



GURUGRAM CYBER POLICE

DIAL 1930 OR
REPORT ANY CYBERCRIME AT
CYBERCRIME.GOV.IN



Cyber Crime Investigation

MOBILE FORENSICS

DR RAKSHIT TANDON
MASTER TRAINER

SH. VIKAS KUMAR ARORA, IPS
COMMISSIONER OF POLICE, GURUGRAM

SHRI SIDDHANT JAIN
DCP SOUTH / CYBER , GURUGRAM

SHRI PRIYANSHU DEWAN
ACP CYBER GURUGRAM



GURUGRAM CYBER POLICE

Keeping Gurugram Cyber Safe



NIKHIL TYAGI CW-79

Name - Nikhil Tyagi ,
Roll_ Number - CW_79
TOPIC - Research Report on The Role of Mobile
Forensics in Crime Investigations .

ACKNOWLEDGEMENT -

I would like to express my deepest gratitude to all those who contributed to the successful completion of this project.

First and foremost, I am profoundly grateful to my guide and mentor, **MR .Rakshit Tandon** , whose invaluable guidance, encouragement, and insight have been instrumental throughout this journey. Your expertise and constructive feedback have greatly enhanced the quality of this work.

I would also like to extend my sincere thanks to the entire team behind our internship program. To **Sh.Vikas Kumar Arora** IPS , **Commissioner of Police, Gurugram** , **Shri Siddhant Jain DCP South/ Cyber** **Shri Priyanshu Dewan** , **ACP Cyber Crime** thank you for your unwavering support and for providing a conducive environment for learning and growth. Your leadership and vision have been a source of inspiration.

A special thanks to my colleagues and fellow interns: **Mr.Vipin Dubey** , **Mr Utsav Kumar**, **Mr . Harshit Kumar** , and others, for their collaboration and camaraderie. Your teamwork and shared knowledge have enriched this experience.

I am also grateful to the **Gurugram Cyber Police** , **DAV** for offering me this opportunity and for the resources provided, which were essential to the project's success.

Lastly, I would like to thank my family and friends for their constant support and encouragement throughout this journey.

Thank you all for your contributions and support.

Nikhil Tyagi

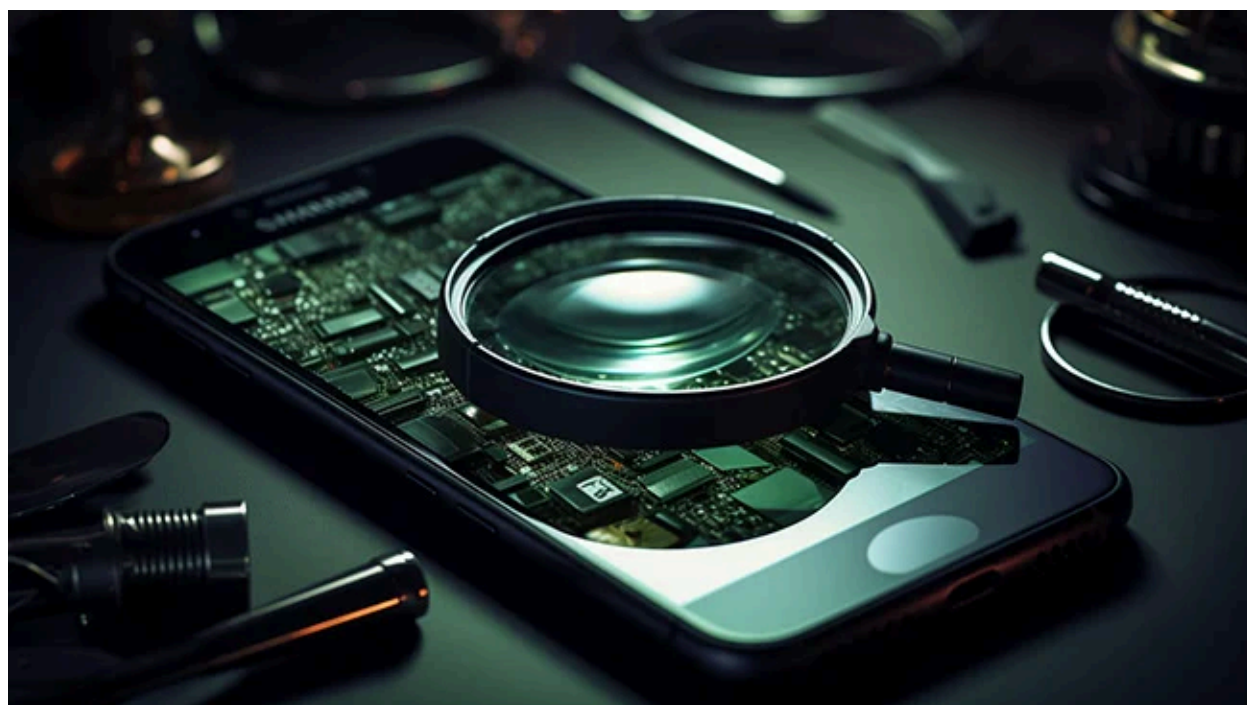


The Role Of Mobile Forensics in Cyber Crime Investigations

Nikhil Tyagi

(Cyber Security and Cyber Law Student), University of Delhi , Rohini

Corresponding Author:Nikhilcyber610@gmail.com



1.Abstract :

Mobile Forensics has become a crucial component of Cyber Crime Investigation due to extensive use of mobile devices in our everyday life . This paper will examines the



Pivotal role of Mobile forensics that how mobile forensics will play in solving cyber crimes problems , through the lens of detailed case studies. Its focus emphasizes the tools and methodologies used and explores the challenges and advancement in the field .

2.Introduction:

According to the cyber crime act , Mobile Forensics is the part of Digital Forensics . It is concerned with Collecting , retrieving , analyzing data from electronic sources . The recovery of evidence from mobile devices such as smartphones and tablets is the focus of mobile forensics. Because individuals rely on mobile devices for so much of their data sending, receiving, and searching, it is reasonable to assume that these devices hold a significant quantity of evidence that investigators may utilize.

2.1 Importance of Mobile Forensics in Cybercrime Investigations:

The role of Mobile Forensics in cybercrime investigations cannot be overstated. In my opinion Mobile devices have become an integral part of daily life, storing vast amounts of personal and professional data. As an Output in today's world . They often hold crucial evidence in cybercrime



investigations, including text and audio , Encoded messages, emails, call logs, location data, app activities etc . Mobile forensics enables investigators to uncover the data, Even if it has been deleted or hidden, providing key perception into criminal activities. Whether it's tracking the communications of a fraudster, revealing the location history of a suspect, or recovering incriminating photos in cases of organized crime, mobile forensics plays a pivotal role in modern digital investigations.

2.3 An Overview of Paper's Structure

This Paper is fully Structured to provide an extensive examination of mobile forensics in the context of cyber crime investigations . The First Section talks about various types of mobile forensics related to cyber crimes such as Financial Fraud , terrorism , organized crimes , data breaches , data leakage and Inside threats . By Following , the paper delves into the techniques used in mobile Forensics , including Logical Acquisition , Physical Acquisition , file system acquisition , even the advanced methods like JTAG and chip-off etc .So the process of evidence collections is explored in detail , covering the takeover and isolation of devices , meticulous documentation and various data acquisitions methods .The paper also examines the key tools used in mobile forensics , Oxygen Forensics and XRY , highlighting their effectiveness . The discussion also concludes with an analysis and observation of the challenges faced in the field , recent advancement and future directions for mobile forensics .

Would like to know more details on specific sections or others have questions ?

1. How Mobile forensics solves the real world problem ?
2. What are the key challenges to highlights in the future directions sections ?
3. What Specific example highlights the importance of mobile Forensics in cyber crime Investigations ?
4. What will be the conclusions and Outcome of the Case Study ?

Let's We Discuss with the Case Studies -

3. Case Studies 1 -

I still remember one important case that happened in 2008. In the Arushi Talwar was a highly published murder case of 2008 . She was found murdered in her bedroom on May 16 ,2008 ,The investigation totally focused on her parents and

her servant Krishna was accused of the murder .So here Digital forensics had a vital role in examining electronic evidence . It helps Investigators to reconstruct the communication and interactions between the victims and possible evidence with



with the help of computer data , emails and Mobile phone Records . Analysis of digital footprints helps to provide the victim 's activities and possible leads in spite of certain data handling and integrity challenges .

Case Studies - 2 :

Secondly, one Important that I had Decided to move on the important case study of India that showed how Vijay Mallaya was accused of financial fraud and money laundering .It merely involves loans worths of 9000 crore from various banks of India .So there Mobile Forensics had engaged to track Maliys communications and financial transactions and movements . Investigators analyzed the data from his smartphones and other digital devices to trace the flows of funds .

End Result : The evidence gathered through mobile forensics contributed to building a strong case against Vijay Mallya , leading to his exile from proceedings and ongoing legal battles . This case highlighted the role of digital forensics in the field of Financial Crime Investigations .



Case Studies -3

The Most of my favorite case study that I reveal is about The Gurugram school Murder case . This case study with a school named Ryan International School Murder Case in 2017 . A seven-year-old boy , named Praduyman Thakur , was found murdered in the School of washroom . The case initially led to the arrest of a bus conductor , but later , a class 11 student was identified as the main suspect .

How Forensics solved the Real World Challenge ----->

It involves again analyzing the call records , messages and social media activity of the suspects . The timelines of events were reconstructed using location data from their devices .

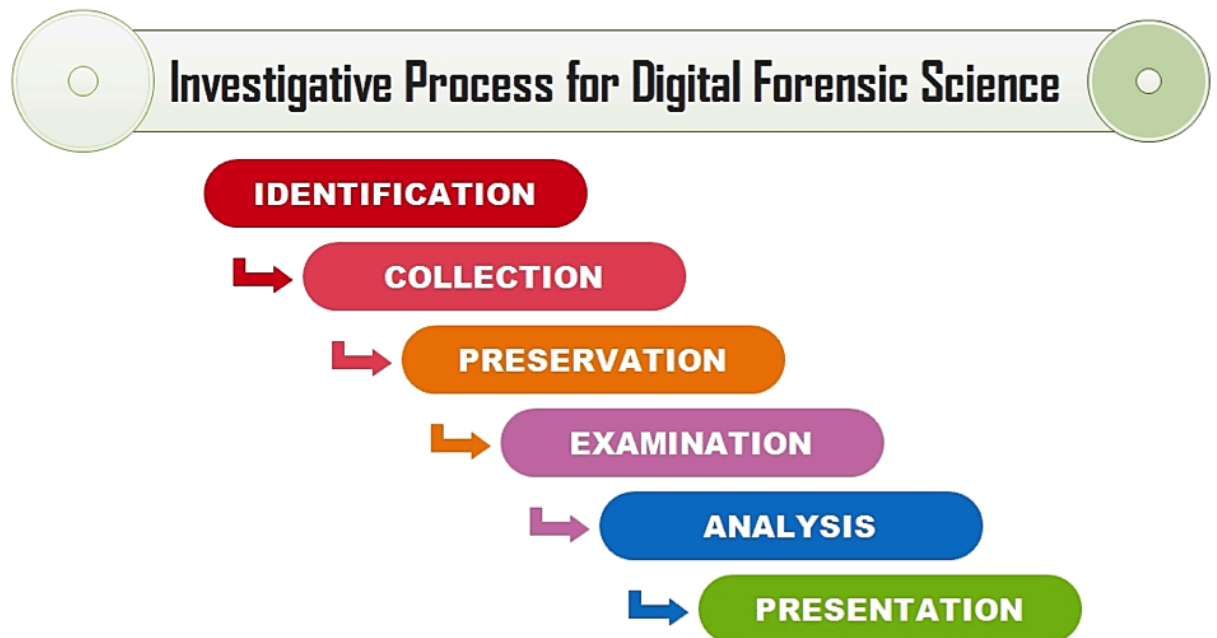
END RESULT :

The digital Evidence collected using mobile forensics played a crucial key role in shifting the investigation's focus to the students , leading to the confession . This case highlighted the critical role of mobile forensics in uncovering the truth in criminal Investigations .



5. Procedure of Mobile Forensics :`

There are following steps which can explained the Procedure of Mobile Forensics -



1. Secure and Isolations -

This is the First step where we secure the mobile device from doubtful or crime scenes . Ensure that it can't be remotely accessed or altered and Intercept . Here we can used the tools



Like faraday bags , cages to block down network signals .

2. Documentation -

We usually record the details about the devices like model number , condition , color and take photos. Here we generally used Digital Camera and Standardized Documents forms .

3. Data Acquisition -

We usually extract records in front of the device , select the method based on the device type and the investigation 's needs .

We use tools like Oxygen Forensics Detective and Cellebrite UFED etc .

4. Data Analysis :-

We analyze the extracted data for evidence such as call logs , messages and location data .Tools used to do this are - Magnet Axiom , XRY and Cellebrite UFED .

5. Data Preservation -

We ensure the integrity of the data by creating hash values and maintaining a chain of custody . Here we can use tools like FTK Imager , Hash Calu etc .



6 . Reporting -

Here we compile our findings into the detailed report .Tools can be used to generate the reports as follows: Cellebrite UFED , MAGNET AXIOM etc .



6 .Challenges :

There can be various challenges in the Future of digital Forensics :

1. Encryption and Security measures .
2. There can be technical difficulties and Limitations .
3. They can evolve mobile forensics and their impact on forensics .



7. Advancement and Future Considerations :

As technology advances, Various mobile forensics research continue to be discovered, and the cybercrimes associated with these platforms continue to increase. According to recent reports, the market size of mobile forensics may continue to grow. This is because of the increasing number of cases. For instance, in 2023, These advancements allow investigators to gather comprehensive evidence from mobile devices, making it possible to uncover hidden or erased data that are crucial for solving cyber crimes such as financial fraud and data breaches.

Advancement :

AI and machine learning algorithms are now integrated into forensic tools to automate data analysis, identify patterns, and highlight relevant evidence more efficiently.

Tools like Magnet AXIOM Cyber and BlackLight use AI to sift through large volumes of data quickly.



These advancements reduce the time needed for manual analysis and increase the accuracy of detecting important information, which is especially useful in complex cases involving terrorism and organized crime.

8 .Conclusions :

In conclusion, mobile forensics has proved to be an essential tool in modern cybercrime investigations and providing critical evidence that aids in solving challenging cases. The advancements in data recovery techniques, such as those offered by Cellebrite UFED and Oxygen Forensics Detective, have greatly enhanced our ability to retrieve deleted and encrypted data. The integration of AI and machine learning, enhanced by tools like Magnet AXIOM Cyber, has significantly improved the speed and accuracy of data analysis. Additionally, the expansion into cloud forensics and IoT device forensics has broadened the scope of the investigation process, allowing for a more comprehensive collection of evidence. Looking to the future, the field must adapt to the challenges posed by 5G technology and increasingly encryption methods, while also navigating legal and privacy concerns. Continuous innovation and adherence to ethical guidelines will be crucial in enhancing that mobile forensics remains a powerful and legally sound tool in the fight against cybercrime.



9 .References -

1. *Cellebrite UFED - A Universal Forensic Extraction Device*. Retrieved from Cellebrite .
2. Oxygen Forensics - *oxygen Forensic® Detective*. Retrieved from [Oxygen Forensics](#) .
 - Information about the capabilities and applications of Oxygen Forensic Detective in mobile forensics.
3. <https://www.police.vic.gov.au/cybercrime-strategy-2022-2027/cybercrime-cas-e-studies> .