

[2] Samijayani, Octarina dan Ibnu Fauzi. (2015). Perancangan Smart Home Berbasis Jaringan Sensor nirkabel. *Jurnal Al-Azhar Indonesia Seri Sains dan Teknologi,* 3(2), 76-81.

[3] Dargie, Waltenegus dan Christian Poellbauer. (2010). Fundamental of Wireless Sensor Network. *Wiley and Sons,*

[4] Muharam, Mumuh, Melda Latif dan Mahendri Saputra. (2018). Sistem Kendali Jarak Jauh Berbasis Web Untuk Sistem Rumah Pintar. *Jurnal Nasional Teknik Elektro,* 7(3), 203- 208.

[5] Harper, Richar, ed. (2010). Inside the Smart Home: The Internet of Things A Survet. *Springer Sciene & Business Media 2006, Computer Networks,* 5(4), 2787-2805.

[6] Bregman, David. (2010). Smart Home Intelligence-The eHome that Learns. (online), Vol. 4. Diakses 5 Februari 2022.

[7] Rafitas, A. B. (2005). Kiat Sukses Bisnis Broker Properti. Jakarta: Bumi Aksara.

[8] Amalia, Anisa Indah. (2015). Peluang Investasi Properti di Indonesia. *Academia.*

[9] Yurmama, Fajar Tri. (2009). Perancangan Software Aplikasi Pervaisve Smart Home *Seminar Nasional Aplikasi Teknologi Informasi,* E1-E5

[10] Gupta, R.A. dan Chow, M.Y. (2010). Networked Control Systems: Overview and Research Trends. *IEEE Trans. On Industrial Electronis,* 57(7), 2527-2535.

[11] Najmurrokhman, A., Riyanto, B., Rohman, A.S., dan Hendrawan. (2013). Dissipative Controller Design for Networked Control Systems via the Markovian Jump System Approach. *Jurnal Eng. Technol. Sci.,* 45(1), 25-46.

[12] Soegoto, E. S., & Rahman, R. A. (2021). Technology on E-Payment Systems. *International Journal of Research and Applied Technology (INJURATECH), 1*(1), 140-147.

[13] Soegoto, E. S. (2018, August). Implementing Laravel framework website as brand image in higher-education institution. In *IOP Conference Series: Materials Science and Engineering* (Vol. 407, No. 1, p. 012066). IOP Publishing.