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DESIGN OF AN INTELLIGENT KEY SYSTEM FOR HOME SECURITY MONITORING: SYARIF'S INTELLIGENT KEY OF DISCOVERY (SITC) MODEL BASED ON ANDROID

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Abstract. Objective from This research is to provide convenience while increasing the value of valid and reliable information, results that are in accordance with current conditions in monitoring and responding remotely to the activities of people around (in front of the door) via the Android application. This research was conducted at the elite Citra Garden housing complex, Gowa Regency on Jalan Yusuf Bauti using a questionnaire as a data collection technique. Data obtained from 102 respondents who had filled in and provided an assessment of the statements given were then processed using the SPSS application to carry out validity and reliability tests. The research method used is Research and Development (R&D) as a development using the SDLC (Software Development Life Cycle) software model approach to design a remote monitoring system application for Internet network connections with the stages carried out sequentially from top to bottom, often called the waterfall model or Waterfall model. The result of this research is that it is able to carry out remote monitoring to monitor home security via Android.
Keywords: Application Design, R&D, IoT, Waterfall, Monitoring, Android

A. INTRODUCTION

Technology that is developing in all fields has become a problem that must be overcome with skills and abilities that are able to face the challenges of the world of life in society. The skill abilities of the generation obtained from education and experience must be implemented in the world of work or society which is increasingly changing from manual jobs to digital technology-based jobs. The era of the industrial revolution 4.0 and the era of society 5.0 means that society must contribute and participate in utilizing technology whose use has been found in all fields including education, transportation, industry, health, arts and the business

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world.(F. Syafar and M. Anwar). Android-based technology is not only used as a communication and business tool but can also be used to monitor remote activities that we cannot reach with our five senses (S. Baco, S. Muddin, F. Aziz, A. Martani, and H. Almunir).

The social life of neighbors looks after and protects each other for the security of a residence where the user or owner of the house resides. The security of a residential environment is the main target, but it cannot be denied that in the midst of life, thieves or thieves often take things from the house due to negligence. Currently, homeowners generally only use technology that relies on CCTV (Closed Circuit Television) devices to monitor the situation around their home, but this is limited because it can only be seen from both close and long distances but does not take the desired action. It often happens among people with home security systems or there are times when family or guests come to the house because there are no occupants or owners so they cannot enter the house. Based on this problem, researchers designed an Android-based application to monitor a remote system with an internet connection for visiting family or guests. If guests come and the owner of the house is not there, action can be taken to ensure that the person is immune so that the door can be opened remotely via Android. This system can be used in all areas, apart from residential areas, it can also be used in offices, hospitals and others that require a security system. This model uses an application design utilizing a database system for storing data that is detected continuously. Meanwhile, the Android application design uses Kodular which is connected to Firebase. The database system is designed and designed for cloud-based storage which allows data in the form of images to be stored and can be viewed at any time when the data is needed. Data storage other than using SD memory cards is more directed towards storing data in databases that have a larger capacity. Databases that are stored in real time in the form of images will be deleted by setting old (initial) data so that the storage is not full. In supporting the use and utilization of current technology, it is important to increase the abilities and skills applied to the education system, especially Vocational Education, which is expected to have the skills and intelligence abilities of a generation ready to work and even be able to become a resource whose competence opens up job opportunities in improving people's standard of living. Vocational education that focuses on work abilities must provide skills that are able to design, design, create and discover innovations that can be applied in technological developments that are entering digital technology life. The development of life in the digital world does not look back but is increasingly advancing along with advances in intelligence-based technology. The model approach that must be taken to support the achievement of learning objectives at the vocational level so that they are more focused and ready to work in the industrial world is to implement learning principles with a percentage of theory and practice, namely 30% theory and 70% practice as implemented by the government to support

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the education curriculum to be transformed so that can suit the needs of the industrial world, which is better known as link and match. Planning and designing is a performance that can be implemented based on vocational education and training programs to improve development and the national economy.

B. METHOD

1. Types of Research

This research uses the R&D (Research & Development) method for developing application designs using a waterfall model approach through direct experimental testing of the Android applications that are created. Data collection uses an instrument in the form of a questionnaire which is distributed to residents as respondents to find out3level of validity and reality regarding the use of remote monitoring applications via the Android application. The data obtained was processed using SPSS and then analyzed quantitatively descriptively. Data obtained from respondents is based on the number and answers to 15 statements with a 1-5 likers scale with categories namely: 5 = strongly agree, 4 = agree, 3 = quite agree, 2 = disagree, 1 = strongly disagree. Data is input into the SPSS application as follows:

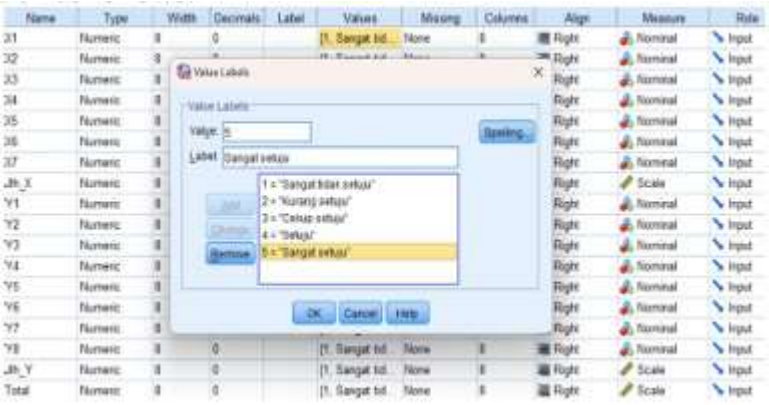

Figure 1. Respondent assessment data input

2. Design Models

The Android-based application program design was created using the Kodular program to complete the display model and user access control when used. The design model is made complete in accordance with remote control and monitoring forms with an internet connection. The design model in this research is integrated with two systems, namely hardware and software. The design model is grouped into two, namely hardware and software models that are implemented so that its use can be connected and monitored remotely using Android as in the scheme below.

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a. Hardware design

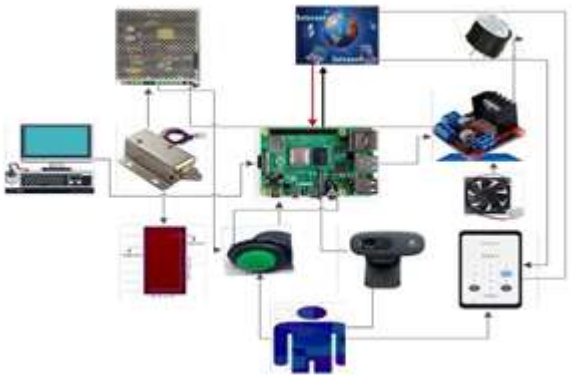

Figure 2. Hardware design schematic

Based on Figure 1 above, all components are connected to one another to form an integrated system so that the complete design can be connected to the Android system. The person object that has been image detected is used as test data and then processed on the Raspberry Pi system and then displayed on a visual monitor or Android device with the OpenCV (open Computer Vision) program. The reading system flowchat based on Figure 1 above, the reading sequence is as follows:

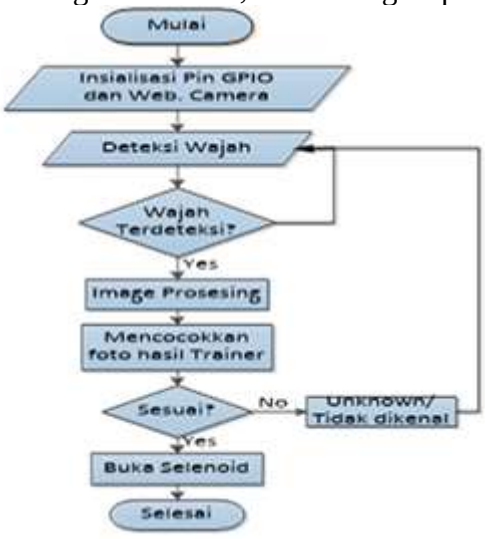

Figure 3. System Flow Design Flowchat

b. Software model design

The software design displayed on the Android system to control and monitor remote systems is designed using the Kodular application. The modular design model is as follows:

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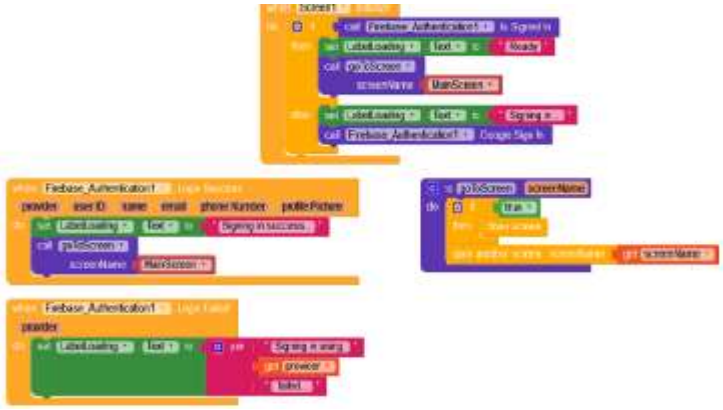

Figure 4. Kodular display design

Based on the software model design in Figure 3 above, it is a design for displaying the monitoring system in the Android application.

3. Testing Techniques

Experimental testing is carried out on other people who do not have train data and test data as a key access process so that when a photo object is detected it will be displayed on Android which can be seen from afar by the user as the home owner. The Android application display from a distance is as in the image below.

Figure 5. Application Monitoring Display

The application design using Kodular as in Figure 4 above displays a remote home security monitoring system that detects someone at the door of the house. The action that can be taken on the Android application is that it can monitor the person in front of the door who is detected by the camera and in real time the image is taken by the system and stored in the database.

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C. RESULTS AND DISCUSSION

1. Results

The research results were obtained from initial data collected through the observation stages and distribution of instruments in the form of questionnaires distributed to warha in the Citra Garden Kab residential complex. Gowa. Initial observations were carried out as evidence of documentation and recording regarding the situation of the residents' environment regarding the use and implementation of existing security systems in the residents' environment, especially regarding the use of technology for monitoring and controlling systems using the internet. The conditions and systems that apply in general, the security system still uses the conventional model, namely guarding by security guards. Through research with ongoing environmental conditions, the research was continued at the next stage, namely by distributing an instrument in the form of a questionnaire to carry out a needs analysis in designing an Android-based monitoring application. The instrument was filled in by respondents with varying answers, but the conclusion of the data analysis was that the desirability and usefulness of using a home security system, especially the use of intelligence-based locks, was agreed because the average assessment was valid and in accordance with the expected results. After the data is processed, the statement data x1 to x4 is taken to produce table data as on the following page:

Table 1. Validity and Reliability Test

Reliability Statistics

Cronbach's Alpha	N of Items
,469	7

Intraclass Correlation Coefficient

	Intraclass Correlation b	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	,112a	,057	,184	1,884	101	606	,000
Average Measures	,469c	,295	,613	1,884	101	606	,000

X1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	1.0	1.0	1.0
	Quite agree	1	1.0	1.0	2.0
	Agree	21	20.6	20.6	22.5
	Strongly agree	79	77.5	77.5	100.0
	Total	102	100.0	100.0	

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X2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	1.0	1.0	1.0
	Agree	28	27.5	27.5	28.4
	Strongly agree	73	71.6	71.6	100.0
	Total	102	100.0	100.0	

X3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	1.0	1.0	1.0
	Don't agree	1	1.0	1.0	2.0
	Quite agree	3	2.9	2.9	4.9
	Agree	43	42.2	42.2	47.1
	Strongly agree	54	52.9	52.9	100.0
	Total	102	100.0	100.0	

X4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	1	1.0	1.0	1.0
	Strongly disagree	16	15.7	15.7	16.7
	Don't agree	12	11.8	11.8	28.4
	Quite agree	12	11.8	11.8	40.2
	Agree	18	17.6	17.6	57.8
	Strongly agree	43	42.2	42.2	100.0
	Total	102	100.0	100.0	

Correlations

		X1	X2	X3	X4	X5	X6	X7	Jlh_X
X1	Pearson Correlation	1	,782**	,592**	,012	-,002	,004	-,145	,330**
	Sig. (2-tailed)		,000	,000	,905	,988	,971	,145	,001
	N	102	102	102	102	102	102	102	102
X2	Pearson Correlation	,782**	1	,500**	,010	-,026	,016	-,027	,357**
	Sig. (2-tailed)	,000		,000	,923	,793	,874	,791	,000
	N	102	102	102	102	102	102	102	102
X3	Pearson Correlation	,592**	,500**	1	,121	,015	-,063	,060	,405**
	Sig. (2-tailed)	,000	,000		,224	,884	,532	,549	,000
	N	102	102	102	102	102	102	102	102
X4	Pearson Correlation	,012	,010	,121	1	,247*	,111	,152	$1,599**
	Sig. (2-tailed)	,905	,923	,224		,012	,265	,127	,000
	N	102	102	102	102	102	102	102	102

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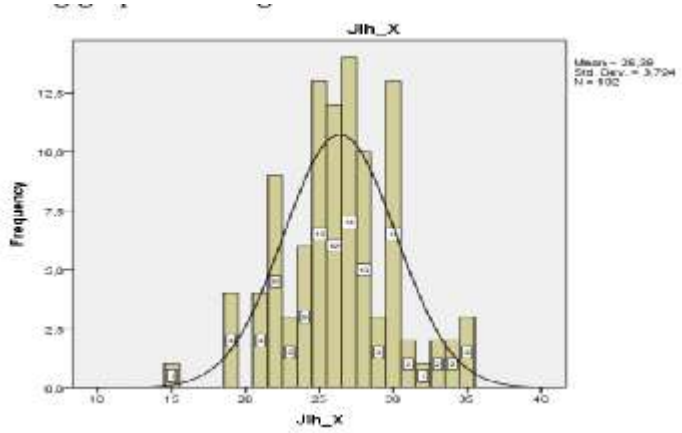
X5	Pearson Correlation	-,002	-,026	,015	,247*	1	,078	,213*	,475**
	Sig. (2-tailed)	,988	,793	,884	,012		,434	,031	,000
	N	102	102	102	102	102	102	102	102
X6	Pearson Correlation	,004	,016	-,063	,111	,078	1	,389**	,569**
	Sig. (2-tailed)	,971	,874	,532	,265	,434		,000	,000
	N	102	102	102	102	102	102	102	102
X7	Pearson Correlation	-,145	-,027	,060	,152	,213*	,389**	1	,632**
	Sig. (2-tailed)	,145	,791	,549	,127	,031	,000		,000
	N	102	102	102	102	102	102	102	102
Jlh_X	Pearson Correlation	,330**	,357**	,405**	$1,599**	,475**	,569**	,632**	1
	Sig. (2-tailed)	,001	,000	,000	,000	,000	,000	,000	
	N	102	102	102	102	102	102	102	102

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Based on the data in the Reliability table, the Cronbach's Alpha value is 0.469, for the r table data value it is 0.1946 as a benchmark value, while the calculated r value is obtained from the total number of respondent data for statements x1-x7, namely 0.330, the average value is greater than the r value. table is 0.1946, then the conclusion is declared valid. Furthermore, the reliability test data obtained a value of 0.469 which is greater than the benchmark value of 0.60, so it was declared Reliable. The results of data analysis are displayed as the following graph or histogram:



The appearance of the Android application stored in the database is recorded every time an object is detected by the camera as shown in the following image:

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Figure 6. Data/photos stored in the database

2. Discussion

The use of digital-based technology or intelligence systems has not been facilitated and no Citra Garden housing residents have used it as a monitoring system to maintain home security. Generally, the door locks used are manual, such as ordinary locks using a twist and push handle, equipped with monitoring by a security guard. The use of technology to see the monitoring side of who is around the house is using CCTV (Closed Circuit Television), of course the limitation is that it can only be monitored at a certain distance around the house. Based on these conditions, researchers designed and designed an Android-based application that can monitor the distance of people coming around the house, especially those in front of the door. So that when it is detected by a device camera installed on the door using a Raspberry Pi with an internet connection it can provide information and display it on the Android application system. The Android application is designed using Kodular with the control menu provided so that it can view data in the form of images stored in the previous data database and the final data. The Android application's working system starts with a tool that detects the object of the person in front of the door with a camera, then the image is sent to OpenCV for processing to match it according to the train data and test data. If the detected image is appropriate, the object can unlock the door and enter, but if the object is detected as unknown, the system displays a photo of the object on the homeowner's Android application which can be viewed remotely as long as the Internet network connection remains stable.

D. CONCLUSION

Based on the research findings on application and tool design, experimental tests were conducted on respondents, and the results were analyzed according to their needs. It was concluded that home security can be effectively maintained without the need for CCTV or security personnel. Homeowners feel safer from potential thieves because the system allows them to monitor their home remotely

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through an Android app, with all activity evidence stored in a secure database. The test results indicate that the Android application enables homeowners to remotely monitor visitors at the door as long as they have an internet connection, and the system provides clear, unlimited real-time video feed as long as the connection is stable, ensuring a reliable home security solution.

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