CLOSE OBSERVATION TOWARDS CRIME USING SPY CAMERA

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ABSTRACT – In this paper we want to give high level overview of how an android Spy camera app is made. As the name goes, we spy clicking photos or filming without anyone knowing, the app won't show any kind of preview. The Main Goal of This App is to Click Picture or Record the Video from The Back/Front Camera Even If the App Is Closed without anyone knowing. In this app, the user has a setting screen where he/she can select if he/she wants to click photo on duration or photo counts also he/she can decide on a buffer time so that the app will wait the time mentioned by the user before clicking another photo. He/she can also select where to click the photo from the back camera or the front camera. In this app by sending a particular code we can on the camera and similarly by sending the code we can off the camera. There is also a setting where the user can adjust the duration for the video recording and also that the video that will be recorded should be from the front camera or the back camera. Once the photo or video is captured or filmed the user can view the photo/video in the app, they can share or delete the same. once the process is started app will be closed automatically and a notification will be displayed on the phone if the user wants to stop the process manually, he/she can click the notification and stop the process or wait until the process automatically ends as per the conditions selected on the settings page. The Photos or Videos Captured cannot be seen anywhere i.e., in any other apps but this.

KEYWORDS- Spy Camera, Android studio, SQLite

1. INTRODUCTION

As the technology is improving day by day, different ways are used to record the surroundings. We want to make a cost effective spy camera, so we designed a Spy Camera app for Android devices. This app can be used for property security, personal surveillance, photography and many more. This can also be used by intelligence agencies, corporations, or other entities for security purpose. You can make use of this app for removing crimes and corruption in government offices. This application could be a best solution to various problems or situations where wireless surveillance is needed; this application has a huge scope. Spy Camera Application describes a new solution for spying and using android phones without connecting to a recording device. This system uses the android operating system which is currently the most used operating system and also has a great future scope. When it is legally permitted to this system, this app can be useful with multiple features. It can benefit the user in many ways, depending on the situation. Coming to advantages it works even if the app closed and if the screen goes blank. It doesn't need camera application to open. No one knows that the mobile is capturing photos or recording videos even if they unlock the mobile. The app get closed automatically when you click on camera icon in the home screen and start capturing photos, similarly when you click on video icon then the video will start recording. You can mention in the setting that what should be the buffer time between capturing the photos and the duration of the video as mentioned in the abstract. The main difference between our Spy camera app and other camera apps is that you don't need to

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present physically with you to capture photos or to record vides. You can message from other mobiles to your SIM as “Spy camera photo on” to capture photos and “Spy camera photo off” to stop capturing. Similarly, you can message “Spy camera video on” to record video and “Spy camera video off” to off the recording. This features of our makes it unique from other spy android mobile apps. So, simply Spy Camera is an Android based project that allows the user to program their mobile phone camera to discreetly click photos or record videos.

2. RELATED WORK

Spy cameras are mostly used for surveillance. You can use CCTV for surveillance, but what if you want to know what is happening in your absence or if you want to record some illegal activities you can use spy cameras for that. However, mostly this spy camera is considered as an illegal activity because it violates the privacy. As you know that every invention or every solution have some drawback, similarly this is one the drawback of our spy camera idea. Mostly these spy cameras are integrated into some physical objects like wrist watches, clocks, fans, lights… so on. So that other can’t find the existence of spy camera. This way of spying is not cost effective because separate hardware need to be purchased and used, but using android application as a spy camera is a cost effective idea because no separate hardware need to be purchased. Here we listed drawbacks of some existing spy camera android applications.There was no easily accessible spy camera available for the android system.For most of the systems someone must be there to capture photos and record videosDifficult to install surveillance cameras because of no cost-efficiencThe existing system is not user-friendly and it’s difficult to handle because it requires proper maintenancen the scenario where the loss of information is the main concern today, protecting the data of the android phone has increased and there are no easily available applications to serve this purpose

3. PROPOSED METHOD

Need of Spy camera applications and drawbacks of existing spy camera applications were discussed above. We can control our system manually and remotely. When we are with our phone we can manually on the system to capture pictures and record videos. If in case you are not physically present with your photo but still you can control your mobile phone to capture photos and videos by sending messages which already mentioned in the introduction. Below we mentioned most important features of our application.In this application, without even launching the camera app, the system will automatically click the specified number of photos once the camera or video setting is done.No need to manually control the phone to capture photos and videos.The user can find all of the photos or videos on the app's home screen once they've been captured and they canview them later.The system also has a unique feature of Incoming SMS to read them for a certain pattern and start capturing photos or video.hrough the notification, the user can also opt to manually stop the recording. The recorded video may be seen on the home screen's videos tab.App works even the screen got black or closed.The data can be misused, so the system captures photos and videos at intervals and lets the owner know what’s going around and where exactly the device 3.1**ANDROID:**

ndroid is an operating system and programming platform developed by Google for software development. Android Studio provides a unified environment where you can build apps for Android phones, tablets, Android Wear, Android TV, and Android Auto. As the world's most popular mobile platform, Android powers millions of mobile devices in more than 190 countries around the world. It can run on many different devices from many different manufacturers. Android includes a software development kit (SDK) that helps you write original code and assemble software modules to create apps for Android users. Android also provides a marketplace to distribute apps. All together, Android represents an *ecosystem* for mobile apps.Coming to android studio, it has a consolidated environment where we can develop for all Android devices. Apply changes to the resource code of our running app without restarting the app. Android Studio provides extensive testing tools and frameworks. Android Studio is the official Integrated Development Environment (IDE) for android application development. Android Studio provides more features that enhance our productivity while building Android apps.

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There are other IDEs like Eclipse, DroidSript, NetBeans, PhoneGap, MIT App inventor so on.

3.2 ANDROID STUDIO:

Android development can be done using different types of IDEs. However, Android studio is the best and specially made IDE for android application development. In android studio we can build, run and debug our application.Android Studio is specially made for android application development by Google. It has a flexible Gradle-based build system.It has a fast and feature-rich emulator for app testing.Android Studio has a consolidated environment where we can develop for all Android devices.Apply changes to the resource code of our running app without restarting the app.Android Studio provides extensive testing tools and frameworks.It provides build-in supports for Google Cloud Platform. It makes it easy to integrate Google Cloud Messaging and App Engine.Android studio problems can be easily fixed because large community of developers using android studio to development.Code templates and GitHub integration to help you build common app features and import sample code.

3.3 REQUIREMENTS:

As already discussed about all application is an android application so, we use android studio as development environment using Java language. XML is used for UI design. We make use of SQLite database for storing captured photos and recorded videos. Android mobile is used for testing the application.

3.4 MODULES:

Our Application consist of below modules

1. Photo module and their respective settings
2. Video module and their respective settings

- **Photos –** the user can view, share or delete the photos from the list
- **Videos –** the user can view, share or delete the videos from the list
- **Photo settings –** User can select front or back camera to capture. User can set a specific duration or photo count as per their requirement, after certain buffer time mentioned in the settings the application start capturing photos.
- **Video settings –** User can select front or back camera to capture. User can set a specific video duration as per their requirement, after certain buffer time mentioned in the settings the application start capturing video.
- **SIM messages for capturing photos –** We can send message to our SIM like “Spy camera photo on” to click pictures and “Spy camera photo off” to stop capturing pictures.
- **SIM messages for capturing video –** We can send message to our SIM like “Spy camera video on” to record video and “Spy camera video off” to stop recording video.
- **Notification –** The app shows the notification of capturing and lets the user know that it will be closed automatically when it’s done. But the User can click on the notification if they want to end the process at any time.

3.5 COMPONENTS:

Activity: An activity is a class that represents a single screen. It is like a Frame in AWT. Activity is a very commonly used component in all android application.

View: A view is the UI element such as button, label, text field etc. Anything that you see is a view. Camera icon, video icon, settings icon, radio buttons, delete icon, share icon, edit text, text view and all other UI components are considered as view components of our application. This component resides in view group and view group resides in activity.

Services: Service is a background process that can run for a long time. As part of our application we use services to keeping running our application in the background for videos recording or photo capturing.

Fragment: Fragments are like parts of activity. An activity can display one or more fragments on the screen at the same time. In our application we have photo and video fragments.

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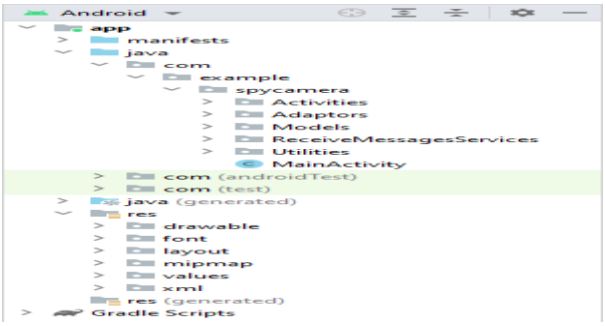
Intent: Intent is used for navigating among various activities within the same application. It is not limited to one single application. There are majorly two types of intent one is Implicit Intents and Explicit Intents**.**

SQLite: Before using sqlite database we need to take disk reading and writing permission from the user. This permission can be done by Manifest.xml file. It is an open-source relational database i.e. used to perform database operations on android devices such as storing, manipulating or retrieving persistent data from the database. It is embedded in android by default. So, there is no need to perform any database setup or administration task. **SQLiteOpenHelper** class provides the functionality to use the SQLite database.



Theandroid.database.sqlite.SQLiteOpenHelper class is used for database creation and version management. For performing any database operation, you have to provide the implementation of **onCreate()** and **onUpgrade()** methods of SQLiteOpenHelper class. It contains methods to be performed on sqlite database such as create, update, delete, select etc.

There are many methods in SQLiteDatabase class. Some of them are void execSQL(String sql)(executes the sql query not select query), long insert(String table, String nullColumnHack, ContentValues values)(inserts a record on the database. The table specifies the table name, nullColumnHack doesn't allow completely null values. If second argument is null, android will store null values if values are empty. The third argument specifies the values to be stored), int update(String table, ContentValues values, String whereClause, String[] whereArgs)(updates a row) and Cursor query(String table, String[] columns, String selection, String[] selectionArgs, String groupBy, String having, String orderBy)(returns a cursor over the resultset).

Internal Storage: When we run our application and enter data using edit text, but when we close and open our application we can't find the data we enter in edit text because our application can't remember data we need to use file storage or database to store data permanently. We can save or read data from the device internal memory for saved settings, captured photos and recorded videos. Basically to save photos and video web use SQLite which mentioned above, but for storing simple text data we can use file input stream reader which is available in java library.

SIM services: We need to import android.telephony.SmsManager; to work with sms messaging services and need to flow with below code.

Intent intent;intent = new Intent (getApplicationContext(),MainActivity.class);
msManager sms=SmsManager.getDefault(); String mess = sms.readTextMessage("0123456789");
Reading sms messages is crucial part our application. When we are not with our phone and would like to capture photos or video we can easily do it with by sending some specific messages as mentioned before.

Camera: Camera is the vital resource in our application.Camera is mainly used to capture picture and video. No dependencies are needed to add while working with camera resource, we can make use of SDK in build classes. We can control the camera by using methods of camera api. Before capturing photos we need to get permission from the user which was mentioned in permission section.

Android provides the facility to work on camera by 2 ways:

- By Camera Intent
- By Camera API

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Basic classes of Camera intent and API are Intent, Camera, SurfaceView, Media Recorder. To get a basic idea let's discuss one by one.

Intent: By the help of 2 constants of **MediaStore** class, we can capture picture and video without using the instance of Camera class.

- ACTION_IMAGE_CAPTURE
- ACTION_VIDEO_CAPTURE

Camera: It is main class of camera api, that can be used to take picture and video.

SurfaceView: It represents a surface view ore preview of live camera.

Media Recorder: It is used to record video using camera. It can also be used to record audio files as we have seen in the previous example of media framework.

CodetinitiaterequesforcameraisIntent cameraIntent = **new** Intent(android.providerMediaStore.ACTI ON_IMAGE_CAPTURE); startActivityForResult(cameraIntent, CAMERA_REQUEST);

After capturing images from camera we can show them using imageView component.

3.6 PROJECT FOLDER STRUCTURE:

Every Android project contains mainly two folders, the app folder and the gradle folder. App folder contains our applications code and gradle folder contains dependencies required by our application. App folder has mainly three folders they are manifest, java and res folders. We also have some hidden folder like R.java in our app folder, however they are not accessible to the developer because developer never gets need to modify the code in R.java folder. R.java auto generated by the system acts as a bridge between XML and Java files.manifests folder contains AndroidManifest.xml which contains user permissions and other configurations. Java folder contains our applications java code. Com (androidTest) and com(test) used by the system. Only the com folder contains java code. Next res folder contains resource like audio, video files, image files, app icon, layouts and so on. Basically res folder has drawable folder which contains images required by our application, font folder contains fonts related xml of our application, layout is an important folder in res folder which contains the XML coding of our application, mipmap folder contains app icon, values colors and string of our application, xml folder contains provider_path.xml file.

3.7 REQUIRED PERMISSIONS:

<uses-permission android:name= "android.permission. WRITE_EXTERNAL_STORAGE" />

This permission is used to write data on to the disk like the videos and photos which got recorded by the spy camera.

<uses-permission android:name="android.permission.READ_EXTERNAL_STORAGE" />

This permission is used to read data from the disk means to show photos and videos which got recorded.

<uses-permission android:name = "android. Permission. CAMERA"/>

<uses-permission android:name ="android.permission .WAKE _LOCK" />

This is an important and dangerous permission because this permission is used to run the application in the background even if
the screen got closed.

<uses-permission android:name="android.permission.RECORD_AUDIO" />

This permission is required to record audio.

<uses-permission android:name="android.permission.READ_SMS" />

This permission is required to read SMS.

<uses-permission
android:name="android.permission.RECEIVE_SMS" />

This permission is required to receive SMS.

3.8 WORK FLOW STRUCTURE:

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As you can find in the ER diagram below, we can interact with our spy camera application from two interfaces one is from home screen and other is by sending SMS.

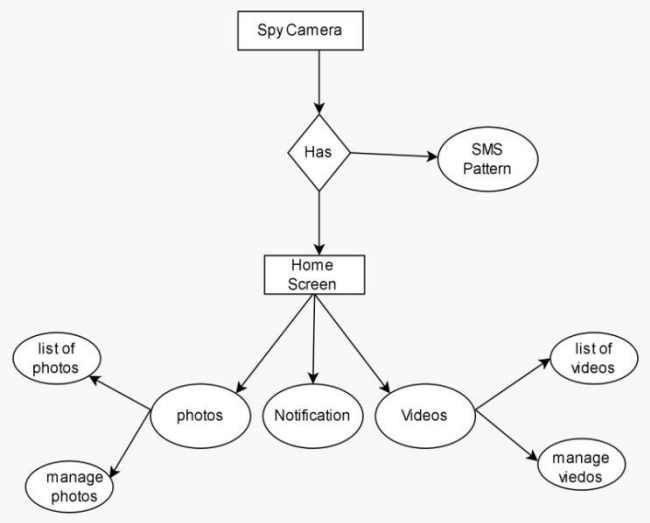

Fig :Work Flow

We can manage photo and video settings by clicking on their respective settings icon. We can find the recorded photos and videos which got recorded in their respective fragments.The minute user installed the app. Our spy camera app asks for access permissions like Camera, Microphone, SMS and Storage. Smart background running option will be enabled to capture photos and record videos from the background. This works even if the screen is off. When your screen is off and system got a message to capture photos or record videos, still spy camera app activates and start doing it's work of capturing.As part of our photo settings we can select whether to capture photos from front camera or back camera using radio buttons. We can select between photo count and photo duration to specify number of photos to capture and buffer time between the photos.When you select photo Duration[5] then you have to specify photo duration and buffer time, theyou hone captures photos till the photo durations ends and photos captured according to the buffer time mentioned. Similarly, when you select photo count then you have to give number to photos to be captured and buffer time between the photos. You can't give invalid values in setting, you will get a toast message saying that you have enter invalid values. Remember you have to click on save changes button you will get a toast message saving settings saved successfully. This will save the new setting you made and go to photo icon which is beside settings icon then the photos will start capturing. The movement you click on camera icon the application closes automatically you can also remove it from background and work with other applications or can simply off the screen. Photos get captured. You can either manually stop capturing of the photos if not needed or the system stops itself automatically when the time mentioned in the setting is over. You can find them on home screen, you can share captured photos to other applications, delete them if not needed or can view photo using any photo viewing application. This is how photo module designed.Similarly, In video settings you can specify whether to capture video from front camera or from rear camera. One more thing is that you can specify the video duration in the text box. You can't give invalid values in settings[6], you will get a toast message saying that you have entered incorrect values. Remember to click on save changes button then you get a toast message saying that settings have been saved successfully. This will save the new setting you made and go to video icon which is beside settings icon then the video will start recording. The movement you click on video icon the application closes automatically you can also remove it from background and work with other applications or can simply off the screen. Videos get recorded. You can either manually stop recording of the video if not needed or the recording stop itself automatically when the time mentioned in the setting is over, records can be found on the home screen you can you can view, delete or share to other apps. Videos which got recorded using this application will not be available in any other app until you

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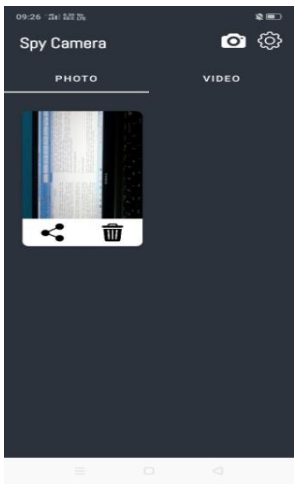
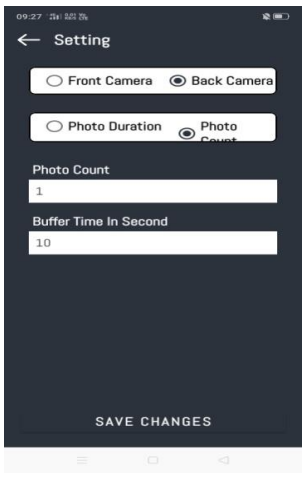
share, this is because to maintain security. Other most important module of our application is SMS module. You can start capturing photos and record videos without the need of opening the app using this SMS module. There can be some need to capture photos and videos but still you are not with your phone then you can make use of the SMS module, Using which you can send "spy camera photo on" to start capturing photos. The buffer time between photos is by default 5 seconds and system captures photos for every 5 seconds until you send another message like "spy camera photo off". No one knows even if they open you mobile until they open our spy camera application. Similarly, with videos[8] when you send SMS like "spy camera video on" then videos starts and when you send another message "spy camera video off" then video stops. You can send this message from any phone there is no restriction. When you want to turn off the capturing then you can do it manually from the application or just put turn off message from the same phone or from some other phone. Application[7] is very simple. Main motto of our application ids make a simple spy camera application which can be used by everyone. Anyone can easily make use of our application for capturing photos and for recording videos from their android phone. This is how our spy camera application works. You can use this application when you are travelling during nights for safety or you can use it to record crime scenes or takes pictures when a government officer doing corruption.

4. RESULTS AND DISCUSSION:

Photo Fragment **Video Fragment**





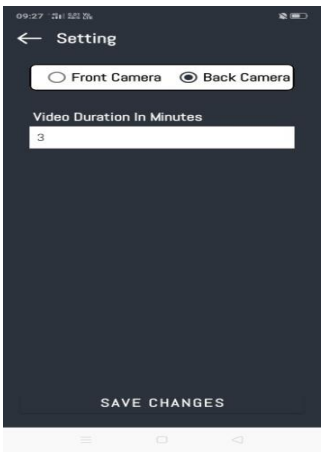


Fig: 3 Photo tab **Fig:** 4 Video tab **Fig:** 5 Photo Settings **Fig:** 6 Video Settings

This is the home screen of our application. When you click on photo tab you will find photos and similarly when you click on video tab you will all recorded videos. As you can see bottom of every media has shrare and delete option to share and delete media.Here you can find photo and video settings where you can specify photo and video settings as you want. After modifing settings you can click on save settings button to save them into system otherwise precious settings will be applied.

5. CONCLUSION:

Hope this paper helps you in understanding how our spy camera app works.

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