

# Analysis of File Component Requirements Using Digital Forensic XML on Social Media TikTok Applications

Muhammad Romi  
Nasution  
Universitas Pasir  
Pengaraian

Mirajul Rifqi  
Universitas Pasir  
Pengaraian

Urfi Utami  
Universitas Pasir  
Pengaraian

Wirda Jannatul  
Jannah  
Universitas Pasir  
Pengaraian

## ABSTRACT

Every smartphone application definitely leaves traces, especially XML file artifacts, for example the TikTok application has XML artifacts from records of activities carried out in the application. Starting from the beginning of the application being installed, the version of the application used, the time the application was accessed, videos or photos uploaded, newly registered or previously existing accounts and so on. This research found more than 150 XML files in the TikTok application using 3 accounts. However, not all of them are user activities, in general the activities carried out by users are recorded in the aweme\_user file, even though the account has been deleted, it still leaves traces in the file. These activities are entering the application and recording video uploads. The file classification required for analysis in the context of this research is divided into 3 parts. These include very needed, less needed and not needed. Analysis is carried out especially on really needed parts such as the aweme\_user file, version, search and others. Those that are less needed will still be analyzed to support the XML data contents of the very needed category files. After carrying out the analysis, it can be determined which files are isolated for further study. The data content of these files will be seen to see whether they contain important information about the perpetrator's activities. In this research, dozens of XML files can be identified.

## General Terms

Your general terms must be any term which can be used for general classification of the submitted material such as Pattern Recognition, Security, Algorithms et. al.

## Keywords

Analysis, Social Media, Aplikasi, jejak digital, XML, Digital Forensic.

## 1. INTRODUCTION

Society's active use of information and communication is now through smartphones, creating an integrative communication system, automating various branches of production, increasing reliable sources and carriers of information leading to rapid transformation [1]. The increase in the number of crime cases in cyberspace continues to occur every year, so that the influence of the internet on people's social life, activities and education cannot be avoided. Misuse of the internet and social media is called cybercrime. In 2015, it reached \$3 trillion globally in losses due to cybercrime [2]. Online interaction through social media allows users to contribute concepts, experiences from the same interests and ideas, such as uploading pictures, videos, sharing files and updating status and other information, thereby forming collaboration in various activities and events. Apart from that, you can collaborate and communicate using instant messaging and electronic mail with online relatives or friends[3]. A lot of information is obtained

from social media including TikTok. TikTok's advantage in presenting short video content is that it is creative and interesting. Some users create content to get more attention and recognition, thereby increasing their sociality. Every uploaded content can be fully explored if you follow each other, as long as the content is unique and entertains other people, there will definitely be real-time feedback from the audience[4]. TikTok is a social media that was launched in 2016 in the Chinese market (as Douyin) and in 2017 launched internationally under the name (TikTok). The most downloaded mobile application in the United States in 2018 and is currently available in more than 150 countries with more than 800 million active users every month. Users aged between 16 and 24 years are 41% the youngest demographic when compared to other social media users. This interest is because TikTok provides an easy and fast experience when creating and sharing short videos of 15 to 60 seconds by providing various sounds and effects[5]. Show in figure 1 TikTok will be ranked first as the largest social platform using each total daily minute in 2025, based on publication analysis of total time spent on activities.

**TikTok Passed Instagram in Total Daily Minutes in 2022 and Will Pass Facebook in 2025**  
millions of minutes per day among the US adult population

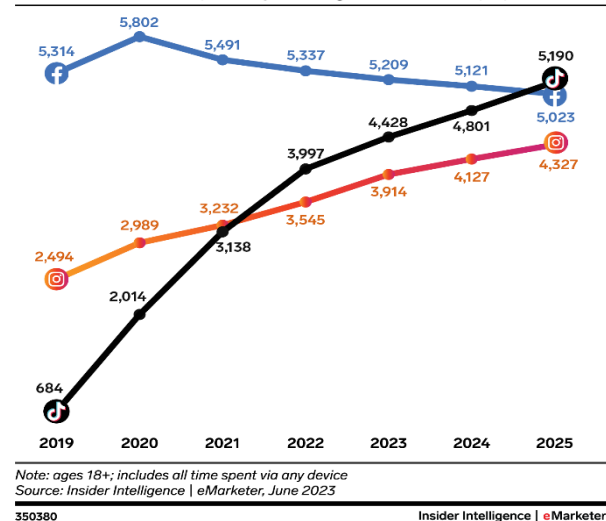


Figure 1: Prediction Platform Social in 2025

US adults spent 4.43 billion minutes per day on TikTok this year, a five-fold increase since 2019. Compared to the Facebook platform, there has been a decline in usage from 2020 to now, namely from 5.4 to 5.2. It is predicted that it will continue to decline to 5.0 in 2025. In contrast to Instagram, it continues to grow upwards starting from 2019, having usage of 2.4 to 3.9 in 2023. Even though these two applications are

owned by metaverse companies, in 2023 Instagram will grow to 4.3 minutes of usage per day[6].

Research on identifying digital artifacts from the TikTok application is still divided into different parameters but has the same goal XML files can be identified by Three parameters. These include friends, users and search. XML files basically provide Seven information. Namely when the application was opened, installed, updated, MAC address, search, language and region The results obtained an analysis of the Android operating system to see any artifacts left behind where XML files were found as well as the TikTok application database such as user information, application logs, video database, downloaders and users [7] The next research uses the Post-Mortem method to identify artifacts on TikTok. As a result, we found three important XML files, namely user, login and search. This research also uses an Autopsy module which can identify functional friends and messages. The database results into 2 functional modules including contact functional as well as messages and assessments in 4 XML files [8].

All components obtained from the TikTok application artifact will be analyzed for the purpose of viewing user activity. Through this research, 3 parameters will be produced in the analysis including: Needed meaning Activities carried out such as login, account, access time, search and other. Less Needed is like a Age level when accessing the application, wifi used and Not Required Such as cache, config prefs and shared tokens.

## 2. DIGITAL FORENSIC XML

DFXML can enhance the composition in providing a language to describe digital forensic processes for example forensic work products (e.g. file locations on hard drives), metadata (e.g. file names and timestamps) and crypto graph hashing. XML files make it easy to share information with other organizations. In some cases, it is only necessary to share the XML file, not the disk image itself. This is more efficient because the file size is much smaller than a disk image and helps protect data privacy[9]. The XML format makes it easy to identify and change personal data. The resulting XML files may be distributed without Institutional Review Board (IRB) or Ethics Board approval. they can even be published online. Finally, because DFXML files store a version of every file created by the tool, the tool can easily reprocess disk images automatically as the tool evolves[10].

According to the explanation, the most important components in metadata are general signature and signature validation. The general signature has 2 components, namely Creation of References explaining the source of the download location via URI, carrying out the transformation described in the transform element on the referenced data object and using an algorithm to calculate the hash function value[11]. Then the Signature creation component is "SignedInfo" (including reference elements), the hash value is "SignedInfo" and the encryption of the hash value is then stored in "SignatureValue. Signature validation also has 2 components, namely reference validation executing a hash calculation algorithm to calculate the hash value of the changed document and signature validation reading key information from "KeyInfo" then explaining the "Signature Value" from the "Signature Method". XML elements that can be analyzed such as VTs and VTe for validation time, timestamp attributes TTs and TTe for transaction time, contributor, identifier, coverage and rights, title / name of file, format, , language, source, relation, creator and data type[12]. Conventional XML elements have information elements from the creator such as the name of the

document with the extension, XSD (XML Schema Definition) meaning the definition of the purpose of the code created, contributor, publisher, specific information, identifier. The most important elements are TST (Transaction Start Time) and TET (Transaction End Time) or can be called Timestamp which includes validity (VST and VET)[13].

**Table 1. Table Standart element file XML**

| No | Element    | Description   |
|----|------------|---|
| 1  | uid        | The ID of the user who owns the file. Numeric in POSIX file systems but string for SID in NTFS. |
| 2  | Version    | XML generating program version.   |
| 3  | Start Time | The date and time the program was run   |
| 4  | Username   | User Name when the program is run   |
| 5  | Name_type  | Representation of file types such as general, directory, link and others                        |
| 6  | Crtime     | last accessed time  |
| 7  | Ctime      | Time the metadata was modified  |
| 8  | OS Version | Versi of Operating System   |

The location of the folder in the directory is a collection of everything used for analysis, the first three files extracted from the smartphone, the most important files are the phone file and the pdf file. Each file has a different character. The character is in the form of stored data, for example the phone file file is used almost entirely as an artifact of activities in the TikTok application, especially in the ugc trill file. However, some XML files are outside it, such as cell info, which is a source of information from the signal used when connecting to the internet [14]. PDF files are pieces of images from videos that have been uploaded to the TikTok application, these images also include pieces of effects used in the video. The characters of all images have a sequence of Names such as img\_7216, img\_7217 and so on, the extension in compress image chunks using png.

DFXML provides tools for common forensic processes such as hashing and cryptography. Forensics on directories such as file locations on the hard drive as well as on the metadata section File names and timestamps. DFXML files were created for each common XML component totaling over 800 lines, having 72 elements required in the analysis. The elements used are not all in the XML file, the elements can be adjusted to the needs of the XML metadata being processed[15]. DFXML stores output that can provide retrieval information and representation of file system metadata to ensure the origin, authenticity, and integrity of storage media. A manifest is sufficient to enforce full storage navigation and file extraction without needing to re-parse the structure on disk after the XML is generated.

## 3. FRAMEWORK

### 3.1 Location

The location of the folder in the directory is a collection of everything used for analysis, the first three files extracted from the smartphone, the most important files are the phone file and the pdf file. Each file has a different character. The character is

in the form of stored data, for example the phone file file is used almost entirely as an artifact of activities in the TikTok application, especially in the ugc trill file. However, some

XML files are outside it, such as cell info, which is a source of information from the signal used when connecting to the internetase.

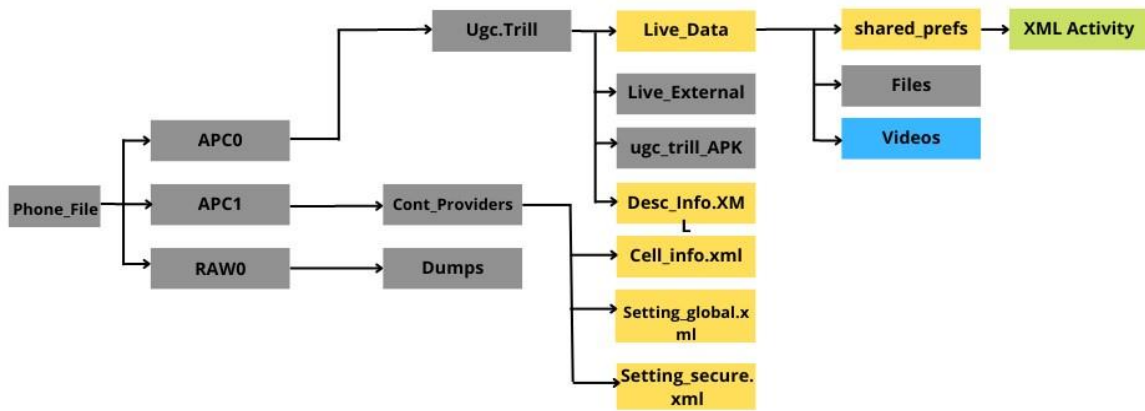


Figure 2: Location File XML

PDF files are snippets of images from videos that have been uploaded to the TikTok application, these images also include snippets of the effects used in the video. The characters of all images have a sequence of Names such as img\_7216, img\_7217 and so on, the extension in compress image chunks using png.

### 3.2 Analysis using DFXML

DFXML separates file system analysis and interface software. This is largely possible due to the long-term stability of the file system interface. It provides a navigable interface to powerful file system metadata following broad common denominators in modern storage interface requirements, such as following file navigation and reading POSIX interface components[16]. DFXML provides tools for common forensic processes such as hashing and cryptography. Forensics on directories such as file locations on the hard drive as well as on the metadata section File names and timestamps[17]. This research DFXML files were created for each common XML component totaling over 800 lines, having 72 elements required in the analysis. The elements used are not all in the XML file, the elements can be adjusted to the needs of the XML metadata being processed. stores output that can provide retrieval information and representation of file system metadata to ensure the origin, authenticity, and integrity of the storage medium. A manifest is sufficient to enforce full storage navigation and file extraction without needing to re-parse the structure on disk after the XML is generated. This research uses 9 more elements by adapting to the needs of XML data. The most important element is the UID, because it follows a single account found on a smartphone to differentiate its behavior in the application. In general, the DFXML workflow of this research describes the metadata structure to be serialized into an XML tree by taking only important file metadata.

The most important thing stages in the image is the file system description, this stage is carried out to see the contents of the data to adjust it to the required elements. Element validation plays an important role because not all elements in DFXML can be applied to TikTok XML files such as the "mode" element which means the mode the file is being opened in.

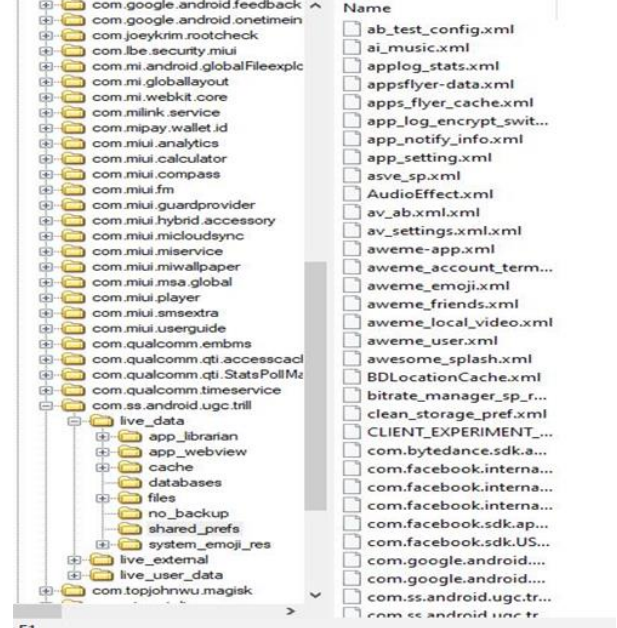


Figure 4: XML artifacts recorded

The following is an figure 4 xml artifacts recorded on the smartphone. TikTok application XML file used in this research is version 16.6.4. has more than 108 pieces of potential information, such as the time the application was first opened, the time the application was installed, the application was last updated, the SSID MAC address used, search history and so on. All XML files are located in the backup application area in the com.ss.android.ugc.trill directory which requires root access on the smartphone. In contrast to access without root, it only has a little information, including: First time the application was installed, Last time the application was updated, Application



Figure 3: File XML Description Process

version, Certificate for application use, Permission rights on Android. Everything is saved in the directory com.ss.android.ugc.trill\live\_external. Element validation is required when the XML is parsed. Elements are used according

to data requirements elements are matched to data in XML. If the data meets the NIST element standards, it can be continued for analysis.

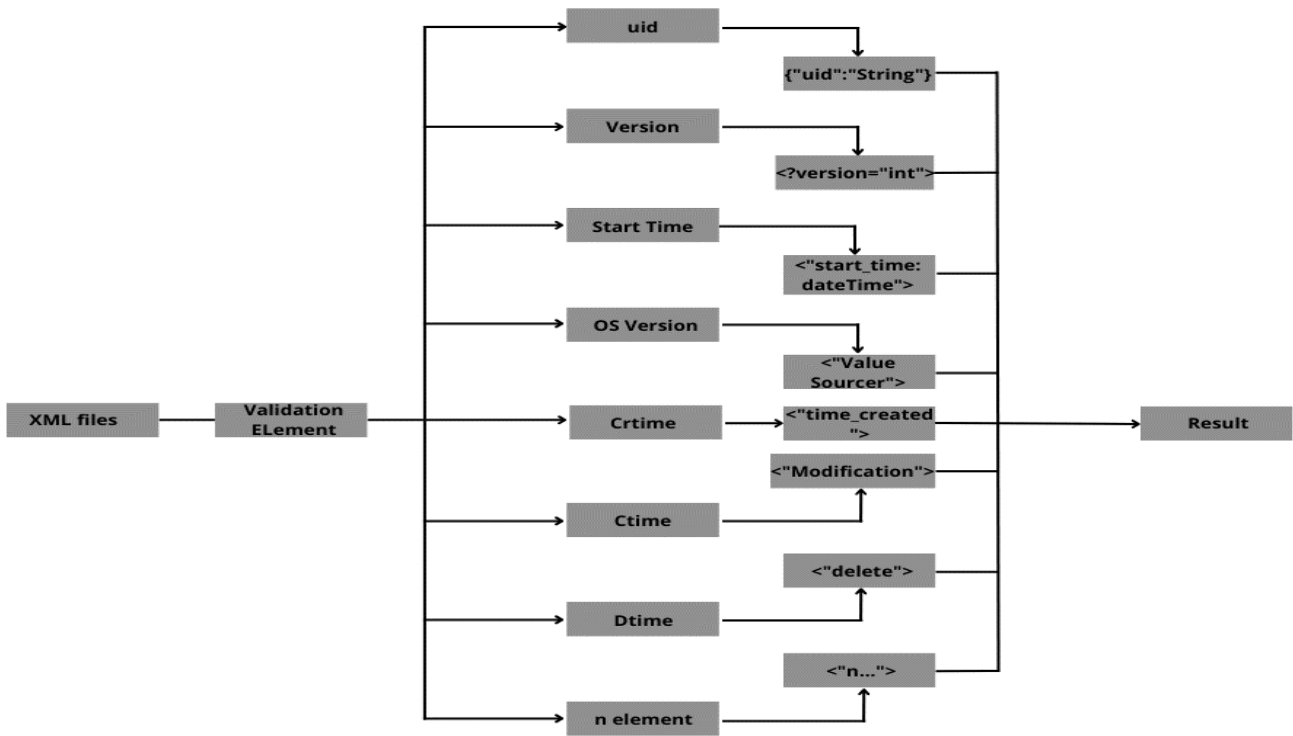


Figure 5: XML Validation File

The old and new versions of the TikTok application have a significant difference in increasing the number of XML files. Every version update, some XML files still have the same name such as aweme\_user.xml this file stores data about TikTok users and whether the TikTok account is linked to Facebook, Twitter, Weibo, Youtube or Instagram, the number of followers, friends and accounts followed. Next, the search.xml file contains information about the history of searches carried

out by the user. Each application on Android has a different number of metadata file systems, even between applications it will be different if the version has changed, the XML files in the TikTok application version 8.9.4 were found to be 103 different from TikTok version 15.1.0. as many as 104 XML files in the application. Each XML file found contains activity instructions from application users.

```

<string name="6930551655360414721_significant_user_info">{"uid":"6930551655360414721","short_id":"0"," unique_id":"kell_1.3","nickname":"Kell_1.3","avatar_url":"https://p16-sign-sg.tiktokcdn.com/musicallymaliva-obj/1594805258216454~c5_100x100.webp?x-
expires\u003d1613808000\u0026xsignature\u003dXopf2O0xFqJDb3RLUwvmOyWUBWo%3D"}</string><string name="6930551655360414721_aweme_user_info">{"accept_private_policy":false,"account_region":""," account_type":0,"allowStatus":0,"author_hority_status":0,"avatar_larger":{"height":0,"data_size":0,"uri":"musically-maliva-obj/1594805258216454","url_list":["https://p16-sign-sg.tiktokcdn.com/musically-malivaobj/1594805258216454~c5_1080x1080.webp?x-
expires\u003d1613808000\u0026xsignature\u003dre3HHNF98wm%2FUaZHQr9hxiZmlIQ%3D"],"https://p16-signsg.tiktokcdn.com/musically-maliva-obj/1594805258216454~c5_1080x1080.jpeg?xexpires\u003d1613808000\u0026xsignature\u003dN6F6L4RMeVUudzGgMVt5Ggst54U%3D"],"width":0},"avatar_medium":{"height":0,"data_size":0,"uri":"musically-maliva-obj/1594805258216454","url_list":["https://p16-signsg.tiktokcdn.com/musically-maliva-obj/1594805258216454~c5_720x720.webp?xexpires\u003d1613808000\u0026xsignature\u003djxf5GmoA8E25TbYGHNRbb2MI5pA%3D"],"https://p16-sign-sg.tiktokcdn.com/musicallymalivaobj/1594805258216454~c5_720x720.jpeg?x-
expires\u003d1613808000\u0026xsignature\u003dKX0OLuMzf5w6qu6GspVWDTvI27M%3D"],"width":0},"avatar_thumb":{"height":0,"data_size":0,"uri":"musically-maliva-obj/1594805258216454","url_list":["https://p16-signsg.tiktokcdn.com/musically-maliva-obj/1594805258216454~c5_100x100.webp?xexpires\u003d1613808000\u0026xsignature\u003dXopf2O0xFqJDb3RLUwvmOyWUBWo%3D"],"https://p16-signsg.tiktokcdn.com/musically-maliva-obj/1594805258216454~c5_100x100.jpeg?xexpires\u003d1613808000\u0026xsignature\u003dkSsDaS514IzQhQjofvr1fk%2B7ds
  
```

```
%3D"],"width":0},"avatar_update_reminder":false,"vid_eo_icon":{"height":0,"data_size":0,"uri":"","url_list":[],"width":0},"aweme_count":1,"aweme_hotsoon_auth":0,"aweme_hotsoon_auth_relation":0,"bind_phone":"","bio_permission":{"enable_email":false,"enable_location":false,"enable_phone":false,"enable_url":false},"birthday_hide_level":0,"can_modify_school_info":false,"can_set_geofencing":false,"cancel_type":0,"category":"","collect_count":0,"comment_filter_stats":0,"comment_setting":0,"commerce_permissions":{"e_homepage_tab_management":-1,"elite_login":-1,"enterprise":-1,"head_image":-1,"star_atlas_order":-1,"top_item":-1},"commerce_user_info":{"ad_authorization":false,"ad_influencer_type":0,"has_ads_entry":false,"is_ad_partner":false,"is_auction_ad_influencer":false,"show_star_atlas_cooperation":false,"star_atlas":0},"commerce_user_level":0,"constellation":0,"cover_url":{"height":0,"data_size":0,"uri":"tiktokobj/1613727517271041","url_list":["https://p16-sg.tiktokcdn.com/obj/tiktokobj/1613727517271041","https://p53-sg.tiktokcdn.com/obj/tiktokobj/1613727517271041"],"width":0},"custom_verify":"","display_wvalantine_activity_entry":false,"donation_guai_count":0,"dou_plus_share_location":0,"download_setting":0,"duet_setting":0,"education":0,"email":"k***1@gmail.com","enterprise_verify_reason":"","mplatform_followers_count":0,"favoriting_count":0,"favorite_expire_time":0,"follow_status":0,"follower_count":0,"follower_status":0,"following_count":2,"force_private_account":false,"friend_count":0,"gender":0,"google_account":"","has_email":true,"has_facebook_token":false,"has_activity_medal":false,"has_orders":false,"has_story":false,"has_twitter_token":false,"has_youtube_token":false,"hide_location":false,"hide_following_follower_list":0,"hide_search":false,"hide_share_button":false,"ins_id":"","is_activity_user":false,"is_ad_fake":false,"is_binded_weibo":false,"is_block":false,"is_blocked":false,"content_language_already_popup":false,"has_insights":false,"is_discipline_member":false,"is_effect_artist":false,"is_email_verified":true,"is_flowcard_member":false,"is_minor":false,"isNewRecommend":false,"douplus_old_user":false,"is_phone_binded":false,"is_pro_account":false,"is_star":false,"sync_to_toutiao":0,"is_verified":0,"iso_country_code":"","latest_order_time":0,"live_agreement":0,"live_commerce":false,"login_platform":0,"mAtType":0,"is_gov_media_vip":false,"music_compliance_account":0,"need_addr_card":false,"need_recommend":false,"neiguang_shield":0,"nickname":"Kell_1.3","nickname_update_reminder":false,"normal_top_comment_permission":0,"notify_private_account":0,"original_musician":{"digg_count":0,"music_count":0,"music_used_count":0},"post_default_download_setting":true,"prevent_download":false,"private_aweme_count":0,"pro_account_tcm_red_dot":false,"profile_completion":0.0,"profile_pv":0,"recommend_score":0.0,"registerStatus":0,"register_time":1613650106,"forward_count":0,"room_id":0,"school_visible":0,"school_type":0,"sec_uid":"MS4wLjABAAAAKrnEpz3gQIsda93DwsYtMpaltqZCVfpmom8zPaLswRt2nwHNtYQgCvQ_6g3Ve3","secret":false,"share_info":{"bool_persist":1,"share_image_url":{"height":0,"data_size":0,"uri":"","musically-maliva-obj/1594805258216454","url_list":["https://p16-signsg.tiktokcdn.com/obj/musically-maliva-obj/1594805258216454?x-expires\u003d1613743200\u0026xsignature\u003dZbtMKZEhlz%2BIlpbPB01cCBa%2BHEk%3D"],"width":0},"share_desc":"Lihat Kell_1.3! #TikTok","share_title":"Bergabung dengan TikTok dan lihat yang saya kerjakan!","share_title_myself":"Aplikasi TikTok ini sangat asyik! Ikuti saya @Kell_1.3 di TikTok dan lihat video saya!","share_title_other":"Pengguna TikTok ini keren sekali. Ikuti @Kell_1.3 di TikTok dan lihat video yang hebat itu!","share_url":"https://t.tiktok.com/i18n/share/user/6930551655360414721/?_d\u003dddh56j90e002kih\u0026language\u003did\u0026sec_uid\u003dMS4wLjABAAAAKrnEpz3gQIsda93DwsYtMpaltqZCVfpmom8zPaLswRt2nwHNtYQgCvQ_6g3Ve3\u0026share_author_id\u003d6930551655360414721\u0026u_code\u003dddh5iba3j57c7mi","share_weibo_desc":"TikTok: Membuat Setiap Detik Berharga"},"shield_comment_notice":0,"shield_digg_notice":0,"shield_follow_notice":0,"short_id":"0","should_write_in_privacy":false,"show_artist_playlist":0,"show_favorite_list":false,"show_gender_strategy":0,"show_image_bubble":false,"message_chat_entry":true,"show_user_ban_dialog":false,"signature":"","star_billboard_rank":0,"star_use_new_download":false,"story_count":0,"story_open":false,"tab_settings":{"hide_like_tab":false,"private_tab":{"private_tab_style":2}},"profile_tab_type":0,"total_favorites":0,"tw_expire_time":0,"twitter_id":"","twitter_name":"","uid":"6930551655360414721","unique_id":"kell_1.3","unique_id_modify_time":0,"user_canceled":false,"user_mode":1,"user_period":0,"user_rate":1,"user_story_count":0,"verification_badge_type":0,"verification_type":0,"verify_info":"","realname_verify_status":0,"video_cover":{"watch_status":0,"with_commerce_enterprise_tab_entry":false,"with_commerce_entry":false,"with_commerce_newbie_task":false,"with_dou_entry":true,"with_douplus_entry":false,"with_fusion_shop_entry":false,"with_item_commerce_entry":false,"with_luban_entry":false,"with_new_goods":false,"with_shop_entry":false,"with_star_atlas_entry":false,"wx_tag":0,"xmas_unlock_count":0,"youtube_last_refresh_time":0,"youtube_refresh_token":"","youtube_channel_id":"","youtube_channel_title":"","youtube_expire_time":0}</string>
```

Figure 6: Account Information

The information that can be taken from the aweme\_user.xml file is quite complete in the account description section, such as UID "6930551655360414721", short\_id "0", unique\_id "kell\_1.3", short name "Kell\_1.3", avatar\_url "https://p16-signsg.tiktokcdn.com/obj/100x100/tiktokobj/1683676134080514.webp". Login activity is visible eight times on the application for all accounts while it is operating on

the @kell\_1.3 account, recorded with the login number 1594805258216454 then log in again at the same avatar address "https://p16-sign-sg.tiktokcdn.com/musicallymaliva\_obj/1594805258216454-c5\_1080x1080.jpegxexpires\u003d1613808000\u0026xsignature\u003dN6F6L4RMeVUudzGgMvt5Ggst54U%3D" seven times.

```
<?xml version="1.0" encoding="UTF-8" standalone="true"?>
<map><string name="extra_data">{"6930877942188788994":{"local_path":"data/user/0/com.ss.android.ugc.trill/files/synthetise_2021-02-19-144205227-concatv","author_id":"6930551655360414721","create_time":185068285,"duration":8006.0,"is_h265":false,"m_vr":false,"ratio_uri":"v07025e8000c0nmpebrgkfm10fb8o0_h264_540p_3922628","source_id":"6930877942188788994","height":960,"data_size":0,"uri":"v07025e8000c0nmpebrgkfm10fb8o0_h264_540p_3922628","width":544},"6930882230294220033":{"local_path":"data/user/0/com.ss.android.ugc.trill/files/synthetise_2021-02-19-150002736-concatv","author_id":"6930553924097590274","create_time":186066687,"duration":10534.0,"is_h265":false,"m_vr":false,"sour
```

```
e_id":"6930882230294220033","height":960,"data_size":0,"uri":"v070258e0000c0nn14f_2slelrkj5ob0_h264_540p_3888039","width":544}}</string></map>
```

**Figure 7: XML Video Information**

The video that is published will also be stored in the form of XML metadata. Each metadata provides a lot of information such as audio bit rate, composition video resolution width, record video resolution width, effect version, record video resolution height and user device. The video is saved in the directory "com.ss.android.ugc.trill/files/" file name "synthetise\_2021-02-19-144205227-concat-v", video creation time "185068285", standard video type is not H264 and has a duration of "80006.0".

The UID account "6930553924097590274" is stored in the same directory as the file name "synthetise\_2021-02-19-150002736-concat-v", creation time "186066687", video duration "10534.0" and Does not support the H265 standard.

#### 4. RESULT

Result of XML files of around 109 items. However, not all items receive information from the perpetrator's activities. The following is a table of all the XML files that can be extracted from the perpetrator's smartphone and has been tested one by one against each account, so it can be concluded that the accounts that have been deleted do not have all the XML files.

**Table 2. XML File**

| No | File                                   | Status |
|----|--|--------|
| 1  | ab_test_config.xml                     | ✓      |
| 2  | ai_music.xml                           | ✓      |
| 3  | app_log_encrypt_switch_count.xml       | ✓      |
| 4  | app_notify_info.xml                    | ✓      |
| 5  | app_setting.xml                        | ✓      |
| 6  | applog_stats.xml                       | ✓      |
| 7  | apps_flyer_cache.xml                   | ✓      |
| 8  | com.facebook.sdk.USER_SETTINGS.xml     | ✓      |
| 9  | asve_sp.xml                            | ✓      |
| 10 | AudioEffect.xml                        | ✓      |
| 11 | av_ab.xml.xml                          | ✓      |
| 12 | av_settings.xml.xml                    | ✓      |
| 13 | aweme_account_terminal_relative_sp.xml | ✓      |
| 14 | aweme_emoji.xml                        | ✓      |
| 15 | aweme_friends.xml                      | ✓      |
| 16 | aweme_local_video.xml                  | ✓      |
| 17 | aweme_user.xml                         | ✓      |
| 18 | aweme-app.xml                          | ✓      |
| 19 | awesome_splash.xml                     | ✓      |
| 20 | BDLocationCache.xml                    | ✓      |
| 21 | bitrate_manager_sp_rate_setting.xml    | ✓      |
| 22 | clean_storage_pref.xml                 | ✓      |
| 23 | CLIENT_EXPERIMENT_CACHE_TAG.xml        | ✓      |
| 24 | com.bytedance.sdk.account_setting.xml  | ✓      |

|    |   |   |
|----|---|---|
| 25 | com.facebook.internal.preferences.APP_GATEKEEPERS.xml | ✓ |
| 26 | com.facebook.internal.preferences.APP_SETTINGS.xml    | ✓ |
| 27 | com.facebook.internal.SKU_DETAILS.xml                 | ✓ |
| 28 | com.facebook.sdk.appEventPreferences.xml              | ✓ |
| 29 | imbase_6896333489403724802.xml                        | ✓ |
| 30 | imbase_6930551655360414721.xml                        | ✓ |
| 31 | imbase_6930552960570000386.xml                        | ✓ |
| 32 | imbase_6930553924097590274.xml                        | ✓ |
| 33 | imsdk_6896333489403724802.xml                         | ✓ |
| 34 | imsdk_6930551655360414721.xml                         | ✓ |
| 35 | imsdk_6930552960570000386.xml                         | ✓ |
| 36 | imsdk_6930553924097590274.xml                         | ✓ |

The file that is fulfilled from the account that is logging in is aweme\_user.xml. Each account's activities will be saved in this file even though the account has been deleted in the TikTok application system. After checking all the files, filtering the analysis requirements is carried out so that in the future you do not check all the files that have been extracted, as in the following analysis requirements table.

The classification of files needed in the analysis, the context of this research is divided into 3 parts, namely very needed, less needed and not needed. The analysis is carried out especially on the really needed parts such as the aweme\_user file, version, search and others. Those that are less needed will still be analyzed to support the XML data content of the really needed category files. After carrying out the analysis, it can be determined which files are isolated for further study. The data content of these files will be seen to see whether they contain important information about the perpetrator's activities. In this research, dozens of XML files can be identified.

**Table 3. Requirements Analysis Result**



| No | File  | XML    |      |
|----|---|--------|------|
|    |   | Needed | Less |
| 1  | aweme_local_video.xml                                 | ✓      |      |
| 2  | aweme_user.xml  | ✓      |      |
| 3  | custom_channels.xml                                   | ✓      |      |
| 4  | description.info.xml                                  | ✓      |      |
| 5  | LoginSharePreferences.xml                             | ✓      |      |
| 6  | search.xml  | ✓      |      |
| 7  | version.xml   | ✓      |      |
| 8  | com.facebook.sdk.USER_SETTINGS.xml                    |        | ✓    |
| 9  | asve_sp.xml   |        | ✓    |
| 10 | AudioEffect.xml                                       | ✓      |      |
| 11 | av_ab.xml.xml   |        | ✓    |
| 12 | av_settings.xml.xml                                   |        | ✓    |
| 13 | aweme_account_terminal_relative_sp.xml                | ✓      |      |
| 14 | aweme_emoji.xml                                       | ✓      |      |
| 15 | aweme_friends.xml                                     | ✓      |      |
| 16 | clean_storage_pref.xml                                |        | ✓    |
| 17 | bitrate_manager_sp_rate_setting.xml                   |        | ✓    |
| 18 | aweme-app.xml   |        | ✓    |
| 19 | awesome_splash.xml                                    |        | ✓    |
| 20 | BDLocationCache.xml                                   |        | ✓    |
| 21 | com.facebook.sdk.appEventPreferences.xml              |        | ✓    |
| 22 | com.facebook.internal.SKU_DETAILS.xml                 |        | ✓    |
| 23 | CLIENT_EXPERIMENT_CACHE_TAG.xml                       |        | ✓    |
| 24 | com.bytedance.sdk.account_setting.xml                 |        | ✓    |
| 25 | com.facebook.internal.preferences.APP_GATEKEEPERS.xml |        | ✓    |
| 26 | com.facebook.internal.preferences.APP_SETTINGS.xml    |        | ✓    |
| 27 | ab_test_config.xml                                    |        | ✓    |
| 28 | ai_music.xml  |        | ✓    |

## 5. CONCLUSION

The result of this study if you use more than one account on one device, each activity will be saved in one file. For example, the aweme\_user.xml file contains all traces of each account, the arrangement is arranged vertically in the order that each account enters first or with the term first in first record. Traces of deleted accounts are not all stored in the XML file. This is very different from accounts that have not been deleted, the activity of the deleted account is only recorded in four XML files including LoginSharePreferences.heading. The character of the data stored in the form of the phone file folder is used almost entirely as an artifact of activities in the TikTok application, especially in the ugc trill file. However, some XML files are outside it, such as cell info, which is a source of

information from the signal used when connecting to the internet.

## 6. REFERENCES

- [1] N. N. Isachenko, "The role of information and informational and communication technologies in modern society," *Utopia y Praxis Latinoamericana*, vol. 23, no. 82, pp. 361–367, Jul. 2018, doi: 10.5281/zenodo.1512122.
- [2] Ming-Li Hsieh and K. W. Shun-Yung, "Routine activities in a virtual space: A Taiwanese case of an ATM hacking spree," *International Journal of Cyber Criminology*, vol. 11, no. 1, pp. 110–127, 2018, doi: 10.5281/zenodo.495776.
- [3] A. Oliveira, T. Kohwalter, M. Kalinowski, L. Murta, and V. Braganholo, "XChange: A semantic diff approach for XML documents," *Inf Syst*, vol. 94, no. August, 2020, doi: 10.1016/j.is.2020.101610.
- [4] Y. H. Wang, T. J. Gu, and S. Y. Wang, "Causes and Characteristics of Short Video Platform Internet Community Taking the TikTok Short Video Application as an Example," *2019 IEEE International Conference on Consumer Electronics - Taiwan, ICCE-TW 2019*, pp. 4–5, 2019, doi: 10.1109/ICCE-TW46550.2019.8992021.
- [5] A. Fiallos, C. Fiallos, and S. Figueroa, "TikTok and education: Discovering knowledge through learning videos," in *2021 8th International Conference on eDemocracy and eGovernment, ICEDEG 2021, Institute of Electrical and Electronics Engineers Inc.*, Jul. 2021, pp. 172–176. doi: 10.1109/ICEDEG52154.2021.9530988.
- [6] Debra Aho Williamson, "TikTok Will Be the Top Social App in Daily Minutes in 2025," *eMarketer*.
- [7] N. Hoang Khoa, P. The Duy, H. Do Hoang, D. Thi Thu Hien, and V. H. Pham, "Forensic analysis of TikTok application to seek digital artifacts on Android smartphone," *Proceedings - 2020 RIVF International Conference on Computing and Communication Technologies, RIVF 2020*, 2020, doi: 10.1109/RIVF48685.2020.9140739.
- [8] P. Domingues, R. Nogueira, J. C. Francisco, and M. Frade, "Post-mortem digital forensic artifacts of TikTok Android App," *ACM International Conference Proceeding Series*, no. August, 2020, doi: 10.1145/3407023.3409203.
- [9] S. Garfinkel, "Digital forensics XML and the DFXML toolset," *Digit Investig*, vol. 8, no. 3–4, pp. 161–174, 2012, doi: 10.1016/j.diin.2011.11.002.
- [10] S. L. Garfinkel, "Digital forensics research: The next 10 years," *DFRWS 2010 Annual Conference*, vol. 7, 2010.
- [11] G. Wawrzyniak and I. El Fray, "New XML Signature Scheme That is Resistant to Some Attacks," *IEEE Access*, vol. 8, pp. 35815–35831, 2020, doi: 10.1109/ACCESS.2020.2975034.
- [12] Q. Hoang, T. Van Nguyen, H. L. M. Vo, and T. T. N. Thuy, "A method for transforming TimeER model-based specification into temporal XML," *Advances in Intelligent Systems and Computing*, vol. 453, pp. 59–73, 2016, doi: 10.1007/978-3-319-38884-7\_5.
- [13] Z. Brahmia, H. Hamrouni, and R. Bouaziz, "XML data manipulation in conventional and temporal XML databases: A survey," *Comput Sci Rev*, vol. 36, p. 100231, 2020, doi: 10.1016/j.cosrev.2020.100231.

- [14] M. Romi Nasution, “Analisis DFXML Untuk Mendukung Identifikasi dan Pengelolaan Artefak Digital Pada Aplikasi TikTok,” 2022.
- [15] M. R. Nasution, Y. Y. Prayudi, and A. Luthfi, “Investigating Social Media User Activity on Android Smartphone,” 2022.
- [16] A. Nelson, A. Chassanoff, and A. Holloway, “Navigating Unmountable Media with the Digital Forensics XML File System,” *Int J Digit Curation*, vol. 12, no. 2, pp. 309–326, 2017, doi: 10.2218/ijdc.v12i2.581.
- [17] M. Hacherouf, S. N. Bahloul, and C. Cruz, “Transforming XML documents to OWL ontologies: A survey,” *J Inf Sci*, vol. 41, no. 2, pp. 242–259, 2015, doi: 10.1177/0165551514565972.