

# Forensic Data Analysis on Smartphone Memory Android Operating System Using Framework GRR

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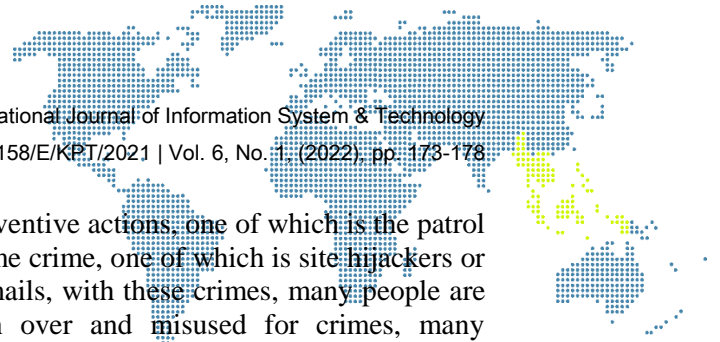
## Abstract

*The background of this research is how to find out and search for hidden data that has been deleted on a hidden smartphone device so that it can be used as evidence of crime, especially in cybercrimes. The method used in this study using the four-step method, namely the first stage is collecting data, the second stage is looking for data, the third stage is analyzing data and the fourth stage is reporting with the existence of these four stages, the method will be able to help research. The problem raised in this research is how to find evidence on a smartphone that was deleted by the users of, the crime so that the data can be returned and can make evidence as evidence of a crime. The purpose of this study is to find evidence on a smartphone and test whether the data is really the data you are looking for so that it can be used as evidence in cybercrimes.*

**Keywords:** Forensic Data, Smartphone, Memory, Android Operating System, Framework Grr.

## 1. Introduction

Now it is undeniable that technological developments have been very rapidly balanced with the development of the internet which can be applied in many ways, therefore with the times and technological developments, smartphones come with many technologies that can help many people, for example, Smartphones and the internet and others, therefore with the presence of technology that can help the wider community and can help many jobs in certain fields, the development of smartphones continues every year every year, developing with the latest technology from photography to memory which continues to grow every year, because that with the combination of smartphones and the internet, the world is truly in the hands of the community and can find out anything from a smartphone [1]. The existence of technological developments is also balanced with the development of crime in the field of technology, therefore the plus and minus faced by the technology used by the wider community is that people can use the technology for many things and help people in their daily lives, the minus is that people can commit crimes. the technology that is the basis for the tool to commit cybercrime crimes occurs, because there is internet with the internet, cybercrime can cover the whole world not only in Indonesia in Indonesia, the level of



cybercrime is quite high so the police take many preventive actions, one of which is the patrol cyber on social media [2]. Several types of cybercrime crime, one of which is site hijackers or the rights of others such as social media account emails, with these crimes, many people are harmed because these accounts have been taken over and misused for crimes, many cybercrime crimes are not revealed because they were committed abroad Therefore, this is a big challenge for the related parties, namely the police on how to prevent and overcome the level of cybercrime at home and abroad [3].

The method used in this research is to test on a mobile phone to get data that has been hidden, so that the data can be retrieved and can be used as evidence for cybercrimes investigated by the police [4]. The problem raised in this research is how to find data on a smartphone that uses the Android system, and the data has been deleted so that the data must be recovered so that it can be retrieved [5]. The purpose of this study is how to find data with a high level of accuracy on an Android-based smartphone, so that the data can be used as evidence and have an accuracy rate above 90% so that the data is the right data as evidence [6]. Forensic data is data that has been deleted or that has been lost in a memory which can be in the form of a hard disk, flash disk, or memory card court [7]. Smartphone is a technology tool that has been developed from year to year, starting with a regular telephone, then combined with internet media, so that this work can be done simultaneously, initially only in one direction, in 2 directions, then being able to make video calls directly on the smartphone. Smartphones are also developed every year to help people become better [8]. Android is an operating system developed to compete with existing stakeholders, for example Windows and Linux, Android is also applied to smartphones and operating systems on computers, therefore the development of Android from time to time is very rapid because it is widely used on smartphones. Therefore, with the development of Android, the community can be helped by a system that is increasingly sophisticated and can divide the community at large [9].

## 2. Research Methodology

This section discusses how this research method was carried out and what stages were carried out in this research. This research uses four stages, namely the data collection stage, the stage of how the data is processed, the analysis and reporting stage. Researchers conduct targeted research and find the right research objectives [10].

### 1) Collection Stage

The data collection stage is the most important stage in this study, the data collection stage is carried out using the existing memory on the smartphone so that the data sought will be obtained and collected and data can be found to be executed in the next stage.

### 2) Examination Stage

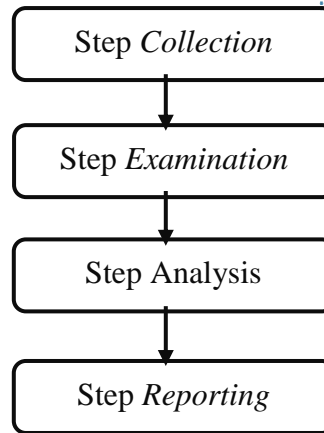
The next stage is the stage of how the data is checked and how the data is prepared for analysis. With this stage, the data will be obtained from smartphones which will be checked by the authorities.

### 3) Analysis Stage

The third stage is the stage of how the data is analyzed and obtained, therefore this stage is a very important stage because it will process data from the smartphone to be examined so that it can find the data to be searched.

### 4) Reporting Stage

The last stage is the stage of how the data is analyzed and the results of the data are matched, so that the data can be used as evidence and the data can be reprocessed as evidence.

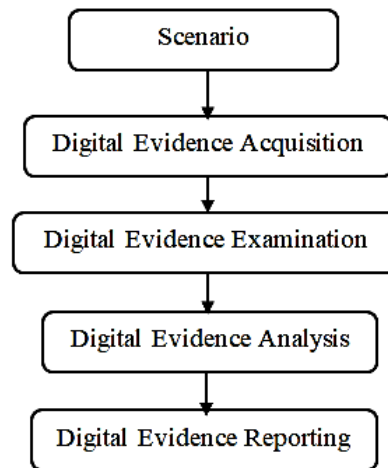


**Figure 1.** Reaserch Method

### 3. Result and Discussion

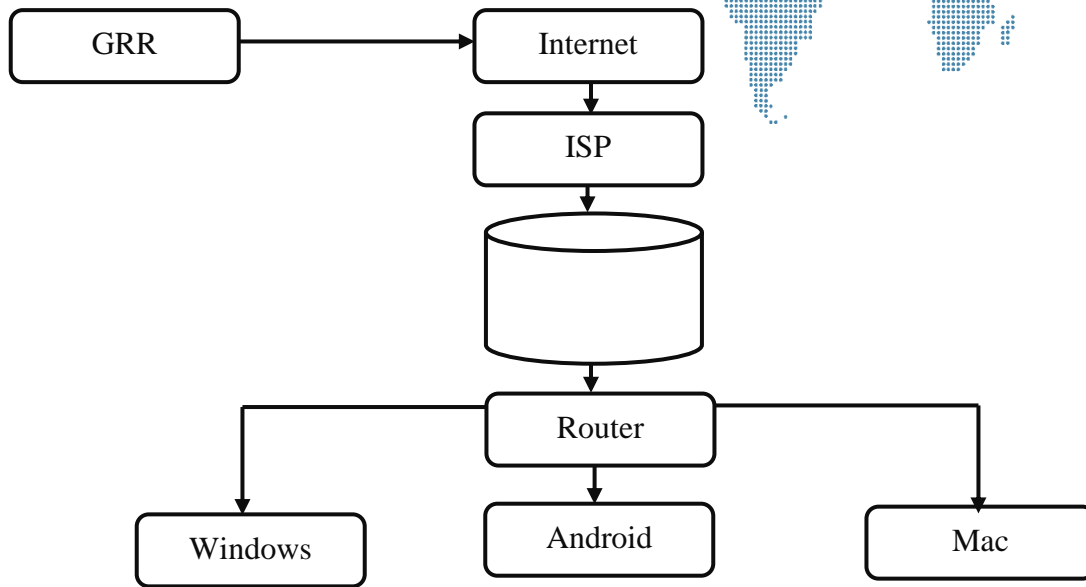
At this stage of results and discussion, the process of forensic data is divided into 5, namely scenario creation, digital evidence acquisition, digital evidence examination, digital evidence analysis, and digital evidence reporting. The results and discussion at each stage are as follows:

- a) Case Scenarios and Implementation.
- b) Digital Evidence Acquisition.
- c) Digital Evidence Examination (Examination).
- d) Digital Evidence Analysis (Analysis).
- e) Digital Evidence Reporting (Reporting)



**Figure 2.** Topologi Reaserch

Based on the picture above, it can be explained that the research topology is using GRR to the operating system.



**Figure 3.** Topologi of Case and Implementation

Based on the picture above, it can be explained that is a picture of the internet case to the operating system. Table 1 explains that the testing rate reaches more than 90% based on trial data, while the explanation can be seen below:

**Table 1.** Test Percentage Results

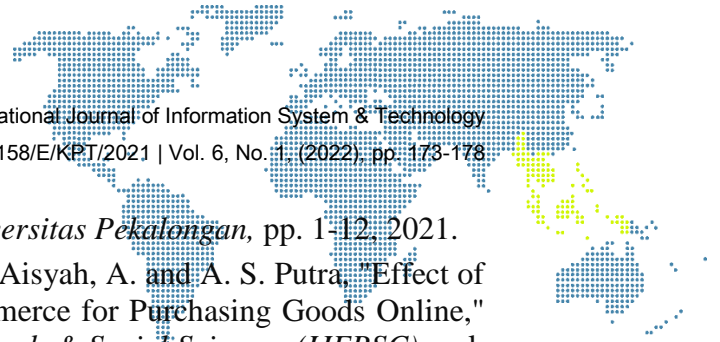
Testing	Persentase
Digital Evidence Acquisition	90%
Digital Evidence Examination (Examination)	92%
Digital Evidence Analysis (Analysis)	95%
Digital Evidence Reporting (Reporting)	94%

#### 4. Conclusion

Based on the results and analysis in the sections above, it can be concluded that there is success from the trials that have been carried out and the data that has been successfully obtained is more than 90% accurate data in further research can be used with various methods, for example, the National Institute of Justice (NIJ), Digital Forensic Research Work Shop (DFRWS), Association of Chief Police Officers (ACPO), and other standard forensic measures.

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