

Home Security Based on Raspberry and Android (Smart Home)

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Abstract— Smart Home is one of the tools that is developed for ease of automation of smart home management from the start of address, security, comfort, savings, through automation with Android. In designing a micro home security system controller using raspberry pi 3 and Android smartphones that can reduce the number of criminal acts of burglary door. This tool consists of an electro magnetic door lock called a solenoid door lock.

This solenoid key is placed on the door of the house for security. The design of this home door security system utilizes Raspberyy pi b + as a control device from near and far by utilizing the wifi network and sms gateway to control opening and closing the home door lock that is controlled via an android mobile. Through web bootstrap that will display the results captured by the camera to provide a home situation every time someone enters.

This house door security system that has been successfully built and tested with the working principle if there is someone who forces or breaks the house door in a closed condition, the system will activate a warning or alarm by sounding the buzzer, because there is an LDR sensor connected to one switch connected to the solenoid key that results, if the key is opened with a security system then the LDR sensor will turn off and there will be no alarm, but if it is forced to break the LDR sensor will activate and read the movement of the door so that the reaction occurs and the buzzer alarm will sound. This security system is a solution to increase the level of home security, besides this sophisticated system is very easy to use and integrated with android smartphones

Index Terms— home security; smart home; android; raspberryPI;

1. How to use the template

Smart home technology is emerging rapidly as an exciting new paradigm. A wide range of aspects that includes security, energy saving, ventilation, smart kitchen is covered in this paper. All of the above is executed with the help of smart devices such as remote control, security alarms, sensors etc. In this paper we present the above mentioned technologies and tools that can be integrated in smart home systems which can provide security energy saving and other such smart systems (Kadam, et al, 2015).

This application uses Raspberry Pi which functions as a server that will connect between hardware and software that is controlled via the web as an interface that is used by the user to enter input and produce output. This web development uses the Rasbian operating system the software used is PHP5. The features on this web are in the form of 6 buttons, of which 3 buttons blue as a rule on and 3 red buttons as a rule off.(Masykur, 2016)

Various controlling devices like fit bit, remote controlled lighting, etc. Working now a day's describe the initial phase of the smart livings. IOT scenario will gave home with controllability at distant operable devices using the data packet connection with the world. This paper is about the designing and modelling our sensible home automation system using the Internet of Things. The paper describes the various steps regarding the implementation of Smart Homes in the present days.(Kaur, et al, 2017)

Along with the development of electronics and communication, the use of computers and mobile phones is

increasingly popular in the community, today there are many electronic devices designed with digital technology so that they can be integrated with computers or micro controllers. The main advantage of electronic equipment in digital technology is that it is flexible because it can be controlled by software (software) making it easier for users (users) to modify the system.

A safe and comfortable home is coveted by everyone. For home security, every homeowner is very attentive. The increasingly widespread crime of theft at home makes many homeowners unsettled, especially when away from home for a long period of time.

For home security systems usually only rely on a key that is used to lock the house door to be safe. In addition to conventional keys, other conventional home security is like a padlock and trellis. Conventional home security is considered insufficient to make homeowners feel safe because thieves in addition to professionals can also work quietly with free time in an empty house without arousing suspicion from residents around the house. The shape of the conventional house key is very easy to duplicate. Especially when the house is uninhabited, the perpetrator can easily open the door with a key that has been duplicated.

One way that can be used to overcome crime at home using a modern home security system. That is using a micro computer Raspberry pi which is connected with a solenoid key as a digital home security system to lock the door and control it from inside and outside the home or even remotely with using an Android smartphone.

2. Research Methods

Understanding raspberry 3 B +, Raspberry pi or the usual in the short term raspi is a microcomputer whose size is only as wide as a credit card, but this series micro computer is equipped with an octa core processor and 1GB RAM for a fairly stable performance when in use, besides it's on the Raspberry Pi 3 series B + is equipped with 4 USB ports and 1 LAN port (Raspberry Pi Foundation, 2016)



Figure 1. Raspberry 3 B +

This micro computer is also equipped with 1 HDMI port to display the display like a PC desktop, but Raspberry is based on Linux and uses Raspbian as its OS, so it will be a bit foreign to Windows users. but with components embedded in this raspberry pi model 3 B +, we can edit documents, play HD videos, play games, coding and more.

The advantages of this raspberry pi are 40 GPIO (General Purpose Input Output) pins that function to connect raspberries with several electronic modules such as, relay modules, GSM modules, dynamo servo etc. To be controlled and used as a tool that can be developed into a tool, one of which is a sophisticated home security tool.

This Raspberry is very efficient in terms of size and power needed to turn it on, it only needs 5volt voltage. Raspberry can ignite, even with a power bank, so we don't need to bother with the need for large power coverage like just like a PC desktop, and this raspberry can turn on when PLN's electricity is off, while the power bank is still available as its power supply.

Definition of relay modules, Relay is a switch (switch) that is operated electrically and is an electromechanical component consisting of 2 main parts namely electromagnetic (coil) and mechanical (switch / switch). Relays use Electromagnetic Principles to move Switch contacts so that with a small electric current can conduct electricity with a higher voltage (Aripriharta, 2014)



Figure 2. 8 Channels Relay Module

Understanding the solenoid key, the solenoid key is an electronic key that can be controlled by raspberry pi. The

workings of this solenoid use a magnetic system, what if you get DC electricity this door lock will react to pull the iron that functions as the key and will release it again if the DC current disappears or is not flowed again.

This solenoid key is very suitable for making electronic doors that can be controlled by a micro controller, so that it can be set to lock without having to walk closer to the door. (shandy, 2015)



Figure 3. Solenoid key

Understanding Sensor LDR, LDR is short of Light Dependent Resistor which is one type of resistor component whose resistance value can change according to the intensity of light. LDR resistance value is strongly influenced by light intensity. The more light it hits, the lower the value of the resistance. Conversely, if the light hits it a little (dark), then the value of the resistance becomes larger, so that the flowing electric current will be hampered.

In general, an LDR has a resistance value of 200 Kilo Ohm when in low light conditions (dark), and will decrease to 500 Ohm in conditions exposed to light.

Understanding Python, Python is a multipurpose interpretive programming language with a design philosophy that focuses on the level of code readability. Python is claimed to be a language that combines capabilities, capabilities, with very clear code syntax, and is equipped with a large and comprehensive standard library functionality. (Kadir, 2005)

Python supports multi programming paradigms, mainly but not limited to object-oriented programming, imperative programming, and functional programming. One feature available in Python is as a dynamic programming language that is equipped with automatic memory management.

As with other dynamic programming languages, python is generally used as a script language even though in practice the use of this language is broader including the context of usage which is generally not done using the language of the script. Python can be used for a variety of software development needs and can run on a variety of operating system platforms.

Understanding PHP Hypertext Preprocessor", which is a programming language that is widely used for handling the creation and development of a website and can be used in conjunction with HTML.

Preprocessor" with the abbreviation "PHP".

The latest PHP version is the 5th version. Based on Netcraft's survey in December 1999, more than a million sites used PHP, including NASA, Mitsubishi and RedHat

3. Metode

This micro controller based home security system is a system used to control relays connected to home security interfaces such as solenoid keys, PIR sensors, camera modules, LDR sensors, servo motors, and buzzer speakers.

The relay function here only changes the function of the object that will be turned on via the Android smartphone control, the LDR sensor that is relayed will read every time the door opens through exposure to light that was originally darkened, then the relay switch will be connected to the buzzer speaker so that the speaker door will sound .

While when the door of the house will be opened, the relay will be switched to active so that the LDR sensor will turn off and the solenoid key will light up so that the door can open without any alarm sound because the relay is not connected with the LDR sensor again.

Then the PIR sensor that is placed on the door area will be active and send commands to the camera via raspberry to take pictures quickly, so the photo of the person entering will always be visible and can be known.

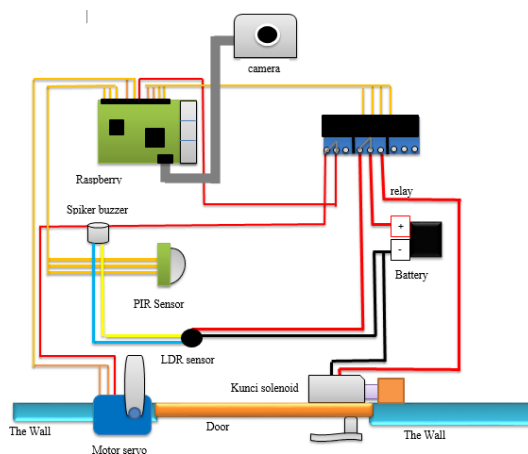


Figure 4. security system work scheme

4. Results and Discussion

In accordance with the application of a home security system that is now widely used by people in general, every house is only given a normal house key such as a sentil padlock or a manual door lock, so the homeowner must always be careful when locking out the house for a long time, or briefly.

When homeowners are in a hurry when leaving home due to an urgent time, without a security guard tasked with securing a house, this will be a very dangerous thing and will be an easy target for robbers who are always looking for prey.

Steps for installing a home security system :

1. Raspberry installation with raspbian operating system
2. Programming using putty
3. Relay installation
4. Setting Relay
5. Installation PIR dan Camera Sensor
6. Installation motor servo
7. Installation sms gateway

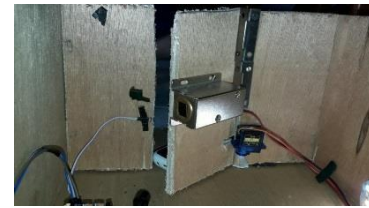


Figure 5. open the door with selenoid key



Figure 6. image capture by camera

5. Conclusion

1. Home security systems have been successfully created with Raspberry Pi with Android smartpone controllers.
2. Home security systems that can be tightened with the help of electronic devices that are quite sophisticated and easy to use.
3. Providing lessons for utilizing technology in the security sector.
4. Micro computers such as raspberry can be developed into a home security system that is easy and good, and can be further developed according to ideas and creativity.

References

- Kadam, et all.2015. Smart Home System. International Journal of Innovative Research in Advanced Engineering (IJIRAE) 2(1) 81 – 86.
- Masykur, Fauzan., Prasetowati, Fiqiana.2016. Aplikasi Rumah Pintar (Smart Home) Pengendali Peralatan Elektronik Rumah Tangga Berbasis Web. Jurnal Teknologi Informasi dan Ilmu Komputer (JTIIK) 3 (1), 51 -58
- Kaur, et all., 2017. Smart Homes: Sensible Living Using Internet of Things. Indian Journal of Science and Technology. 10 (31), 1 – 8
- Raspberry Pi Documentation by the Raspberry Pi Foundation is licensed under a Creative Commons Attribution 4.0 International Licence.
- Shandy, Yan Detha.2015. Implementasi Sistem Kunci Pintu Otomatis Untuk Smart Home Menggunakan SMS Gateway. e-Proceeding of Engineering .2 (2) 6395 – 6407.\
- Kadir, Abdul., 2005.Dasar Pemrograman Phyton. Andy Publisher

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