



Designing an Android-Based Streaming Video Player Application

Gatot Soepriyono

Progam Studi Informatika, Fakultas Teknologi Komunikasi dan Informatika, Universitas Nasional

E-mail: gatot.soepriyono@gmail.com

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ABSTRACT

Indonesia is one of biggest country that has a huge potential. Nowday, mobile technology is growing very rapidly. Therefore, we also have to keep following these technological developments. For example, many software of video players run on Android-based OS. The author interested in making an Android-based Video Player Streaming application using the Eclipse Kepler application. Using the Waterfall method, which is a method of sequential requirement (system analysis), system design, coding, testing, implementation and maintenance. How to install JRE, JDK, SDK, and Streaming Video Player source code, finally the author produced a video player that can be run on the Android mobile operating system, and smartphone tablets Ice Cream Sandwich and Jelly Bean. The added value of this application is able to play video live streaming. The author will continue to develop this application. So, it can be operated on the i-phone operating system, i-pod and other types according to the progress of the operating system itself.

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1. Introduction

The development of information technology drives software development, including smartphone applications that are widespread to this day. Many additional features are found in smartphones. One of them is the video player, which is adding many other elements to a mobile phone. A video player is a video player app that plays videos that are found on both internal and external phone memory. With the addition of comparative literature studies in journals from existing player applications, such as Building Multimedia Player Applications Using Java Frame Work[1], media players can play video and music. Still, this application can only be run on the Windows Operating System or Desktop PC only with a player display that is even less attractive. Build a Video Player Application Using Visual Basic 6.0[2], a media player application with a beautiful and easy-to-use interface that can only be run on Windows Operating Systems. Design and Implementation of Android Based Music Player [3], the audio player application has an attractive display design. It can be run not only on Windows Operating System but on Android Operating System can also be run. Video Player Application On Mobile Phone using J2ME Programming [4], this Audio player is explicitly made for mobile-only.

Then the Design and Implementation of Video Streaming Application Using HTML5 (SECURED) [5], where the application is designed to play videos, no longer needed flash player plugin on the client-side other words, can create a fully controlled player control with JavaScript. The five pieces of literature above refer to making a better video player from some aspects and elements of the assessment of the existing video player. The problems include: first, the video player has not been compatible with many versions of the Android operating system and tablet smartphones and the operating system Ice Cream Sandwich and Jelly Bean. Second, existing video player apps cannot access uniform resource locator (URL) videos or run streaming videos. This research aims to create a multimedia video streaming application that can provide easy access to video on internet sites. Produce a video player that can be tested using the Android Virtual Device emulator on eclipse and some operating systems of android phones and tablet smartphones.

2. Theory Study

The first literature study was building multimedia player applications using Java Media Frame Work. Media player by Dinny Wahyu Widarti and Muhammad Noor from STMIK PPKIA Pradnya Paramita. The features contained in the player control, seek bar, volume control, add a media file, support file, file information, and run on Windows system (PC). The second literature study was building a Video Player Application Using Visual Basic 6.0 Works from Verika Nur Cahyadi Putra, Department of Informatics



Management stmik AMIKOM. A simple interface display and features such as control, seek bar and run on operating system windows (PC). It has menu features that are still lacking. The third literature study is the Design and Implementation of Android Based Music Player by Bima Injan Pamungkas Study Program Management Informatics, STMIK AMIKOM. This application's look is still effortless, and the features contained in this player control, seek bar, playlist, add the file, and be run on the mobile operating system and Windows (PC). It's just that this app is devoted to playing music files only. The fourth is Video Player Application On Mobile Phone Using J2ME Programming by Elvina, Fajar Masya, and Bernadus Ari Christianto. It can be seen from some of the video player's features such as control, add a file, and can be used on mobile phone only. The fifth literature study is "Designing and Implementing Video Player Application Using HTML5 (SECURED)" by Farrell Pratama Sulisty Department of Informatics Engineering, Faculty of Information Technology, Satya Wacana Christian University 2012. The features obtained control, volume control, add a file, and run on the computer only.

TABLE 1
COMPARISON CHART

Graphic	Study Lit 1	Study Lit 2	Study Lit 3	Study Lit 4	Study Lit 5	Concept
Frame Rate	14.909 fps	14.977 fps	23.976 fps	23.976 fps	23.925 fps	30.000 fps
Resolution	640 x 480 Pxl	640 x 480 Pxl	640 x 480 Pxl	640 x 480 Pxl	480 x 800 Pxl	720 x 480 Pxl
Display Aspect Ratio	4:3	4:3	4:3	4:3	4:3	3:2
Bits/(Pixel*Frame)	0.328	0.326	0.214	0.149	0.159	0.386

Table 1 Description:

- With the larger Frame Rate, it will affect the image quality and not fracture.
- Precise resolution adjustments according to the application's implementation so that the video will perform better.
- Display aspect ratio is determined in the application implementation. When the app is run for mobile, adjust the app's size with the mobile screen.
- The higher Bits/Pixels will affect the quality of the image display. Therefore the higher bits/pixel/frame will be, the better the display of the image.

Of the five literature studies, each saw some imperfections from the applications built. Therefore, the author wants to contribute thoughts and works to improve the existing live streaming video by meeting the above criteria.

3. Research Methods

3.1 Hardware and Software Specifications

In creating this streaming video player application, I used a personal desktop computer PC with the following specifications.

- AMD A10-5800K Quad-Core 4.2 GHz Max Turbo, 3.8 GHz Base
- Mainboard MSI FM2-A75MA-P33
- Memory Team Elite 4GB DDR3
- VGA APU
- PSU FSP 550W
- Mouse dan Keyboard
- Monitor ADVAN

As for program design, coding, and central menu creation, and folder view on streaming video players using.

- Java Development Kit 7
- Android SDK for Java ME Platform
- Eclipse KEPLER with AVD Plugins
- ADT Plugins

3.2 Flowchart

In its design, the author uses a research flowchart and a streaming video player app flowchart. Here's the flowchart. In this video application design, the authors used waterfall methods that demand continuity in the form of system analysis, system design, coding, testing, implementation, and maintenance, using the following research flowcharts.



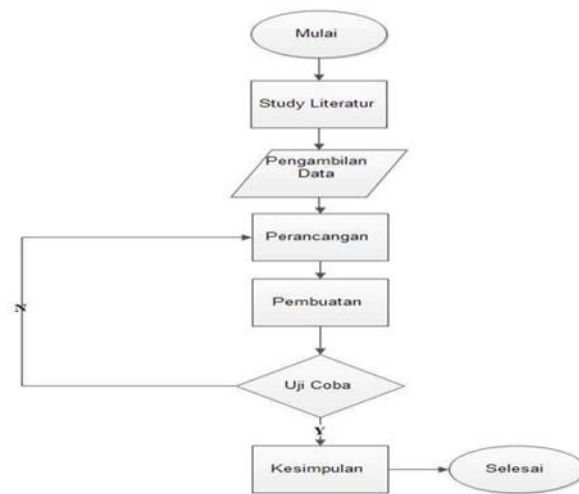


Fig 1 Research Flowchart.

It starts with the beginning of presenting research ideas and ideas about the advancement of video technology for users. Study literature, showing the first steps of research to get the problem that became the initial concept of streaming video applications. Data retrieval is conducted based on book references, research, and data search on the internet. Design, determine the mechanism by which the application is used and the hardware and software used. Creation, the data obtained, is then managed and processed to get a result that meets the criteria and needs. Test, test the application created on the test tool to determine if the application's quality is the same as desired. In conclusion, enable the project results that have been made to determine whether there are still shortcomings or advantages of the application project that has been created.

3.3 Flowchart Video Player Streaming

In the design of this video application, the author uses the following research flowchart:

Description:

In figure 2 of the flowchart above described, start the video player, and will then display the splash screen display (the opening menu of the streaming video player). After a few seconds, the splash screen appears and will immediately display the main menu of the video player containing internet videos, local media, and about.

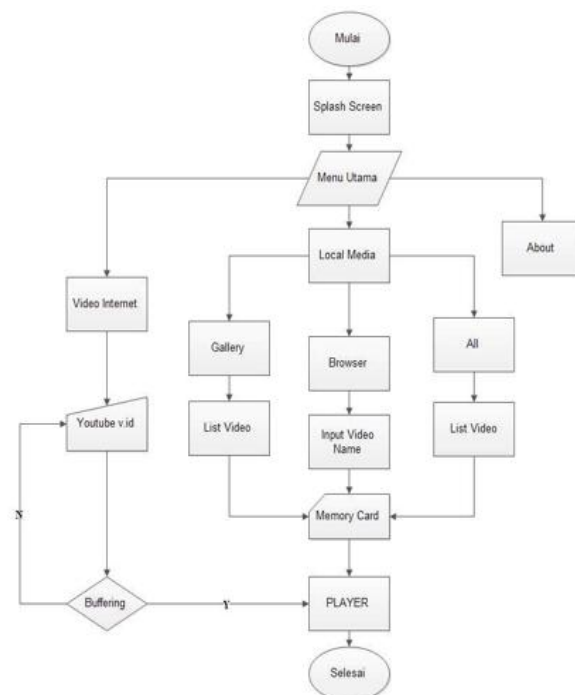


Fig 2 Flowchart Video Player Streaming.

3.4 Storyboard

The storyboard explains how the application path will be created to clarify the intent of the streaming video player application made, as in figure 3 below.



Fig 3 Storyboard.

Description:

- Start by clicking on the launcher Video Player Streaming icon and then exit the Splash Screen view in a few seconds on the screen.
- After the splash screen display comes out, they will go to the Main Menu view inside, which is applied three buttons, namely Video Internet button, Local Media button, and About control. Each button has its function.
- When you click the internet video button, the video player will be streamed with internet network support to play the video.
- Then click the local media button will display the video list contained on the mobile phone's memory, which also has three buttons that also have their functions, namely button Gallery, Browser button, and Button All. Button Gallery serves to display a list of videos that are on the phone's memory. Button Browser helps to search for videos in memory by inputting the video name in the available input fields. The button displays all videos contained on mobile phone memory both externally and internally.
- Then the last about the button that when we click it will come out the view about explaining the streaming video player application and the biodata only.

3.5 Video Player Streaming Design Concept

The basic concept of this streaming video player application is user/ user, Providing ease for video connoisseurs in playing/playing a video without downloading the video. With a simple, attractive, and easy to use look, this app is a must-use. All ages can use this app.

4. Results And Discussion

4.1 Testing

Before the implementation phase is carried out, testing should be conducted to see if the streaming video player application can be run by the initial planning stage of creating the streaming video player. The test consists of two parts:

- ANSI (American National Standards Institute) standard compatibility testing of different operating systems on Android Virtual Device (AVD) eclipse on Personal Computers (PCs), as well as on various android phones, and tablet smartphones in the Video Player Streaming App.
- Testing error programs on applications that have been created, they consist of three test programs (Syntax, Runtime, and Logic) errors.

4.2 System Compatibility Testing

In this stage, the compatibility testing and system need to be used by the streaming video player application using Andromax C smartphone device operating Android Ice Cream Sandwich 4.0 system with the following specifications:

- CPU Qualcomm MSM8625 Dual Core 1GHz ARMv7
- Sistem operasi Ice Cream Sandwich or android 4.0
- RAM 512 MB
- Display Screen 4.0 inchi IPS

- e. ROM 4 GB
- f. Audio MP3, FLAC, OGG, APE
- g. Display 480 x 800

4.3 OS Compatibility Testing On Personal Computer AVDs

TABLE 2
 COMPATIBILITY TESTING IN WINDOWS 7 ULTIMATE
Windows 7 Ultimate (64-bit)

Specification	Quad Core (4.2 GHz), RAM 4GB, VGA APU DDR3
Hardware	
Test result	Applications can be installed and run generally without the slightest problem on Windows-7 Ultimate x64 by using the Android OS Ice cream sandwich (4.0) and Jelly Bean (4.1).



Fig 4 Display Streaming Video Player on AVD OS Ice Cream Sandwich (ICS).

Description: The display typically runs on OS Ice Cream Sandwich when running with results, as shown in Figure 4 above.

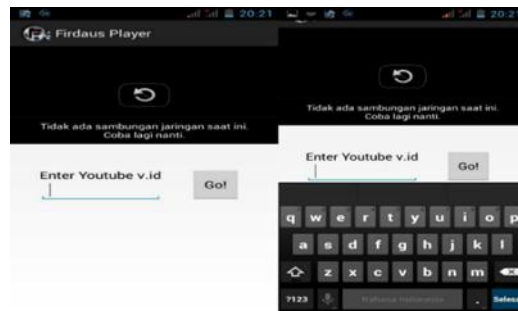


Fig 5 Display of Streaming Video Player on AVD OS Jelly Bean.

Description: The display runs typically on Jelly Bean OS when running with the results as shown in Figure 5

4.4 Compatibility Testing on Mobile OS

TABLE 3
 COMPATIBILITY TESTING ON HP SMARTFREN ANDROMAX-C OS ICE CREAM SANDWICH
Smartfren Andromax-c.V1.00 Operating system Ice Cream Sandwich

Specification	Processor Qualcomm MSM8625 Dual Core
Hardware	1GHz ARMv7, RAM 512 MB, TFT LCD with WVGA 480x800 Pixels
Test result	Applications can be installed and run generally without the slightest problem on Windows 7 Ultimate 64-bit using the Android OS Ice cream sandwich (4.0) and JellyBean (4.1).



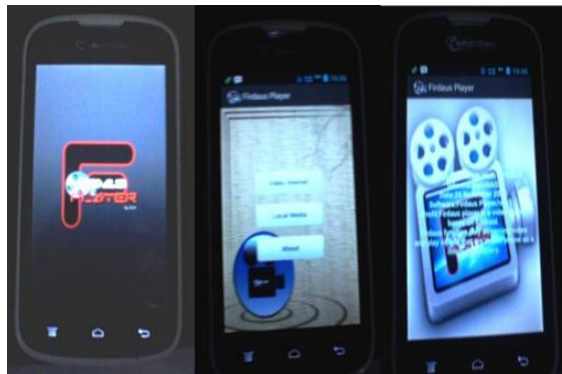


Fig 6 Smartfren Andromax-c OS Ice Cream Sandwich.

Note: The display of the streaming video player usually runs on the Mobile Ice Cream Sandwich Operating System, starting from the installation process until it runs, as shown in Figure 6.

TABLE 4

COMPATIBILITY TESTING ON ADVAN EIC MOBILE TABLET OPERATING THE ICE CREAM SANDWICH SYSTEM

EggPad Tablet HY2508 Operating systems Ice Cream Sandwich

Specification Hardware	CPU Boxchip CORTEX A10 1.2GHz, RAM 512 MB, Display TFT IPS 800x480 Pixels 7.0 inchi, GPU MLI-400MP.
Test result	Applications can be installed and run normally on the Ice Cream Sandwich operating system without the slightest problem.



Fig 7 Advan EIC Tablet OS Ice Cream Sandwich.

Note: The Video Player Streaming display runs normally on the Advan EIC Tablet Mobile Ice Cream Sandwich operating system, starting from the installation process to execution as shown in Figure 7.

TABLE 5

COMPATIBILITY TESTING ON ADVAN EIC MOBILE TABLET OPERATING THE ICE CREAM SANDWICH SYSTEM

LG P713 Operating Sistem Jelly Bean

Specification Hardware	Dual core Cortex-A5 1 GHz, 768 MB RAM, 480 x 800 pixels
Test result	Compatibility Testing on LG P713 Jelly Bean OS



Fig 8 LG P713 OS Jelly Bean.

Note: The display of Video Player Streaming has a slight delay in the initial process of clicking the launcher when running it on the LG P713 OS Jelly Bean Smartphone, but after that it runs normally. Look at the figure 8.

TABLE 6

COMPATIBILITY TESTING ON ADVAN EIC MOBILE TABLET OPERATING THE ICE CREAM SANDWICH SYSTEM

Advan Vandroid S5E Operating sistem Jelly Bean	
Specification Hardware	Cortex A7 Dual Core 1.3GHz, RAM 512 MB, Display TFT 480x800 Pixels 5.0 inchi, GPU Mali-400MP
Test result	Compatibility Testing on LG P713 Jelly Bean OS



Fig 9 Advan Vandroid S5E OS Jelly Bean

Note: The display of the streaming video player runs normally on the Advan Vandroid S5E OS Jelly Bean cellphone, starting from the installation process until it runs as shown in Figure 9.

4.5 Program Testing

It aims to find out whether the program has been running by the design that has been made. The tests that must be done at this stage are the Syntax error, Runtime Error, and Logical Error. Testing syntax errors, there are six warnings on applications that have been made. The sign is not an error in coding, but only a notification and an exception for the hard coding; see Figure 10 below.

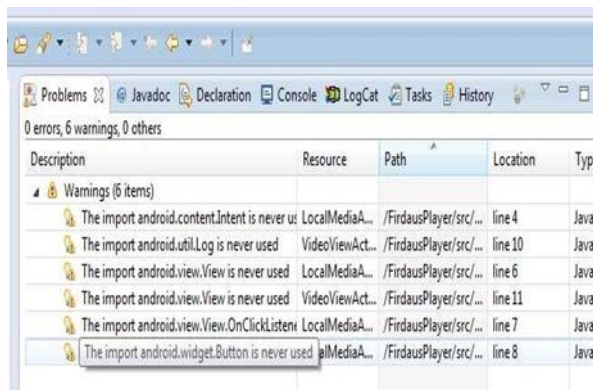


Fig 10 Warning Syntax Video Player Streaming Application

Description: In the picture above, there are several explanations as follows:

- a. Description describes the file with the problem in the coding process.
- b. Resources are descriptions of part of the file.
- a. Path is the location where files or coding that have been typed are stored and executed later.
- b. Line is the coding Line's location in the eclipse application. For example, in the image, there is a warning at line 7, then line 7 of the source code that we will see later.
- c. Type is an extension of the coded file; here, the display type will be java using the java language.

Runtime error tests are tests when the compiler runs the application. Often problems occur but not the error in question, but a crash or crash of the AVD from Android in the eclipse due to several issues such as the following:

- a. Configure the SD card on the emulator.
- b. Too many applications running simultaneously.
- b. Internet connection.
- a. Previous applications that are still on the emulator.
- b. AVD changes when experimenting on different Android operating systems.
- c. Configure the AVD system on eclipse.

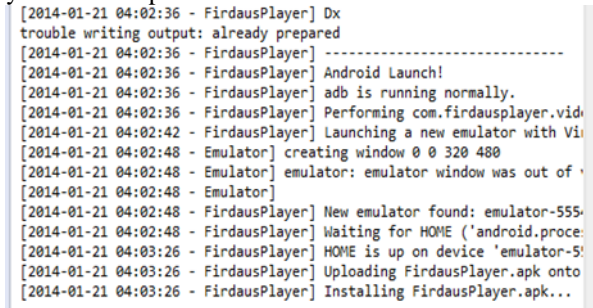


Fig 11 Runtime Error AVD Android

Description: The chat log from the runtime when the application is run will show a screen similar to Figure 11. Where when the application runs on the Android Virtual Device, it will load all AVD components that have been set when running the streaming video player application on the AVD. Therefore, the AVD Jelly Bean removal process is when the application is not running or not yet running.

The various problems above can be resolved by re-running the application that we want to run with the emulator. The results are like

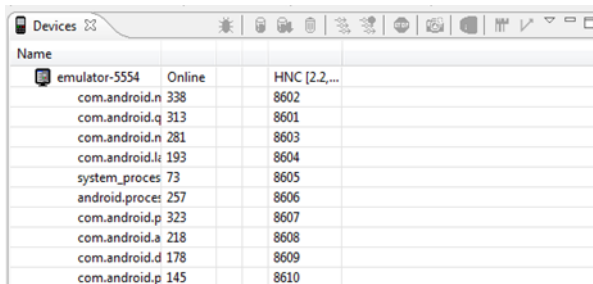


Fig 12 Device Emulator Android

Note: The result of reading the emulator is in the form of port addresses (8602) when the application is running using the default emulator from Eclipse which operates a jelly bean system. As picture 12.

```
[2014-01-21 04:01:17 - Emulator] creating window 0 0 320 480
[2014-01-21 04:01:18 - FirdausPlayer] New emulator found: emulator-5554
[2014-01-21 04:01:18 - FirdausPlayer] Waiting for HOME ('android.process.acore') to be
[2014-01-21 04:01:27 - Emulator] Error accepting connection, aborting
[2014-01-21 04:01:27 - FirdausPlayer] emulator-5554 disconnected! Cancelling 'com.firda
[2014-01-21 04:02:36 - FirdausPlayer] Dx
trouble writing output: already prepared
```

Fig 13 LogChat Emulator Android

Description: The display when the emulator is running reads the running application, with data processing on previously typed coding, using the address of each emulator port is able to read them one by one which will eventually run an application on the emulator. While the reading results can be in the form of a chat log for the application process running as shown in Figure 13.

4.6 Logical Error Testing

It is a logical error in the program that causes the program to not crash, but it does not crash and the application will still compile.

```
package com.firdausplayer.videostream;

import android.view.View;
import android.content.Intent;
import android.widget.Button;
import android.view.View.OnClickListener;

protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_Localmed);
}
```

Fig 14 Logic Error Local Media Activity.java

Description: The exclamation mark shown in the image above is the result of testing a logic error where the coding does not need to be in the source code section LocalMediaActivity.java because the eclipse has automatically read the correct coding. With a yellow warning icon marked beside it, it is stated that the coding can still run properly, without experiencing coding errors when the application is run using an emulator or other device.

```
package com.firdausplayer.videostream;

import android.util.Log;
import android.view.View;
import android.view.ViewGroup;
import android.os.AsyncTask;
import android.app.AlertDialog;

public class VideoViewActivity extends Activity {
    VideoView videoview;
    MediaController media;

    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.videoview_main);
        videoview = (VideoView) findViewById(R.id.VideoView);

        new BackgroundAsyncTask()
            .execute("http://r1---sn-2uuxa3vh-jb3l.googlevideo.com/videopla");
    }

    public class BackgroundAsyncTask extends AsyncTask<String, Uri, Void> {
        Integer track = 0;
        ProgressDialog dialog;
    }
}
```

Fig 15 Logic Video View Activity.java

Note: Logic error (yellow sign) that occurs in the mobile streaming video player application is the splash screen that often does not appear when the application is running with the smartphone tablet console due to the screen resolution setting on the smartphone tablet. Meanwhile, the other logic errors are only in the form of warnings, as shown in Figures 14 to 15.

4.7 Implementation

Implementation is the application of the system design that has been made at the design stage as well as the implementation of alternative actions that have been selected at the selection stage. This section is a continuation of the design phase contained in the previous Chapter III.



At the implementation stage, there are several important things that need to be considered, namely the requirements and configuration of the system. The system requirements in question are some hardware components.

System Requirements, hardware is the physical component of the equipment that forms a computer system in carrying out its duties. Minimal hardware required to be able to run the video player streaming application is as follows:

- a. Processor Quad-Core 2.93GHz
- b. Memory 1GB (RAM)
- b. 10GB Hard Disk space (JDK, SDK, JRE, Eclipse, Engine)
- a. VGA GT 512 MB DDR3
- b. Monitor resolution 800x600
- c. Mouse and Keyboard

Meanwhile, the hardware requirements used by researchers in running the streaming video player application are as follows:

- a. Processor Quad-Core 3.8 GHz
- b. Memory 4GB (RAM)
- b. 20GB Hard Disk space (JDK, SDK, JRE, Eclipse, Engine)
- a. VGA GTX 650 1GB DDR3
- b. 1360x768 resolution monitor
- c. Mouse and Keyboard

The program implementation describes the results of the analysis and design of the streaming video player design where at this stage the design results of the player that have been designed will be shown. Video Player Launcher Icon. The icon that will appear after the FirdausPlayer.apk installation process where the icon or what is often called the launcher is double-clicked so that the application can run. See the picture below.



Fig 16 Icon Launcher Video Player (FirdausPlayer) Applications

Description: image of 16 icons from the installed FirdausPlayer launcher in the form of a roll image of a video player and a capital F.

The streaming video player application is a mobile video player application that runs on the Android platform, therefore the video player cursor is done by touching the screen (touch screen), see the picture below.

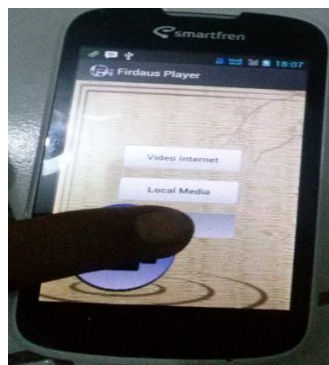


Fig 17 Cursor Driving Streaming Video Player Application.

Description: Figure 17 is a display when the examiner performs a touch screen magnification action on an Android smartphone, the shift is done using the index finger and the Firdaus Player application is able to respond.

The splash screen is the initial display of the player when the launcher is clicked, before the main menu of the player is displayed. The splash screen is also a welcome greeting at the start of the player, see the image below.



Fig 18 Splash Screen Firdaus Player.

Description: This is a splash screen when the launcher icon is touched and will immediately display the splash screen as shown in Figure 18 above. With several options when touched the launcher will wait 5 seconds to enter the main menu, or you can enter directly by touching it directly.

The main menu contains useful navigation to guide the player in running the game. The following is a display of the main menu:

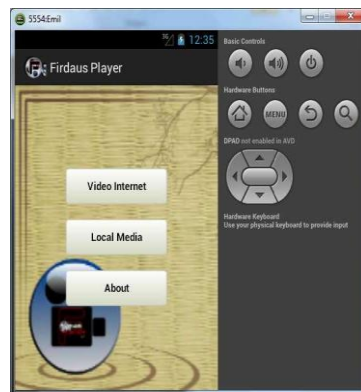


Fig 18 Main Menu Firdaus Player.

Description: There are three menu options, namely Internet Video Menu, Local Media Menu, and About Menu, each of which has the following functions:

The Internet Video menu displays streaming video, see the image below.

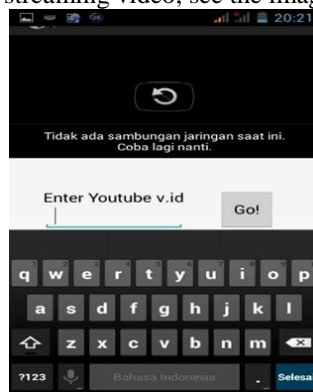


Fig 19 Video Internet Firdaus Player.

Description: When starting to start streaming video directly, the player will play the video, just click or touch.

The Local Media menu functions to play videos contained in the internal or external memory on the device and displays the video track and the Gallery, Browser, and All buttons. The gallery button displays all videos then the Browser button is to search for the video that we want to play which is on the phone memory and the All button functions to play all videos contained in the memory.



Fig 19 Local Media Menu.

Description: The local media menu functions to run videos contained in internal and external memory.

The About menu contains the origin of manufacture, date of manufacture, version and use of the application, see the image below:



Fig 20 About Menu

Description: An explanation of the origin of the video streaming application and the use or function of the player application.

5. Conclusion

Based on the results of the research conducted by the author regarding the streaming video player, conclusions can be drawn that answer the problem, according to the initial objectives and from the test results as follows:

- The Firdaus Player Video Streaming application can run normally on all android mobile phones with the Ice Cream Sandwich and Jelly Bean operating system.
- The Firdaus Player Video Streaming application can be tested using the Android Virtual Device (AVD) emulator on Eclipse.
- Video Streaming Firdaus Player is made using the JAVA programming language and XML.

- d. Video Player Streaming Firdaus Player, the author recommends operating it on the HP Smartfren Andromax-c which can run the best.
- e. Recommend a PC (Personal Computer) when making a video player streaming application, I recommend that at least an Intel Core 2 Duo Processor so that the process of running the Eclipse application does not break.
- f. The best assessment results for contrast 933.6, gamma 1.00%, color 2.03%, grayscale 2.56, 18second response time, and screen resolution is 480x800.

6. References

- [1] Dinny Wahyu Widarti, Muhammad Noor. 2011. Membangun Aplikasi Multimedia Player Menggunakan Java Media Frame Work. STMIK PPKIA 2011: Dinny Publisher.
- [2] Verika Nur Cahyadi Putra. 2012. Membangun Aplikasi Pemutar Video menggunakan Visual Basic 6.0. STMIK AMIKOM Yogyakarta: Verika Publisher.
- [3] Bima Injan Pamungkas. 2012. Desain dan Implementasi Pemutar Musik Berbasis Android, Jurusan Menejemen Informatika. STMIK AMIKOM, Yogyakarta: Bima Publisher.
- [4] Elvina, Fajar. 2010. Aplikasi Video Player Pada Mobile Phone Menggunakan Pemrograman J2ME, Fakultas Ilmu Komputer Universitas Mercu Buana: Fajar Publisher.
- [5] Farrell Pratama Sulisty. 2012. Perancangan dan Implementasi Aplikasi Video Player Menggunakan HTML5 (SECURED). Jurusan Teknik Informatika, Fakultas Teknologi Informasi, Universitas Kristen Satya Wacana: Pratama. Publisher
- [6] Taru, Andi. 2012. Cara Mudah Membuat Video Player di Android. Yogyakarta: Andi Publisher.
- [7] Taru, Andi. 2011. Pemrograman video streaming dengan Java Yogyakarta: Andi Publisher
- [8] Taru, Andi. 2012. Konsep Pemrograman Graphical User Interface pada Media Player Yogyakarta: Andi Publisher.
- [9] Wikipedia contributors. (2019). Accelerometer. In Wikipedia, The Free Encyclopedia. [Online]. Tersedia: <https://en.wikipedia.org/w/index.php?title=Accelerometer&oldid=899777806>
- [10] Agus Haryanto. (n.d.). Blog Belajar Pengembangan Aplikasi android, Blackberry, JQuery, Javascript dan Java. [Online]. Tersedia: <http://agusharyanto.net/wordpress/?p=418>
- [11] Dyah Fajar Nur Rohmah. (2002). Modul Pemrograman Aplikasi Android. [Online]. Tersedia: https://www.academia.edu/1809022/Android_Programming_Modul_Indonesian_Language_
- [12] Eko Kurniawan Khannedy. (2010). 02-membuka-project-di-eclipse.avi. [Online]. Tersedia: <https://www.youtube.com/watch?v=ob19EzgoYpI>
- [13] Power Android. (2012). How to Install .APK file in Android Eclipse Emulator.mp4. [Online]. Tersedia: <https://www.youtube.com/watch?v=7ALFFPPdvgs>

