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Sony Smart Tennis Sensor MP4 Meta Data Developer's Guide

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Contents

1. Overview

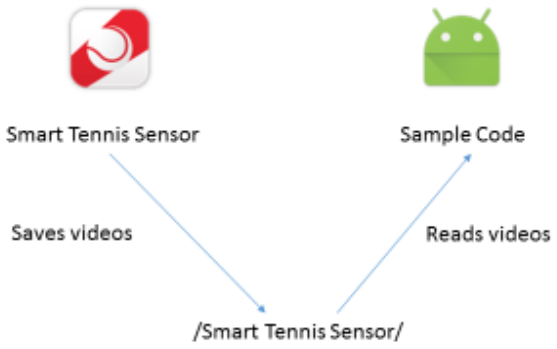
This sample code is for developers using the Smart Tennis Sensor who want to extract metadata from videos recorded by the Smart Tennis Sensor app.

Smart Tennis Sensor MP4 Meta Data Sample code:

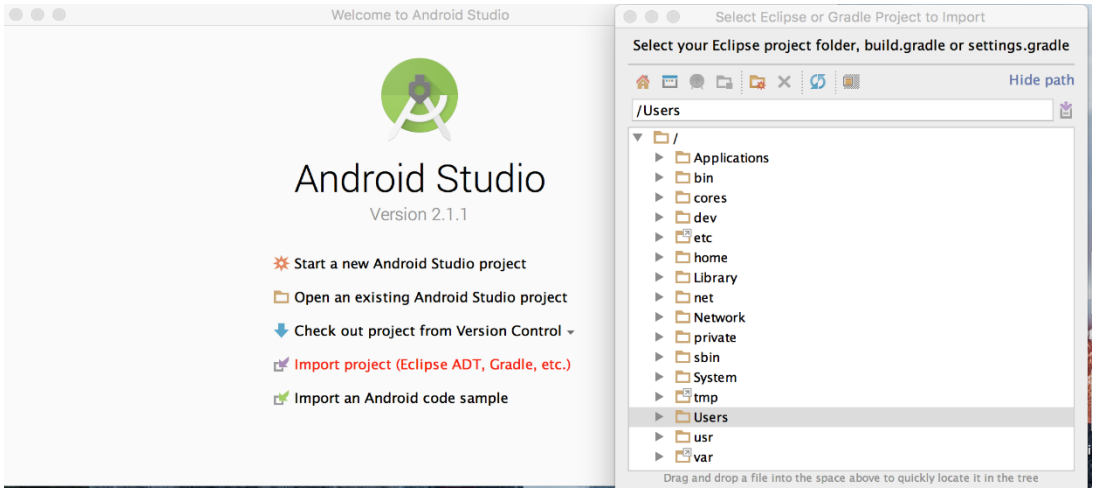
https://github.com/sony/smarttennissensormp4meta

2. Setup

Download and install the Smart Tennis Sensor app. It can be downloaded here: https://play.google.com/store/apps/details?id=com.sony.smarttennissensor&hl=en. The sample code that comes with this package will access the video files that the Smart Tennis Sensor application deploys onto the device.



After downloading the sample code package, download Android Studio and import the code. When prompted to the Welcome screen in Android Studio, click on Import Project and locate the sample code.



3. Compiling the application

This application is compatible with minimum SDK version 17 through 23. Check the file build.gradle (below) to verify that your environment is configured correctly.

```
apply plugin: 'com.android.application'

android {
    compileSdkVersion 23
    buildToolsVersion "23.0.3"

    defaultConfig {
        applicationId "com.sony.smarttennissensor.sample.mp4parser"
        minSdkVersion 17
        targetSdkVersion 23
        versionCode 1
        versionName "1.0"
    }
    buildTypes {
        release {
            minifyEnabled false
            proguardFiles getDefaultProguardFile('proguard-android.txt'), 'proguard-rules.pro'
        }
    }
}

dependencies {
    compile fileTree(dir: 'libs', include: ['*.jar'])
    testCompile 'junit:junit:4.12'
    compile 'com.android.support:appcompat-v7:23.4.0'
}
```

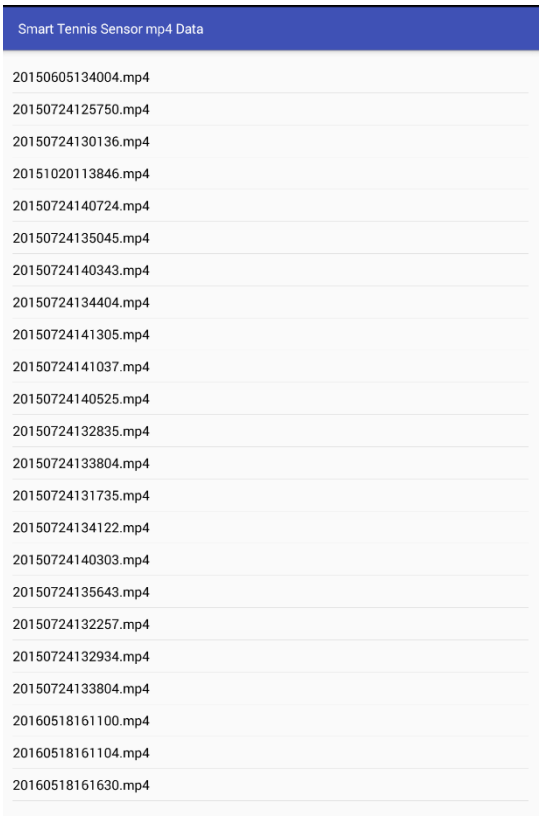
4. Running the application

To run the application, mp4 files from the Smart Tennis Sensor app must be downloaded onto your device. The files should automatically download from the Smart Tennis Sensor app to internal storage in the folder "/Smart Tennis Sensor/."

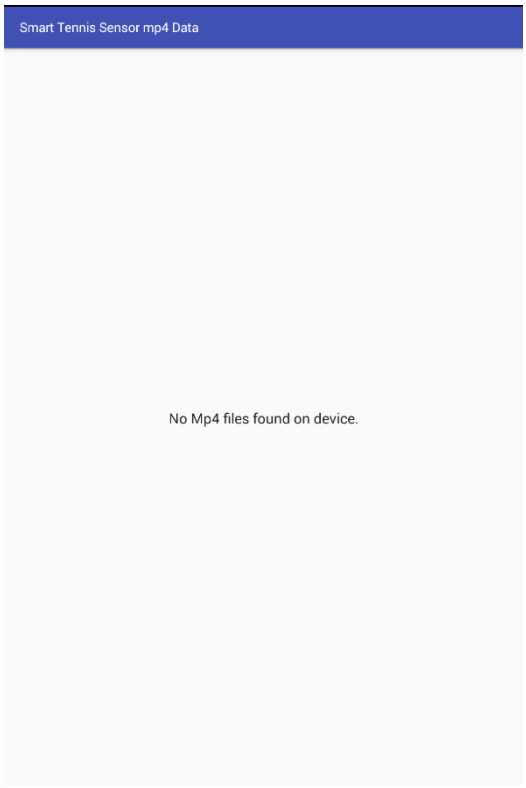
For your convenience, sample MP4 videos are provided. The sample MP4 videos can be found in https://github.com/sony/smarttennissensormp4meta

In SampleVideo directory, there is "/Smart Tennis Sensor/. Copy the folder at the top directory of your Android device. Note that if you have installed Smart Tennis Sensor app and take the video using it, copying "/Smart Tennis Sensor/." will delete existing data and videos permanently. It is recommended to backup your data before copying the "/Smart Tennis Sensor/." from github.

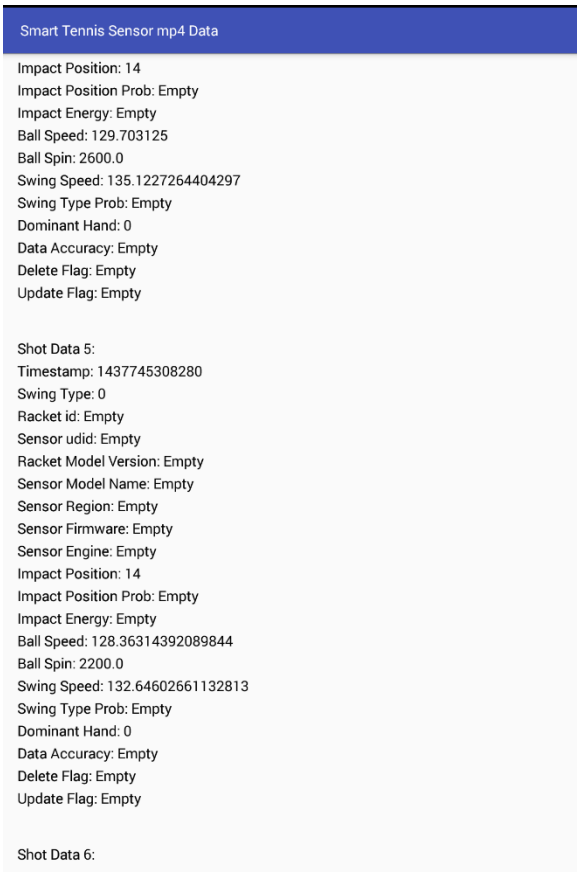
If there are mp4 files on the device, then the app should open to a list of files names.

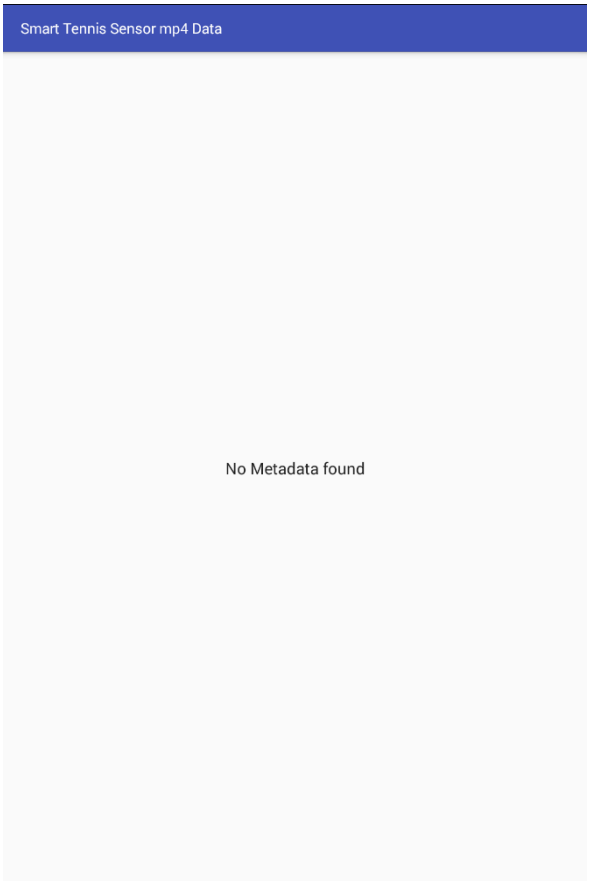


If there are no mp4 files found on the device, or if they have been moved to a different location from which the Smart Tennis Sensor application downloaded them to, then an error message indicating there are no files will show.



Click on an mp4 file, and the metadata should show on a new screen. If there is no metadata found in the video then a message will show on the screen.





5. Code Overview

The code reads the mp4 files for a UUID, and parses out the data, found in the form of XML.

To find the UUID:

Read the first 4 bytes of the file to determine the size of the current header.

Read the next 4 bytes to determine the type of header (MDAT, UUID, etc...)

If the header type is not a UUID, skip over the entire header size.

If a header type is a UUID, then check if it contains a SDAT header within it, which is where the XML is stored.

To parse the metadata out of the XML:

Each piece of data is stored in an XML element. For every shot recorded, there are multiple elements that correspond with a certain tag, which are shown below.

Iterate through the tags and display the data.

If a shot does not contain a certain piece of data, display “Empty.”

Detailed information of the meta data structure in MP4 can be found in

Smart Tennis Sensor MP4 Meta Data Whitepaper.pdf

Element name	element	data
ai	app_info	For extension to store sensor data
si	sensor-info	For future use
sd	shot-data	(parent element per shot)
A	timestamp	UTCTime（with timezone)
B	swing-type	0~8
C	racket-id	Reserved
D	sensor-udid	Reserved
E	racket-model-version	Reserved
F	sensor-model-name	Reserved
G	sensor-region	Reserved
H	sensor-firmware	Reserved
I	sensor-engine	Reserved
J	impact-position	0~26
K	impact-position-prob	Reserved
L	impact-energy	Reserved
M	ball-speed	0.0~ ?
N	ball-spin	0.0~ ?
O	swing-speed	0.0~ ?
P	swing-type-prob	Reserved
Q	dominant-hand	0~1
R	data-accuracy	Reserved
S	delete-flag	Reserved
T	update-flag	Reserved