Kofax mobiFlow

Android Developer's Guide

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KOFAX

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Preface

This guide describes mobiFlow image capture library, and explains how to use this library to integrate mobiFlow into other Android apps using Java.

Note the following:

- The minimal supported SDK version is 9.
- The easiest way to provide image detection in the application is to add a library project named mobiFlow. The image capturing session can be called via Intent. The mobiFlow library handles all aspects associated with the camera (integrating with the MICR algorithm for checks) and then provides the result in the Intent result.
- Image boundaries detection and contrast verification is performed on the image preview frames.
- Before sending the image to the server, the image is cropped, binarized (with 1 channel) from a color image to a B&W image and set to TIFF with Group 4 Fax Encoding (CCITT T.6).

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The Kofax Knowledge Base repository contains articles that are updated on a regular basis to keep you informed about Kofax products. We encourage you to use the Knowledge Base to obtain answers to your product questions.

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Note The Kofax Knowledge Base is optimized for use with Google Chrome, Mozilla Firefox or Microsoft Edge.

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- Access to Kofax support commitments, lifecycle policies, electronic fulfillment details, and self-service tools.

  Scroll to the **General Support** section, click **Support Details**, and then select the appropriate tab.

Product documentation

By default, the Kofax mobiFlow documentation is available online. However, if necessary, you can download the documentation to use offline.

Online documentation

The product documentation for Kofax mobiFlow 6.0.0 is available at the following location:

https://docshield.kofax.com/Portal/Products/en_US/mobiFlow/6.0.0-tss0pu9zau/mobiFlow.htm

Offline documentation

To access the documentation offline, download the documentation .zip files from the Kofax Fulfillment Site and extract them on a local drive available to your users.

Chapter 1

Project settings

This chapter describes the project settings for the Android SDK.

Supported architectures

The mobiFlow package includes the following architectures by default:

- armeabi-v7a
- arm64-v8a
- x86

If you wish to add additional ABIs (such as armeabi, mips, mips64, x86_64), contact Kofax Support.

To reduce the APK size to a minimum, we recommend splitting the APK into multiple ABIs per architecture and uploading a number of APK files per architecture to Google Play.

If multiple APK files is not an option, and reducing the universal APK size is necessary, we recommend removing x86 Intel support devices. Remove the folder that contains x86 so that files for Intel devices are not supported.

See the Showcase project settings for reference.

Libraries

Android Studio

The project can be integrated manually using mobiFlow library or aar. For static UI customization via XML, use mobiFlow library integration.

mobiFlow library integration

Your project should contain two modules: mobiFlow and openCV.

The Build.gradle file of the calling app should contain the mobiFlow library. Add the mobiFLOW library to your dependencies, as shown here:

```
dependencies {
   compile fileTree(dir: 'libs', include: '*.jar')
   compile project(':mobiFLOW')
```

```
}
```

The Build.gradle file for mobiFlow should include a dependency for OpenCV, as shown here:

```
dependencies {
   compile fileTree(dir: 'libs', include: '*.jar')
}
...
splits {
   abi {
         enable true
         reset()
         include 'armeabi-v7a', 'arm64-v8a', 'x86
         universalApk true
    }
}
```

The ndk tag should be included under defaultConfig in the calling application, with supported ABIs:

```
defaultConfig{
...
   ndk {
      abiFilters 'armeabi-v7a', 'arm64-v8a','x86
   }
}
```

You can use the Showcase app as a reference and copy the configuration from there.

aar integration

1. Copy the aar file to the libs folder of the calling application.
2. To compile the aar file, add the following code in the dependencies section of the build.gradle.

```
dependencies {
 repositories{
     flatDir {
         dirs 'libs'
     }
 }
        implementation (name: 'mobiFlow.Android-release', ext: 'aar')
}
```

Note The Android SDK version, permissions, and features must be added to the calling application Manifest.

Android SDK version

```
<uses-sdk android:minSdkVersion="9"/>
```

Permissions

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

Features

```
<uses-feature android:name="android.hardware.camera" android:required="true" />
<uses-feature android:name="android.hardware.camera.autofocus" />
<uses-feature android:name="android.hardware.camera.flash"  android:required="true"  />
```

Activities

Add full class paths to camera-related activities and instructions activities from the library project.

```
<activity
  android:name="com.topimagesystems.controllers.instructions.InstructionsController"
  android:screenOrientation="portrait" />
<!-- camera -->
<activity
   android:name="com.topimagesystems.controllers.imageanalyze.CameraManagerController"
   android:configChanges="keyboardHidden|orientation|screenSize" >
</activity>
<activity
   android:name="com.topimagesystems.controllers.imageanalyze.CameraController"
   android:configChanges="keyboardHidden|orientation|screenSize"
   android:hardwareAccelerated="false" >
</activity>
<activity
   android:name="com.topimagesystems.ui.InfoScreenActivity"
   android:theme="@android:style/Theme.Translucent.NoTitleBar" >
</activity>
```

MLKIT integration to your application

To use MLKitProcess for text recognition in your application you need to integrate MLKIT to your application.

You can connect your Android app to Firebase using the following steps:

Use the Firebase console setup workflow.

1. Go to Firebase console and click **Add project**.
2. Set project name, project id (optional), accept the terms and conditions, and then click **Create project**.
3. Once the project is created, click **Continue**.
4. Click ⚙, and then go to **Project settings** > **Add Firebase to your Android app**.
5. Add the package name of your app and click the **Register app** button.
6. Download google-services.json file and copy it to the Android app module root directory, and then click **Next**.
7. Add the following plugins and dependencies to build.gradle files:

```
Project-level build.gradle ( <project>/build.gradle):
buildscript {
  dependencies {
    // Add this line
    classpath 'com.google.gms:google-services:4.0.0'
  }
}

App-level build.gradle (<project>/<app-module>/build.gradle):
dependencies {
  // Add this line
  implementation 'com.google.firebase:firebase-core:16.0.1'
}
```

```
...
// Add to the bottom of the file
apply plugin: 'com.google.gms.google-services'
```

8. Sync the project and then click **Next**.
9. To verify whether your app is connected to Firebase or not, run your app.
10. Add the following Firebase ML Vision dependency in your app-level build.grade file:

```
 dependencies {
// ...
implementation
'com.google.firebase:firebase-ml-vision:18.0.2'
}
```

11. Add a declaration in AndroidManifest.xml file, which automatically downloads the ML model once the app is installed.

```
<application ...>
...
<meta-data
android:name="com.google.firebase.ml.vision.DEPENDENCIES"
android:value="ocr" />
<!-- To use multiple models: android:value="ocr,model2,model3"
-->
</application>
```

Note Addition of declaration is optional, it is recommend to add the declaration.

Chapter 2

Library

This chapter describes how to use mobiFlow Android library.

Interaction with the Library

Full sample code and integration can be found in the sample SDK application.

Session parameters

Parameter	Description
documentType	Document type set to one of the enums: • TISDocumentType.CHECK • TISDocumentType.PAYMENT • TISDocumentType.FULLPAGE • TISDocumentType.PASSPORT • TISDocumentType.CARD • TISDocumentType.CUSTOM • TISDocumentType.LIVE_OCR Default: None. You must set this parameter.
debugMode	When set to TRUE, images are stored on the device and logs are written to the console. Default: FALSE
uxType	Static capture sets predefined boundaries on the screen according to the aspect ratio, while the document must be placed within the shown boundaries. Live capture looks for a quadrilateral of a document in any size, with optional additional settings according to the document type, and validates that the document is in the correct aspect ratio. Setting the aspect ratio to 0.0 both for Minimum and Maximum skips validation in dynamic mode and lets you capture any document. TISFlowUXType can be set to one of the following values: • STATIC • LIVE Default: LIVE

Parameter	Description
minHeightWidthAspectRatio	Minimum allowed ratio between the height and width of a captured image. Default values: • Checks and bills: 0.35 • Full page: 1.17 • Passport: 0.65 • Card: 0.582
maxHeightWidthAspectRatio	Maximum allowed ratio between the height and width of a captured image. Default values: • Checks and bills: 0.50 • Full page: 1.56 • Passport: 0.8 • Card: 0.7117
enableIQA	When set to TRUE, enables the IQA validations. Default: FALSE
IQASettings	A class of type IqaSettings to set all the threshold parameters for the IQA validations. You can leave it to defaults if not in use.
showInfoScreen	Shows the information screen if the user has difficulty capturing the document after a specific set time. Default: TRUE
InfoScreenInterval	The number of milliseconds until the information screen appears on the camera overlay. Default: 10000
showGuidelinesIndicators	When set to FALSE, only two static indicators are presented. • TISFlowIndicatorAlign: Indicator for alignment (the device should be aligned with the document) • TISFlowIndicatorHold: Indicator for hold (the device should be held over the document) When set to TRUE, dynamic indicators are presented. Default: TRUE
outputGrayscaleImage	Enables the output of a grayscale JPG. Default: TRUE
grayscaleImageCompression	A value of the factor by which the JPG cropped grayscale image is compressed. The value ranges from 0.0 for highest compression (lowest quality) to 1.0 (highest quality) Default: 1.0
outputOriginalImage	Enables the output of the captured original image. Default: TRUE
outputColorImage	Enables the output of the captured cropped color image. Default: TRUE

Parameter	Description
colorImageCompression	A value of the factor by which the JPG cropped color image is compressed. Values ranges from 0.0 for highest compression (lowest quality) to 1.0 (highest quality) Default: 1.0
outputBinarizedImage	Enables the output of the captured black and white image. Default: TRUE
grayScaleSize	Set the width and height of the grayscale output image. The parameter is of typeint[]. Default: [0,0], which means the image cannot be resized.
enableBlurDetection	When set to TRUE, mobiFlow checks the sharpness of an image and notifies when the image is blurred. **Note** Currently blur detection does not apply on the back side of a document. Default: FALSE TRUE for Payment and Full Page, FALSE for Check. Set to FALSE for Checks.
videoFeedProcessing	Only applicable to devices with at least 1920*1080 video resolution. When set to TRUE, the picture is taken directly from the video feed when the document is aligned properly with the frame. In this case, the device does not switch to still mode and does not present the countdown sequence. When set to FALSE, the device switches to still mode to take the picture. For devices with video resolution lower than 1920*1080, the image is taken in stills mode, even if video feed processing is set to TRUE. See Captions and messages for more details. Must be set to TRUE for Passport. Default: TRUE for Check and Passport, FALSE for other types. **Note** When bills are captured with video mode, recognition rate is low.
maxVideoFrameToCapture	When video feed processing is enabled and the device video resolution is higher than the minimum (), the library tries to process the captured image. In case of failure, this parameter is set to the maximum attempts to capture via video mode before switching back to still mode and countdown. For better performance, set this parameter between 5 and 10. This parameter is relevant only when videoFeedProcessing is set to TRUE. Default: 7

Parameter	Description
showCountDown	Only applicable to still mode. When set to TRUE, once the user is in a position to take a picture, the frame turns green and a countdown is shown until the picture is taken automatically. When set to FALSE, no countdown is shown. The picture is taken when the frame is green and the HOLD STILL message appears on the screen. Default: FALSE
countDownStartValue	The number from which the countdown starts when the counter for taking a still image is set in this parameter. Default: 2
countDownStopValue	The number at which the countdown stops when the counter for taking a still image is shown. The countDownStopValue must be lower than the countDownStartValue. Default: 0
enableCountdownSound	When set to TRUE, enables a sound along with the image capture countdown. The sound that is played is beep. Default: FALSE
dynamicStrings	Option to change Strings.xml values at runtime. The key is the String ID as shown in the Strings.xml, the value is the string to replace. If a key does not have a value or all the object is null, the default value is taken from the Strings.xml (set to Null - no change from the original behavior). The parameter is of the type HashMap<String, String>. Default: Null
showDefaultProcessingView	Shows the processing screen (red spinner). When set to TRUE, the progress bar is presented over the camera overlay. When set to FALSE, a new layout from mbck_camera_layout is presented on the screen when the processing stage has started (@+id/processingOverlay). Default: TRUE
multiPageCapture	When set to TRUE, this parameter enables capture of multiple documents. After each capture, a prompt screen is displayed asking user if the user would like to capture another image. If the user selects Finish, the Library calls OnActivityResult. After every captured image, the onMessageReceive listener is called with the TISFlowActionCallback action MULTI_CAPTURE, but the camera session stays open until the user finishes the multipage session. Default: FALSE
binarizeBackSameAsFront	When set to TRUE, the same binarization algorithm that runs on the front side runs on the back side of the check. Default: FALSE

Parameter	Description
binarizationThreshold	Threshold for the strength of the binarization algorithm. Values can be between 0.0 and 1.0. Set only when capturing a single size document. If the size varies, like Bills, then set to 0.0 for optimization. 1.0: Darkest 0.0: The SDK calculates the optimal threshold according to the image size. Default: 0.0
scanFrontOnly	When set to TRUE, only the front side is captured. When set to FALSE and scanBackOnly is set to FALSE, both front and back are captured. Default: FALSE for Checks, TRUE for other types Default: FALSE
scanBackOnly	When set to TRUE, only the back side is captured. If scanFrontOnly is also TRUE, it fails to initialize the Library. Default: FALSE
softCapture	Provides the ability to capture the document while the device is held at an angle and not necessarily flat over the document. In this case, the document image is straightened and aligned from the angled position to a flat position. This method may impact the quality of the final image. Default: FALSE
scanBarcodeLocation	Of type TISScanBarcodeLocation enum value. When set to BARCODE_NONE, no bar code is detected. Otherwise, it determines on which side of the document the bar code is detected. Possible values are: • BARCODE_FRONT • BARCODE_BACK • BARCODE_FRONT_AND_BACK • BARCODE_NONE Default: BARCODE_NONE

Parameter	Description
barcodeTypes	ArrayList<TISBarcodeType> Relevant only when scanBarcodeLocation is not NONE. Contains the bar code types that are recognized during the bar code scan session. Once a bar code is detected, if there is a match with one of the bar code types, the bar code is parsed and the SDK continues to capture the document. If one of the bar code types includes QR_CODE, AZTEC_CODE, or DATA_MATRIX_CODE, a square appears instead of a rectangle for the bar code detection. Supported bar code types in the array: • UPCE_CODE • CODE_39_CODE • CODE_39_MOD_43_CODE • EAN_13_CODE • EAN_8_CODE • CODE_93_CODE • CODE_128_CODE • PDF_417_CODE • QR_CODE • AZTEC_CODE • INTERLEAVED_2_OF_5_CODE • ITF_14_CODEDATA_MATRIX_CODE Default: All bar code types
customView	When set to TRUE, uses the custom view that was set up. Default: FALSE
ocrType	• UNKNOWN (For Check only) • E13B (For Check only) • CMC7 (For Check only) • OCRA • MRZ (For Passport and Card only) • PAN (For Pancard subtype only) • OFF • CREDIT (For Credit Card only) Default: OFF

Parameter	Description
useMaxResolution	This setting is valid for stills capture mode only. The SDK uses the optimal resolution to process an image automatically per document type and flow. Set this parameter to TRUE, if you need to use the maximum camera resolution of the device. **Note** Setting this parameter to TRUE can lead to a longer processing time. Default: FALSE
minMICRLength (Check capture only)	Minimum MICR length (number of characters). Default: 15
maxMICRLength (Check capture only)	Maximum MICR length (number of characters). Default: 50
frontImageSize (Check capture only)	Size of the front black and white and grayscale images output. Should be passed as a parameter to the back scan according to the size output of the front scan when the back scan is done separately. The first value in the array is the image width and the second is the image height. Parameter type is Int[].
portraitCapture (Custom document type only)	When set to TRUE, the camera opens in portrait mode. Default: FALSE
binarizationType (All document types except Check)	Available only for the Custom document type. TIS_GENERAL_BINARIZATION: Default value for all document types except Check. TIS_CHECK_BINARIZATION: Default value for Check. TISSauvolaBinarization TISOtsuAdaptiveBinarization
license	Of the type TISLicenseParameters class, which includes three members that must be initialized on the constructor. A valid license must be coded in order for the camera session to start, otherwise a license error message is displayed. See License parameters for more information.
animateTransitionInLivePreview	For TISFlowUXType.LIVE. When set to TRUE, the green and red rectangles switch with smooth transition animation. Default: TRUE

Parameter	Description
softCaptureThreshold	When enabled, the calling app displays the option to control the strictness/softness of the capture and can allow wider angles and higher capture distance from the frame. Possible values are 0–1. A higher value makes the capture experience less strict. **Note** At the maximum threshold, capture at a wide angle may affect image quality. Default: 0 (the same threshold as previous versions).
tapToFocus	When set to TRUE, user can tap on the camera overlay to focus explicitly. Default: TRUE
enableBlurDetectionOnBackSide (Beta feature)	When set to TRUE, the SDK performs blur detection on the back side of the document to avoid blurry back side images. Valid for all document types. Default: FALSE
enableManualCapture (All document types except Passport and Credit Card)	When set to TRUE, a button is added to the screen, allowing the user to take a still image immediately that will be sent to processing or to the Crop Controller. Default: FALSE
enableCropController (All document types except Passport and Credit Card)	When set to TRUE, the image that is taken by manual capture, or automatically by the SDK, is sent to the Crop Controller to confirm the quality and cropping of the image, or to correct the cropping, before it is sent to processing. This feature is only available from Android API 11. Default: FALSE
shouldDismissWithAnimation	Dismisses the capture screen with animation. Default: TRUE
showErrorSignatureOverCMC7	a signature is detected over an CMC7 MICR, sends an error to the calling app. Default: TRUE
showGridInLivePreview	If the uxType parameter is LIVE, displays the grid over the camera overlay. Default: TRUE
maxFrameWidth	If the uxType is STATIC, determines the percentage of the screen width used by the capture frame. Default value for both landscape and portrait: 0.99
minFrameHeight	If the uxType is STATIC, determines the percentage of the screen height used by the capture frame. Default value for landscape: 0.75 Default value for portrait: 0.86

Parameter	Description
searchForSignature (Check document type only)	Verifies whether there is a signature on the check. Of the TISSearchForSignature enum value. When set to SIGNTATURE_NONE, no signature is searched for. Otherwise, the side of the document a signature should be found is determined. Possible values are: • SIGNATURE_FRONT • SIGNATURE_BACK • SIGNATURE_FRONT_AND_BACK • SIGNATURE_NONE Default: SIGNTATURE_NONE
liveOcrFields (Live OCR document type only)	An array of LiveOcrField objects, that is, a list of fields that should be detected in a document. See Live OCR field for more information.
autoDetectOcr (Live OCR document type only)	Determines whether the system automatically proceeds to the next field for OCR after recognition.
enableStructuredOCRProcessing	Provides the ability to process an entire document or just specific regions (if the structuredOcrParameters parameter is initialized).
structuredOcrParameters	Relevant when enableStructuredOCRProcessing is set to TRUE. Object of the type TISStructuredOCRParameters class, which includes three members that must be initialized. Used to provide specific regions to be recognized.
OCREngineConnector	An instance of the OCR engine. This object conforms to TISOCRProcessable protocol.

Initiating image capturing

To initiate image capturing, invoke an intent that will trigger the library code. Consider using a convenience class CaptureIntent that wraps intent invoking and result receiving.

Create a default parameter class and change any parameter if needed. This example is for bill payment. See Document types for information on the different types of document.

Payments

```
CaptureIntent captureIntent = new CaptureIntent(activity);
// create CaptureIntent to interact with the library
paymentCaptureParams input = (paymentCaptureParams)
CaptureIntent.getCaptureParams(TISDocumentType.PAYMENT);
// Create parameters class that matches the document type capture using casting
CaptureIntent.captureDocument(input);
```

Checks

```
CaptureIntent captureIntent = new CaptureIntent(this); // this is your Activity context
IQASettingsIntent iqaSettings = IQASettingsIntent iqaSettings = new
 IQASettingsIntent().getIQASettingsDefault();// init default IQA settings class
// check 51 init
// IQASettingsIntent iqaSettings = new IQASettingsIntent();
//iqaSettings = iqaSettings.getIQAStandart51Defaults();
```

```
checkCaptureParams input = (checkCaptureParams)
 captureIntent.getCaptureParams(TISDocumentType.CHECK); // init default check
 configuration.
input.outputColorImage = false; // cropped color image, seems you don't need this from
 the settings.
input.IQASettings = iqaSettings;
input.uxType = TISFlowUXType.STATIC;
input.license = new TISLicenseParameters(… ,  … , ) // input the license here
CameraController.registerListener(this); // this == class context, register listener to
 get messages from the SDK, does not have to be here, can be anywhere before .
captureIntent.captureDocument(input); // open camera screen.

CaptureIntent.getCaptureParams(TISDocumentType.CHECK);
```

1. Initialize CaptureIntent to interact with the library.
2. Get the default class parameters (using casting by adding the correct enum that describes the document type).
3. Initialize the session with the parameters class.

Use fragments

CaptureIntent can be used from a Fragment class as well, and all the results will be returned to this fragment. In this case, instead of sending the activity as a parameter to the CaptureIntent constructor, the fragment should be sent as a parameter. It can be a native fragment or a fragment from the support library.

This parameter type is object, so an exception will be thrown if it is not a valid fragment object.

```
CaptureIntent captureIntent;
try {
captureIntent = new CaptureIntent(fragment);
} catch (Exception e) {
e.printStackTrace();
return;
}
checkCaptureParams input = (checkCaptureParams)
captureIntent.getCaptureParams(TISDocumentType.CHECK);
```

Implementation example for checks

The best way to add a fragment is demonstrated in the ShowCaseContainerActivity (fragment used in activity) and ShowCaseContainerFragment (nested fragments: fragment used inside a fragment).

When using onActivityResult in the container, it is important to call the super.onActivityResult so the result of any child fragments used in the container are handled.

If the fragment's container is an activity (use protected):

```
@Override
protected void onActivityResult(int requestCode, int resultCode, Intent data) {
...
// Handling Activity results
super.onActivityResult(requestCode, resultCode, data);
}
...
@Override
public void onActivityResult(int requestCode, int resultCode, Intent data) {
```

```
...
// Handling Fragment results
super.onActivityResult(requestCode, resultCode, data);
}
```

If the fragment's container is a fragment (nested fragments – use public):

```
Fragment fragment = new ShowCaseFragment();
FragmentTransaction transaction = getFragmentManager().beginTransaction();
transaction.add(R.id.container, fragment);
transaction.commit();
```

To avoid the illegalStateException that occurs often when using fragments, it is best to inflate the fragment (no need to use the fragment tag in the layout XML).

Android M permissions

For Android M target applications, the SDK must have camera permission in order to start a session. You must choose whether to ask for permission before initiating mobiFlow, or let mobiFlow ask for permission.

Note If you would like the alert to show on the calling app screen, you must ask for the camera permission before calling mobiFlow.

The following code shows how to ask for camera permission from the calling application:

```
@TargetApi(23)
private boolean askPermission(){
Context c = getApplicationContext();

String permission = "android.permission.CAMERA";
int res = this.checkCallingOrSelfPermission(permission);
if (res == PackageManager.PERMISSION_GRANTED){
// has permission start mobiFLOW
}
Else{
// don't have permission, ask for permission – result will return to
// onRequestPermissionResult method
requestPermissions(
new String[]{Manifest.permission.CAMERA},
MY_PERMISSIONS_REQUEST_CAMERA);
}
return true;
}
// permission result callback
@Override
public void onRequestPermissionsResult(int requestCode,
String permissions[], int[] grantResults) {
switch (requestCode) {
case Constants.CAMERA_PERMISSIONS_REQUEST: {
// If request is cancelled, the result arrays are empty.
if (grantResults.length > 0
&& grantResults[0] == PackageManager.PERMISSION_GRANTED) {
// permission was granted,
// start mobiFLOW
} else {
// permission denied !
}
return;
     }
   }
}
```

If you use debug mode where images are saved on the device, you must grant storage access permission as well in the same way. This must be done from the calling app.

If mobiFlow handles the camera permission, the alert is shown before the camera opens. If the user approves the permission, the session starts as usual.

If the user denies permission, the session closes with the following result code:

RESULT_CAMERA_PERMISSION_ACSSES_DENIED

Live OCR fields

Set the parameters for LiveOCRFields according to the following table.

You must initialize following two values.

Parameter	Description

liveOcrFields: ArrayList<LiveOcrField>	An array with objects of type LiveOcrField
	This array list will set the number of fields for live recognition.
	Each object contains:
	• title: The name of the field that will be recognized.
	• type:
	  • FIELD_TYPE_DATE: A regex for recognize date is provided.
	  • FIELD_TYPE_AMOUNT: A regex for recognize amount is provided.
	  • FIELD_TYPE_RAW_TEXT: A regex to recognize raw texts.
	  • FIELD_TYPE_CUSTOM: For custom regex use.
	• width: The width of the mask rectangle shown on screen to capture specific ROI (value between 0.0 to 1.0).
	• height: The height of the mask rectangle shown on screen to capture specific ROI (value between 0.0 to 1.0).
	• regex: Optional regular expression for specific ROI.
	• detectedSentence: Initialized when recognition is done.

autoDetectOcr (Live OCR document type only)	Determines whether the system will automatically pass to the next field for OCR after recognition.

Sample code: **LIVE_OCR**

```
CaptureIntent CaptureIntent = new CaptureIntent(this);

CaptureIntent.liveOcrParams input = (CaptureIntent.liveOcrParams)
CaptureIntent.getCaptureParams(com.topimagesystems.intent.
CaptureIntent.TISDocumentType.LIVE_OCR);
input.autoDetectOcr = true;
input.liveOcrFields.add(new LiveOcrField("Raw text", LiveOcrField.FIELD_TYPE_RAW_TEXT,
 0.8f, 0.07f));
liveOcrFields.add(new LiveOcrField("Date", LiveOcrField.FIELD_TYPE_DATE, 0.7f, 0.08f));
liveOcrFields.add(new LiveOcrField("Amount", LiveOcrField.FIELD_TYPE_AMOUNT, 0.5f,
 0.08f));

input.enableManualCapture = false;

if (ToUseMLKIT)
    CameraManagerController.setOcrEngineConnector(new MLKitProcess());
```

```
else
    CameraManagerController.setOcrEngineConnector(null); // TISOCRProcess by default
CaptureIntent.captureDocument(input);
```

Structured OCR parameters

This object is relevant only if enableStructuredOCRProcessing is TRUE. This enables the developer to insert specific regions to be recognized.

Set the parameters for enableStructuredOCRProcessing according to the following table.

Parameter	Description
ArrayList<TISOCRRegion>	An array of with objects of type TISOCRRegion. Each object contains the following: • inputROI: The specific ROI to be process. Needs to be measured by developer relative to the property ocrBaseSize. • resultROI: Available after process, when there is recognition. The 'inputROI' converted to output image coordinates system. • regex: Optional, output only text that meets this regular expression. • regionConfidence: Available when setOcrEngineConnector is default. • ocrProcessResults of array with objects of type TISOCRResult: Internal use.
ocrBaseSize	The width and height that all regions were derived from (the size of the document that should be processed).

Sample code: **StructuredOCRParameters**

```
CaptureIntent CaptureIntent = new CaptureIntent(this);
// For any Document if enableStructuredOcrProcessing
if (input.enableStructuredOcrProcessing) {
    ArrayList<TISOCRRegion> ocrRegions = new ArrayList<>();
    ocrRegions.add(new TISOCRRegion(new RectF(9.3f, 0f, 16.2f, 2f),
 TISOCRUtils.ISRAELI_ID_CO_REGEX_STRING));
    input.structuredOcrParameters = new TISStructuredOCRParameters(16.2f, 7.5f,
 ocrRegions);

    // if structuredOcrParameters set to null, the entire document will be read

    input.structuredOcrParameters = null;

    boolean useMlKit =
 mSharedPreferences.getBoolean(ShowcasePreferences.PREFERENCE_USE_ML_KIT, false);

    if (useMlKit)
        CameraManagerController.setOcrEngineConnector(new MLKitProcess());
    else
        CameraManagerController.setOcrEngineConnector(null);

}
```

License parameters

Each version of the SDK requires a license. If a license is not configured, mobiFlow displays an error on the device's screen and does not start the camera session.

The license is individual per implementation and is made up of the licensee name, the license key, and the license itself. The license is either limited by expiration date or is unlimited.

The license is valid per SDK version and can only be used on that version. Upgrading to a newer version requires a new license that matches the version of the SDK used.

You must initialize the following three values (which are provided by mobiFlow).

Parameter	Description
licensee	The name of the licensee that the license is associated with. Usually, this will be the customer name or the project name.
licenseKey	A unique key that is given to each license or customer.
activeLicense	An encrypted string that contains the license information.

Following is the sample code for license.

```
input.license = new
    TISLicenseParameters("ABCD","a70e52b0-e499-3562-
afb1-17f04038356b","TqeRDhExXuGCLNdIcvb4OR9+QJYiTnWQ3ooFtcWx39OkkNeUYf4Ph0U
+P5x6DaRIdA84HwlWUzF5YMLA5k==");
```

If the license information is validated successfully, the camera session starts.

If the license validation fails, a notification is displayed on the screen to the user and the session ends with the following result code:

RESULT_LICENSE_INVALID.

To get the message you can call the following:

```
String licenseErrorMessage = data.getStringExtra(CaptureIntent.MOBIFLOW_ERROR_DETAILS);
```

See the Handle session results section for more details.

IQA parameters

Create the IQASettingsIntent instance, and set its IQA properties.

IQA is used to define validation for image quality.

Set the parameters for iQAParameters according to the this table.

Parameter	Description
maxRotationSkew	Maximum skewing angle allowed.
minDarknessFront	Minimum ratio of black pixels to total pixels for the front side.
maxDarknessFront	Maximum ratio of black pixels to total pixels for the front side.
minDarknessBack	Minimum ratio of black pixels to total pixels for back side.
maxDarknessBack	Maximum ratio of black pixels to total pixels for back side.

Parameter	Description
numberOfSpotsFront	Maximum number of spots that are considered as spots allowed per square inch on average for the front side. Black areas count as spots if the size of the area is greater than 3 pixels and less than 20 pixels, and the black area is surrounded by white pixels.
numberOfSpotsBack	Maximum number of spots that are considered as spots allowed per square inch on average for the back side. Black areas count as spots if the size of the area is greater than 3 pixels and less than 20 pixels, and the black area is surrounded by white pixels.
CornerDataArrayFront cornerDataFrontTLH cornerDataFrontTLW cornerDataFrontTLA cornerDataFrontTRH cornerDataFrontTRW cornerDataFrontTRA cornerDataFrontBLH cornerDataFrontBLW cornerDataFrontBLA cornerDataFrontBRH cornerDataFrontBRW cornerDataFrontBRA	Thresholds for height, width and area (in inches) for every corner of the check on the front side. Use the function setCornerFrontSameToAllCorners to set the same height, width and area for all corners, or use SetCornerFrontAll to set a different threshold for each corner.
CornerDataArrayBack cornerDataBackTLH cornerDataBackTLW cornerDataBackTLA cornerDataBackTRH cornerDataBackTRW cornerDataBackTRA cornerDataBackBLH cornerDataBackBLW cornerDataBackBLA cornerDataBackBRH cornerDataBackBRW cornerDataBackBRA	Thresholds for height, width and area (in inches) for every corner of the check on the back side. Use the function setCornerBackSameToAllCorners to set the same height, width and area for all corners, or use SetCornerBackAll to set a different threshold for each corner.

Parameter	Description
edgeDataTH edgeDataTW edgeDataTA edgeDataRH edgeDataRW edgeDataRA edgeDataBH edgeDataBW edgeDataBA edgeDataLH edgeDataLW edgeDataLA	Thresholds for height, width and area (in inches) for every side of the check (top/bottom/left/right). Use the function setEdgeSameToAllSides to set the same height, width and area for all corners, or use SetEdgeAll to set a different threshold for each corner.
minImageFileSizeFront	The minimum file size for the TIFF image for the front side.
maxImageFileSizeFront	The maximum file size for the TIFF image for the front side.
minImageFileSizeBack	The minimum file size for the TIFF image for the back side.
maxImageFileSizeBack	The maximum file size for the TIFF image for the back side.
horizontalStreakSumOfBlackPixels	The minimum number of black pixels required to determine if the line is black (check front).
horizontalStreakLineWidth	The minimum width of the black line to detect (check front).
horizontalStreakNumLines	The minimum number of black lines for the horizontal streaks alert (check front).
carbonStripSumOfBlackPixels	The minimum number of black pixels required to determine if the line is black (check back).
carbonStripLineWidth	The minimum width of the black line to detect (check back).
carbonStripNumLines	The minimum number of black lines for the horizontal streaks alert (check back).
piggyBackMaxWidth	Maximum width threshold between two checks that overlap each other.
piggyBackMaxAR	Top and bottom Location threshold between two checks that overlap each other.
maxImageDimensionsHeight	The maximum height of the image to detect.
maxImageDimensionsWidth	The maximum width of the image to detect.

The following code is an example of how to initialize IQASettingsIntent and add it to the capture parameters.

```
checkCaptureParams input = (checkCaptureParams)
CaptureIntent.getCaptureParams(TISDocumentType.CHECK);
IQASettingsIntent iqaSettings = new IQASettingsIntent();
iqaSettings.cornerDataFrontTLH = 1.0f;
iqaSettings.cornerDataFrontTLW = 1.0f;
input.IQASettings = iqaSettings; (can be found in sample SDK app).
```

Use the following code to initialize default IQA parameters:

```
check 21
iqaSettings = new IQASettingsIntent();
iqaSettings = iqaSettings.getIQASettingsDefault();
check 51:
IQASettingsIntent iqaSettings = new IQASettingsIntent();
iqaSettings = iqaSettings.getIQAStandart51Defaults();
```

Debug parameters

There are four parameters that can configure the camera with values different from the mobiFlow defaults. This option is for debugging only and must be set to zero when not debugging.

The SDK chooses the video and still camera resolution that best fits the devices that were tested. For problematic devices, you can choose the resolution manually by changing these values. We recommend that you first consult Kofax before changing these values.

The following values are in the integer.xml file:

<integer name="videoWidthResolution">0</integer> - change video width resolution

<integer name="videoHeightResolution">0</integer> - change video height resolution

<integer name="stillWidthResolution">0</integer> - change still width resolution

<integer name="stillHeightResolution">0</integer> - change still height resolution

Note Change these values only for debugging purposes.

Add device exceptions

To work with Camera API 2

To add a specific device to work with CameraAPI2, you must add an entry to the arrays.xml file under exception_devices_use_cameraAPI2.

The SDK will calculate the video resolution that best matches the screen aspect ratio. To suppress this calculation, you can disable calculateVideoToScreenAspectRatio by deleting the value All and applying the AR calculation per device.

To add a device to exception list

Create the structure in the following format:

Build.MANUFACTURER + <space> + Build.MODEL device brand, space, device model

For example: <item>Samsung SM-G900V</item>

Important If you want to make this change other than for debug purposes, consult with Kofax first.

Document types

The available document types are: CHECK, PAYMENT, FULL_PAGE CUSTOM, CARD, PASSPORT, and Live OCR.

Initialize the following document types with the default parameters that fit the relevant document type.

Full Page capture session parameters

```
FullPageCaptureParams input = (FullPageCaptureParams)
CaptureIntent.getCaptureParams(TISDocumentType.FULL_PAGE);
```

Custom capture parameters

```
customCaptureParams input = (customCaptureParams)
CaptureIntent.getCaptureParams(TISDocumentType.CUSTOM);
```

Payment capture parameters

```
paymentCaptureParams input = (paymentCaptureParams)
CaptureIntent.getCaptureParams(TISDocumentType.PAYMENT);
```

Check capture session parameters

```
checkCaptureParams input = (checkCaptureParams)
CaptureIntent.getCaptureParams(TISDocumentType.CHECK);
```

Passport capture session parameters

```
passportParams input = (passportParams)
CaptureIntent.getCaptureParams(TISDocumentType.PASSPORT);
```

Card capture session parameters

```
CardParamsinput = (CardParams)
CaptureIntent.getCaptureParams(TISDocumentType.CARD);
```

Live OCR session parameters

```
liveOcrParams input = (liveOcrParams)
CaptureIntent.getCaptureParams(TISDocumentType. LIVE_OCR);
```

All the default parameters for each class can be modified in the calling application by accessing each parameter in the params variable (in this example, input).

Once all are initialized, you call CaptureDocument to start the camera session:

```
CaptureIntent.captureDocument(input);
```

Video processing guidelines

The check capture and MICR recognition process is done directly from the video feed on supported devices to achieve a better user experience and maximize performance. The video feed is supported on devices with at least 1980*1080. On other devices, the library starts in stills mode, even when video mode option is enabled. The MICR recognition on these devices is done only after the still picture was taken.

To avoid a long session on problematic checks, the maximum taken frame failure in video mode can also be configured with maxVideoFramesToCapture parameters. After X failures on a video frame, the Library switches to still mode.

The resources should also be imported to the library `res` folder.

Force still capture

There is an option to add exceptional devices that will capture in still even if they support video capture (some devices capture better in still and have issues in video capture). This will enforce the devices on the list to capture in still when videoFeedProcessing is set to TRUE.

To add exceptional devices, add an entry to exception_devices_name_stills_only in the arrays.xml file.

To add a device to the exception list, create the structure in the following format:

Build.MANUFACTURER + <space> + Build.MODEL device brand, space, device model

For example: <item>Samsung SM-G900V</item>

Capture messages and errors

To capture messages from the library, the calling app activity should register with CameraController.registerListener(this) and implement the TISmobiFLOWMessages interface.

You must import com.topimagesystems.controllers.imageanalyze.CameraController.TISmobiFLOWMessages.

Three public methods are generated automatically after implementing the listener.

Session events

Session events like OCRResult, CaptureBack, and MultiCapture can be received by using the following method:

```
public void onmobiFLOWGeneralMessageReceived (TISFlowOutputMessages message, Object[]
 extraData, Context context)
```

Possible values for TISFlowGeneralMessages:

Value	Description
CAPTURE_BACK	Fires when the front capture ends before continuing to capture the back side, when both front and back are captured in the same session.
MULTI_CAPTURE	In video mode only, fires after every image capture in a multi-capture session.
CHECK_OCR_RESULT	In video mode only, fires when the document type is Check and OCRType is E13B or CMC7 after recognition is done.
PAN_CARD_OCR_RESULT	In video mode only, fires when the document type is Card and OCRType is PAN after recognition is done.
PASSPORT_OCR_RESULT	In video mode only, fires when the document type is Passport and OCRType is MRZ after recognition is done.
ID_CARD_OCR_RESULT	In video mode only, fires when the document type is Card and OCRType is MRZ after recognition is done.

Value	Description
BACK_PRESSED	Fires when the Back button was pressed. This event must return a value when fired. It can use either CONTINUE_CURRENT_SESSION to cancel the back default behavior, or CONTINUE_MOBI_FLOW to apply the default back press action.
CREDIT_CARD_OCR_RESULT	In video mode only, fires when the document type is Card and OCRType is CREDIT after recognition is done.
extraData	This object contains the OCR results that are returned from mobiFlow and described above.

Validate the OCR result

When one of the OCR result messages is fired, you can validate the OCR results here. See Handle session continuation for information on how to confirm or reject the OCR result.

Error messages

Error messages from the Library can be received by using the following method:

```
public void onmobiFLOWErrorMessageReceived (TISFlowErrorMessage error, Object[]
 extraData, Context context)
```

TISFlowErrorMessage available errors codes are:

```
enum TISFlowErrorCode {
ERROR_GENERAL_FAIL (R.string.TISErrorImageGeneral),
ERROR_OCR_READING (R.strings.TISFlowErrorReadingOCRMessage),
ERROR_NO_VALID_BOUNDING_BOX (R.string.TISFlowErrorNoValidBoundingBox),
ERROR_IQA_CORNER_DATA (R.string.TISFlowErrorIQACornerData),
ERROR_IQA_EDGE_DATA (R.string.TISFlowErrorIQAEdgeData),
ERROR_IQA_SKEW (R.string. TISFlowErrorIQASkew),
ERROR_IQA_DARKNESS (R.string.TISFlowErrorIQADarkness),
ERROR_IQA_NUM_SPOTS (R.string.TISFlowErrorIQANumSpots),
ERROR_IQA_HORIZONTAL_STREAK(R.string.TISFlowErrorHorizontalStreaks),
ERROR_IQA_CARBON_STRIP(R.string.TISFlowErrorCarbonStrip),
ERROR_IQA_PIGGY_BACK(R.string. TISFlowErrorPiggyBack),
ERROR_IQA_IMAGE_DIMENTIONS(R.string. TISFlowErrorMinImageDimensions),
ERROR_BLUR_DETECTED (R.string.TISErrorBlurFail),
ERROR_MICR_LENGHT (R.strings.TISFlowErrorReadingMessage),
ERROR_MICR_INTERUPPTED (R.strings.TISFlowMicrInterrupted),
ERROR_MICR_ON_BACK (R.strings.TISFlowWarningMICRDetectedOnCheckBack),
UNSUPPORTED_CAMERA,
UNSUPPORTED_AUTO_FOCUS,
UNSUPPORTED_CPU
}
```

The order in which the validations run is different when using stills mode and video mode, and so are the messages that are used. The following table shows the order of validations and their application per document type and capture mode.

Validation description	Validation error code (enum)	Error message name	Display message on video feed processing	Message on stills
Image Contrast	TISFlowErrorImageContrast	TISFlowErrorImageContrast	NO*	YES
Blur Detection**	TISFlowErrorBlurDetected	TISErrorBlurFail	NO*	YES
Look For Document Rectangle	TISFlowErrorNoValid BoundingBox	TISFlowErrorNoValid BoundingBox	NO*	YES
User is capturing the front side instead the of back side of the check***	TISFlowWarningMICR DetectedOnCheckBack	TISFlowWarningMICR DetectedOnCheckBack	YES	YES
OCR Validation	TISFlowErrorOCRReading Check	TISFlowErrorReading Message	YES	YES
MICR Length Validation***	TISFlowErrorMICRLength	TISFlowDigitalRowNotIn Scope	YES	YES
MICR Line Interruption By Signature.CMC7 Only***	TISFlowWarningMicr Interrupted	TISFlowWarningMicr Interrupted	YES	YES
IQA Folded Corner***	TISFlowErrorIQACornerDat a	TISFlowErrorIQACornerData	YES	YES
IQA Folded Edge***	TISFlowErrorIQAEdgeData	TISFlowErrorIQAEdgeData	YES	YES
IQA Skew***	TISFlowErrorIQASkew	TISFlowErrorIQASkew	YES	YES
IQA Darkness***	TISFlowErrorIQADarkness	TISFlowErrorIQADarkness	YES	YES
IQA Number of Spots***	TISFlowErrorIQANumSpots	TISFlowErrorIQANumSpots	YES	YES
IQA Horizontal Streaks***	TISFlowErrorHorizontal Streaks	TISFlowErrorHorizontal Streaks	YES	YES
IQA Carbon Strip***	TISFlowErrorCarbonStrip	TISFlowErrorCarbonStrip	YES	YES
IQA Piggy Back***	TISFlowErrorPiggyback Found	TISFlowErrorPiggyback	YES	YES

* When no message is thrown, mobiFlow proceeds to process the next frame.

** Enabled on documents without OCR.

*** Checks only.

Note IQA validations are performed only for Checks and black and white images.

UI events

The following function is fired when any of the UI changes happen in the following table:

```
public void on MobiFlowUIEventMessageReceived(TISFlowUIMessages message,ViewGroup
 cameraOverlayView)
```

You can use cameraOverlayView.findViewById, to inflate your additional UI element and add functionality to it.

The message parameter indicates which UI event is currently occurring in the camera controller.

TISFlowUIMessages optional values are detailed in the following table:

Value	Description
BACK_PRESSED	Fires when the back button is pressed.
BEFORE_PROCESSING	Fires before the processing view animation starts.
AFTER_PROCESSING	Fires before the processing view animation finishes (library finished processing).
INIT_LAYOUT	Fires when the screen is refreshed.
HINT_CHANGED	Fires when the capture hint is changed.
INSTRUCTION_CHANGED	Fires when the capture instruction is changed.

Accessibility

Using HINT_CHANGED and INSTRUCTION_CHANGED messages, you can control the accessibility of the controls and change them at runtime. See the "Sample code" in the Handle session continuation.

Handle session continuation

This section is relevant only for general and error message handling. It explains how to instruct mobiFlow to continue the session after a message is handled.

The calling app can decide at every step how mobiFlow will proceed with the enum TISFlowInputMessages.

Note You must return a message to mobiFlow, so if you do not have any specific request, use the default: CONTINUE_MOBI_FLOW.

First, get the listener by using the following:

```
returnMessage = CameraController.getManagerListener();
```

TISFlowInputMessages possible outgoing values are the following:

Value	Description
CONTINUE_MOBI_FLOW	Indicates to mobiFlow to continue the normal flow. mobiFlow alerts will be displayed. `returnMessage.onMessageReturn (TISFlowActionCallback.CONTINUE_MOBI_FLOW);`
CONTINUE_MOBI_FLOW_CUSTOM_UI	Indicates to mobiFlow to continue the normal flow, but without mobiFlow alerts. The calling app will get the screen context and add UI elements to the camera overlay to be displayed, instead of showing the mobiFlow default alerts.

Value	Description
OCR_RESULT_FAILED	Indicates to mobiFlow that OCR validation has failed. mobiFlow will try to run OCR on the next frame.
OCR_RESULT_OK	Indicates to mobiFlow that OCR is OK and it can proceed with the flow to process the image.
CONTINUE_CURRENT_SESSION	Relevant for the BACK_PRESSED event only. It will not close the camera activity on BACK_PRESSED. The calling application can perform some custom actions here.
CANCEL_SESSION	Indicates to mobiFlow to stop the current session. To fetch the image if it was successfully processed, you will be able to do so on onActivityResult in the case RESULT_CLOSE_SESSION. In code: `returnMessage.onMessageReturn (TISFlowActionCallback.CANCEL_SESSION);`

Sample code

```
@Override
public void onmobiFLOWGeneralMessageReceived (TISFlowGeneralMessages message, Object[]
 extraData, Context
context) {
// get messages from the library.
returnMessage = CameraController.getManagerListener();
switch (message) {
case CAPTURE_BACK:
if (errorMessageReceived) { // if got error on front image don't
// proceed to capture back, close
// session with image result.
returnMessage.onMessageReturn(TISFlowInputMessages.CONTINUE_MOBI_FLOW);
} else {
returnMessage.onMessageReturn(TISFlowInputMessages.CONTINUE_MOBI_FLOW);
}
break;

case BACK_PRESSED:
returnMessage.onMessageReturn(TISFlowInputMessages.CONTINUE_MOBI_FLOW);
break;

case PAN_CARD_OCR_RESULT:
String[] ocrData = (String[]) extraData;
boolean panValidation = OcrValidationUtils.validationPanCard((String) extraData[1]);
if (panValidation) {
returnMessage.onMessageReturn(TISFlowInputMessages.OCR_RESULT_OK);
} else {
returnMessage.onMessageReturn(TISFlowInputMessages.OCR_RESULT_FAILED);
}
break;

case ID_CARD_OCR_RESULT:
returnMessage.onMessageReturn(TISFlowInputMessages.OCR_RESULT_OK);
break;
case CHECK_OCR_RESULT:
String[] ocrCheckData = (String[]) extraData;
returnMessage.onMessageReturn(TISFlowInputMessages.OCR_RESULT_OK);
break;

case PASSPORT_OCR_RESULT:
```

```
boolean passportValidation = OcrValidationUtils.validatePassport((String) extraData[0],
Integer.valueOf((String) (extraData[1])));
// get passport result as key value hash map
HashMap<String, String> passportResultParsed = (HashMap<String, String>) extraData[4];
if (passportValidation) {
returnMessage.onMessageReturn(TISFlowInputMessages.OCR_RESULT_OK);
} else {
returnMessage.onMessageReturn(TISFlowInputMessages.OCR_RESULT_FAILED);
}
break;

case MULTI_CAPTURE:
// get the image here!!! image data can be taken
if (extraData != null) {
// save multi capture images
if (isScanFrontOnly) {
saveMultiCaptureFrontSideImages((String) extraData[0]);
} else if (isScanBackOnly) {
saveMultiCapturBackSideImages((String) extraData[0]);
} else {
saveMultiCaptureFrontSideImages((String) extraData[0]);
saveMultiCapturBackSideImages((String) extraData[1]);
}
}
saveDataForMulticapture((String[]) extraData);
returnMessage.onMessageReturn(TISFlowInputMessages.CONTINUE_MOBI_FLOW);
break;

default: // must use default value here!
returnMessage.onMessageReturn(TISFlowInputMessages.CONTINUE_MOBI_FLOW);
break;
}
}

@Override
public void onmobiFLOWErrorMessageReceived (TISFlowErrorMessage error, Object[]
 extraData, Context context) {
// get Error messages from the library.
returnMessage = CameraController.getManagerListener();
switch (error) {
case ERROR_OCR_READING:
returnMessage.onMessageReturn(TISFlowInputMessages.CONTINUE_MOBI_FLOW);
errorMessageReceived = true;
break;
case ERROR_IMAGE_CONTRAST:
returnMessage.onMessageReturn(TISFlowInputMessages.CONTINUE_MOBI_FLOW);
errorMessageReceived = true;
break;
case ERROR_MICR_LENGHT:
returnMessage.onMessageReturn(TISFlowInputMessages.CONTINUE_MOBI_FLOW);
errorMessageReceived = true;
break;
case ERROR_NO_VALID_BOUNDING_BOX:
returnMessage.onMessageReturn(TISFlowInputMessages.CONTINUE_MOBI_FLOW);
break;
case ERROR_BLUR_DETECTED:
returnMessage.onMessageReturn(TISFlowInputMessages.CONTINUE_MOBI_FLOW);
break;
case ERROR_IQA_DARKNESS:
returnMessage.onMessageReturn(TISFlowInputMessages.CONTINUE_MOBI_FLOW);
break;
case ERROR_IQA_CORNER_DATA:
returnMessage.onMessageReturn(TISFlowInputMessages.CONTINUE_MOBI_FLOW);
break;
```

```
case ERROR_IQA_EDGE_DATA:
returnMessage.onMessageReturn(TISFlowInputMessages.CONTINUE_MOBI_FLOW);
break;
case ERROR_IQA_SKEW:
returnMessage.onMessageReturn(TISFlowInputMessages.CONTINUE_MOBI_FLOW);
break;
case ERROR_IQA_NUM_SPOTS:
returnMessage.onMessageReturn(TISFlowInputMessages.CONTINUE_MOBI_FLOW);
break;
case ERROR_MICR_INTERUPPTED:
returnMessage.onMessageReturn(TISFlowInputMessages.CONTINUE_MOBI_FLOW);
break;
case ERROR_MICR_ON_BACK:
returnMessage.onMessageReturn(TISFlowInputMessages.CONTINUE_MOBI_FLOW);
break;
case UNSUPPORTED_CAMERA:
returnMessage.onMessageReturn(TISFlowInputMessages.CONTINUE_MOBI_FLOW);
break;
case UNSPORTTED_CPU:
returnMessage.onMessageReturn(TISFlowInputMessages.CONTINUE_MOBI_FLOW);
break;
default:
returnMessage.onMessageReturn(TISFlowInputMessages.CONTINUE_MOBI_FLOW);
break;
}
return;
}

// For accessibility support
private TextView hintTextView;
private TextView instructionTextView;

@Override
public void onmobiFLOWUIEventMessageReceived (TISFlowUIMessages message, ViewGroup
 cameraOverlayView) {
// get UI messages from the library.
returnMessage = CameraController.getManagerListener();
switch (message) {
case INIT_LAYOUT:
if (AccessibilityUtils.isAccessibilityEnabled(this)) {
if (isDynamicCapture)
hintTextView = (TextView) cameraOverlayView.findViewById(R.id.DynamicTxtIndicator);
else if (isCustomView) {
hintTextView = (TextView) cameraOverlayView.findViewById(R.id.customTxtIndicator);
instructionTextView = (TextView)
cameraOverlayView.findViewById(R.id.customTxtCapture);
} else {
hintTextView = (TextView) cameraOverlayView.findViewById(R.id.txtIndicator);
instructionTextView = (TextView) cameraOverlayView.findViewById(R.id.txtCapture);
}
}
break;
case AFTER_PROCESSING:
break;
case BEFORE_PROCESSING:
break;
case HINT_CHANGED:
if (AccessibilityUtils.isAccessibilityEnabled(this)) {
if (hintTextView != null) {
String hintText = hintTextView.getText().toString();
if (hintText.equalsIgnoreCase(getResources().getString(R.string.
 TISFlowIndicatorAlignFlat))
hintTextView.setContentDescription(getResources().
 getString(R.string.TISFlowIndicatorAlignFlatDescription));
```

```
}
}
break;
case `:
if (AccessibilityUtils.isAccessibilityEnabled(this)) {
if (instructionTextView != null)
instructionTextView.setContentDescription("instruction: " +
 instructionTextView.getText());
}
break;
default:
break;
}
}
```

See the more detailed sample code in the Showcase app in the ShowCaseActivity.

Handle session results

After CaptureIntent has finished and onActivityResult() function is called, the object that is transferred back to the original calling function is SessionResultParams (see example later on this section).

CaptureIntent.MOBI_FLOW_REQUEST_CODE: This Request code contains RESULT_OK and RESULT_CANCELLED.

Get the images from the library

By default, the images are not saved to the device (to do so, call saveImagesToDevice();).

All the images are stored in the device memory and can be retrieved from the following:

- SessionResultParams.tiffFront;
- SessionResultParams.jpegBWFront;
- SessionResultParams.grayscaleFront;
- SessionResultParams.colorFront;
- SessionResultParams.originalFront;
- SessionResultParams.tiffBack;
- SessionResultParams.jpegBWBack;
- SessionResultParams.grayscaleBack;
- SessionResultParams.colorBack;
- SessionResultParams.originalBack;

The example (later in the section) demonstrates how to retrieve the result from the library. It uses the optional saveImageToDevice function which is given as well in the showcase.

For Checks, when using split capture for front and back, or for other document types, if you want to scale the back side the same as the front side, use this function to retrieve it and to set the frontImageSize for the back side capture.

Method	Description
getFrontImageRectArray()	The array contains the height and width of the front image that was captured.

For document type Card only with OCR PAN

To get Card OCR results as an array, call the following method OcrValidationUtils.parsePanCardResult(currentSessionResult.getOcrParams()[1]);

Method	Description
parsePanCardResult	An array with the card's results. The array size changes dynamically according to the number of results found, while the order of the results are by the x,y location of each field, from top to bottom and left to right.

For document type Card only with OCR MRZ

To get the Card OCR result as a HashMap, call the following method:

OcrValidationUtils.parseIDCardResult(ocrResult.ocrResultWithDelimiter);

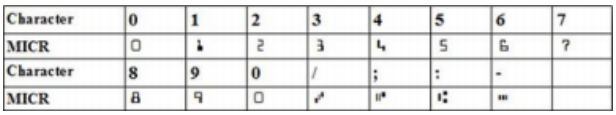
```
String[] ocrData = currentSessionResult.getOcrParams();
OCRResult ocrResult = new OCRResult(ocrData);
HashMap<String,String> parsedData =
OcrValidationUtils.parseIDCardResult(ocrResult.ocrResultWithDelimiter);
```

Method	Description
parseIDCardResult	Returns a HashMap with the card's results, with the following keys: • kTISCard_Type • kTISCard_IssuingCountry • kTISCard_DocumentNumber • kTISCard_DateOfBirth • kTISCard_Sex • kTISCard_ExpirationDate • kTISCard_Nationality • kTISCard_Surname • kTISCard_FirstName • kTISCard_MiddleName

For document type Check only

Available methods:

Methods	Description
getOcrParams(String[])	Session OCR result.
getOcrParams(SessionResultParams. DIGITAL_ROW_LENGTH)	The MICR length.
getOcrParams (SessionResultParams. OCR_RESULT_WITH_DELIMETER)	The MICR result formatted in mobiFlow format (special characters represented by a dash).

Methods	Description
getOcrParams(SessionResultParams. OCR_RAW_RESULT)	The result of every character in the MICR is represented by a number, separated by commas. 0,1,2,3,4,5,6,7,8,9,10,12,11,13 The numbers represent the MICR in the order given in the following table: 
getOcrParams(SessionResultParams.SCORE_RESULT)	The score for each one of the recognized characters separated by commas, respective to the rawResult.

Character	0	1	2	3	4	5	6	7
MICR	0	1	2	3	4	5	6	7
Character	8	9	0	/	;	:	-	
MICR	8	9	0	/	;	:	-	

For document type Check only, with CMC7 MICR

Parameter	Description
signatureOverMicrDetected	Will be available if showErrorSignatureOverCMC7 was set to FALSE. If it returns TRUE, the SDK found a signature over the MICR line.

For document type Live_OCR

Method	Description
getLiveOcrResults()	Returns the live OCR fields

Sample code:

```
protected void onActivityResult(int requestCode, int resultCode, Intent data) {

        if (requestCode == CaptureIntent.MOBI_FLOW_REQUEST_CODE) {
            Log.e("onActivityResult",String.valueOf(resultCode));
            switch (resultCode) {
                case RESULT_OK:
                    // parse session image result.

                   SessionResultParams mCurrentSessionResult =
 CaptureIntent.parseActivityResult(requestCode, resultCode, data);
                    if (mCurrentSessionResult == null)
                        break;
                    List<LiveOcrField> liveOcrResults =
 mCurrentSessionResult.getLiveOcrResults();
                     if (liveOcrResults != null) {
                         StringBuilder stringBuilder = new StringBuilder();
                         stringBuilder.append("Results:\n");
                           for (LiveOcrField field : liveOcrResults) {
                               stringBuilder.append(String.format("%s: %s\n",
 field.getTitle(), field.getDetectedSentence()));

                       }
          Toast.makeText(this, stringBuilder.toString(), Toast.LENGTH_LONG).show();
}



        }
```

```
        // must use this to unregister the listeners
        CameraController.unregisterListener();

        CameraSessionManager.clearCameraSessionManager();
        super.onActivityResult(requestCode, resultCode, data);

    }
```

When enabledStructuredOcrProcessing

Method	Description
getTisOcrTextRegions()	Returns the OCR regions extracted

TISOCRResult:

```
/**
 *  The text that Tesseract has recognized for this block.
 */
private String text;

/**
 *  The bounding box rectangle where this recognized block appears in the
 *  cropped image.
 */
private Rect boundingBox;
/**
 *  Tesseract's confidence in the accuracy of this recognition result. This
 *  number will be between 0.0 and 100.0.
 */
private float confidence;
```

Sample code:

```
 protected void onActivityResult(int requestCode, int resultCode, Intent data) {

        if (requestCode == CaptureIntent.MOBI_FLOW_REQUEST_CODE) {
            Log.e("onActivityResult",String.valueOf(resultCode));
            switch (resultCode) {
                case RESULT_OK:
                    // parse session image result.

SessionResultParams mCurrentSessionResult =
 CaptureIntent.parseActivityResult(requestCode, resultCode, data);
if (mCurrentSessionResult.getTisOcrTextRegions() != null) {

    List<TISOCRRegion> regions = mCurrentSessionResult.getTisOcrTextRegions();
    StringBuilder extraData = new StringBuilder("OCR Text Result:");

    for (TISOCRRegion region: regions) {
        extraData.append("\n");
        if (regions.size() > 1)
            extraData.append(String.format("Region %s :\n", (region.getInputROI() ==
 null) ? "" : region.getInputROI().toString()));
        List<TISOCRResult> textResults = region.getResults();
        if (textResults != null)
            for (TISOCRResult textResult : textResults)
 extraData.append(String.format("%s ", textResult.getText()));
    }

    showImages.putExtra(DISPLAY_EXTRA_SESSION_DATA, extraData.toString());
}

        }
```

```
        // must use this to unregister the listeners
        CameraController.unregisterListener();

        CameraSessionManager.clearCameraSessionManager();
        super.onActivityResult(requestCode, resultCode, data);

    }
```

Bar code configuration and bar code result

The SDK searches for the bar code for “x” frames (default 13). Only frames with a valid rectangle are calculated. If a bar code was not found for "x" frames, the SDK skips the bar code recognition and only captures the image.

The number of frames can be modified in the variable name max_barcode_tries in the integers.xml file.

The bar code result can be retrieved from the SessionResultParams object using the getBarcodeResult() function.

Method	Return
getBarcodeResult()	BarcodeResult object that holds the data of the bar code scanning.

The BarcodeResult holds the bar code scanning data, and has the following get methods:

Method	Return
isEmpty()	Boolean. TRUE if no bar code data was detected, otherwise FALSE.
getBarcodeTypeFront()	Int representing the bar code type on the front side of the document. If no bar code is detected on the front side, this method returns -1.
getBarcodeDataFront()	String. The parsed data from the bar code located on the front side of the document. If no bar code is detected on the front side, this method returns null.
getBarcodeTypeBack()	Int representing the bar code type on the back side of the document. If no bar code is detected on the back side, this method returns -1.
getBarcodeDataBack()	String. The parsed data from the bar code located on the back side of the document. If no bar code is detected on the back side, this method returns null.

Parse bar code data for Driver’s License for US/Canada

To parse the results from the Driver’s License bar code when bar code type PDF_417_CODE was detected, use the following method, which will return a dictionary:

```
OcrValidationUtils.DLBarcodeParser.parseDLBarcode (String barcodeData)
```

The dictionary contains the following keys:

- First Name
- Middle Name
- Last Name
- Name Suffix
- Address
- City
- State
- Postal Code
- ID Number
- Class
- Height
- Weight
- Eye Color
- Hair Color
- Expiration Date
- Date Of Birth
- Sex
- Issue Date
- Restriction Code
- Endorsement Code
- Limited Duration Document Indicator
- Document Number
- Country ID
- Inventor Control Number
- Card Revision Date
- Temp Visitor
- Address
- Address Additional info
- Duplicates
- Organ Donor
- Audit Information
- Ethnicity
- Compliance Type
- First Name Truncation
- Middle Name Truncation
- Last Name Truncation

- Federal Commercial Vehicle Code
- Customer Specific Control Number
- WA Specific Endorsements
- Transaction Types
- Under 18 Until
- Under 21 Until
- Revision Date
- Social Security Number

Exception handling

The Library will catch an exception that is thrown by the camera or any other runtime error.

The exception details will be sent to the calling app as a string to the onActivityResult method.

The result type name is CameraManagerController.RESULT_LIBRARY_ERROR.

To get the exception details as a string, use the following:

```
String errorMessage =
data.getStringExtra(CaptureIntent.mobiFLOW_ERROR_DETAILS;
```

Then the calling app can decide how to proceed with the error handling and beyond.

The following example code shows how to use the error handling.

```
protected void onActivityResult(int requestCode, int resultCode, Intent data) {
if (CameraManagerController.sessionType == SessionType.TEST) {
return;
}

if (requestCode == CaptureIntent.MOBI_FLOW_REQUEST_CODE) {
switch (resultCode) {
case RESULT_OK:
// parse sesion image result.
currentSessionResult = CaptureIntent.parseActivityResult(requestCode, resultCode,
 data);
if (currentSessionResult.getOcrParams() != null) {
String ocrResult = currentSessionResult.getOcrParams()[1];

// for passport you can get results hashMap with this helper method
//HashMap<String, String> passportResult =
OcrValidationUtils.parsePassportResult(ocrResult);

}
// get the front image size if needed for split capture.
if (currentSessionResult.getFrontImageRectArray() != null) {
inputFrontImageArray = currentSessionResult.getFrontImageRectArray();
}
// use this to get barcode results.
//currentSessionResult.getBarcodeResult();
// save multiple images on MultiCapture mode.
if (!isMultiCapture) {
// the images are received as byte[] on device memory,
// this is helper method to save the images to device file system. if needed
saveImagesToDevice();
}

break;
// user pressed on cancel button
case RESULT_CANCELED:
break;
```

```
// user pressed cancel from Alert
case CameraManagerController.RESULT_CANCELED_FROM_ALERT
break;
// get result after session has been closed.
case CameraManagerController.RESULT_CLOSE_SESSION:
// will reach here after
currentSessionResult = CaptureIntent.parseActivityResult(requestCode, resultCode,
 data);
// decode images, Tiff and jpg

if (currentSessionResult.getFrontImageRectArray() != null) {
inputFrontImageArray = currentSessionResult.getFrontImageRectArray();
}
saveImagesToDevice();
break;
// handles camera permissions access denied
case CameraManagerController.RESULT_CAMERA_PERMISSION_ACSSES_DENIED:
// on api 23 target apps, mobiFLOW checking for camera permission
// if not approved will reach here.
String permissionErrorMessage =
data.getStringExtra(CaptureIntent.mobiFLOW_ERROR_DETAILS);
if (permissionErrorMessage != null)
Log.e("error", permissionErrorMessage);
break;

// will get here if error or exception was thrown from the library.
case CameraManagerController.RESULT_LIBRARY_ERROR:
//the exception or error will be received here.
String errorMessage = data.getStringExtra(CaptureIntent.mobiFLOW_ERROR_DETAILS);
if (errorMessage != null)
Log.e("error", errorMessage);
// do something with the error
// got unexpected Error from the Library or exception
break;

// invalid License result code
case CameraManagerController.RESULT_LICENSE_INVALID:
String licenseErrorMessage =
data.getStringExtra(CaptureIntent.mobiFLOW_ERROR_DETAILS);
if (licenseErrorMessage != null)
Log.e("error", licenseErrorMessage);
break;
}
// helper method if needed to remove the images byte array
FileUtils.clearMemory();
}
// must use this to unregister the listeners
CameraController.unregisterListener();
}
```

Library flow

Most users will not need to change the camera session capture flow section, and using of the Library will be sufficient.

Note If you need to change a drawable or string resource, you can add a different resource with an identical name to your project and it will override the one used by the Library. Do this with caution.

To change the camera overlay, refer to the CameraOverlayLayout class and mbck_camera_layout.xml. All the visual overlay elements are available there.

Clear temporary files

The Library does not save the images on the device by default. If you wish to do so, you can use the code supplied above in the function saveImagesToDevice();

When using the saveImagesToDevice(); function as described, you can use the method FileUtils.clearHighResImages(this); to delete the images. If you did not use saveImagesToDevice(); but saved the images to a different path, the method FileUtils.clearHighResImages(this); will not erase your image files.

Note All the above mentioned is implemented in the sample SDK app as an example.

Security recommendations

The mobile calling application has the responsibility to protect the data returned by the SDK in the downstream flow until the mobile application is closed. The mobile calling application implementing the mobiFlow SDK should adhere to security best practices in order to protect any sensitive data and customer information.

Some of the considerations while implementing and configuring the SDK are the following:

- The mobile calling application is responsible for ensuring that any sensitive data received from the SDK process follows existing processes for safeguarding the data. It is assumed that whatever processes are used for manually entered data would be applied to data extracted from the SDK process.
- On closing the SDK, images and/or data are erased from memory. It is the responsibility of the mobile calling application to ensure that the SDK is closed and objects are released upon completion of the SDK process.
- When debugMode is set to TRUE, images captured by the SDK are stored on the device (as well as the logs). It is strongly recommended that IsDebug always be set to FALSE in the release mode of the application build (Production code), as the images and application data should not be physically stored outside the context of the mobile application. The images and data should only exist in the temporary memory of the mobile application and should not be accessible outside the application context.
- For on-device OCR of Checks (for account funding use cases), it is not recommended to return the check image to the user. Only the extracted data should be returned. To do this, set the output settings to **FALSE**:
  - outputGrayscaleImage = FALSE
  - outputOriginalImage = FALSE
  - outputColorImage = FALSE
  - outputBinarizedImage = FALSE
- The Android SDK documentation provides additional code samples (saveImagesToDevice()) to save the images on the device after retrieving them from the SDK. Similar code may also be implemented for iOS as well. It is not recommended to save any images/data available from the SDK to the device of the

application build, especially in the release mode of the application (Production code). This code should only be used for testing and troubleshooting issues in the development cycle.

Chapter 3

Set up a custom capture user interface

This chapter explains how to customize the capture user interface.

Change the look and feel

You can customize user interface by overriding corresponding resources in the library. Any resource residing in the `res\` folder structure can be overridden by the user application.

Following are few examples that can be overridden:

- Values (residing in `values\`): string values, styles, dimensions, colors.
- Layouts (residing in `layout\`): Primary layout files that are displayed by the library intents are:

Layout file name	Description
mbck_camera_layout.xml	Layout of the preview screen as shown to the end user. This layout also includes a processing screen named **processingOverlay**.

- Visual resources (residing in `drawable-...\`): PNG files containing images displayed to the user.

Note The components referred to programmatically in the layout XMLs should exist in your customized version of the XML file, otherwise run-time errors are generated.

The procedure is essentially the same for all types of resources.

1. Select files you want to customize from the `res\` folder of the library and paste them into the respective `res\` directories in your project. For value resources, only copy the corresponding lines. The name of the resource should remain the same.
2. Modify the resource.

After compilation, resources from your project will override the respective resources from the library.

Using this method, you can modify all visual aspects of the application. It is not possible to generate additional screen functionality, your modified resource may use only the component callbacks available on the original screen.

There is an alternative view with all elements, where each custom element starts with a custom prefix. See Additional functionality in Custom view for more information.

Change icons and captions

You can keep some controls from the preview screen and change the image files and captions of what is shown on the capture screen. To do this, change the following files in the res directory:

File name	Description
logo_watermark.png	The logo of the company
btn_torch.png	The flash icon when not selected
btn_torch_selected.png	The flash icon when selected

You can also change the following icons of the indicators and the frame:

File name	Description
ic_boundary_bottom.png	The bottom boundary of the frame when the check is not found.
ic_boundary_top.png	The top boundary of the frame when the check is not found.
ic_boundary_bottom_v.png	The bottom boundary of the frame when the check is found.
ic_boundary_top_v.png	The top boundary of the frame when the check is found.
ic_boundary_bottom_rl.png	The bottom-left boundary of the frame when the check is not found.
ic_boundary_top_rt.png	The top-right boundary of the frame when the check is not found.
ic_boundary_bottom_v_rl.png	The bottom-left boundary of the frame when the check is found.
ic_boundary_top_v_rt.png	The top-right boundary of the frame when the check is found.
btn_general.9.png	The Cancel button background when not selected.
btn_general_selected.9.png	The Cancel button background when selected.

Important Do not change any other images or files in this folder.

The default messages of the label on top of the camera overlay are TISFlowFrontCaption for front and TISFlowBackCaption for back.

To change these captions at runtime, you must change the messages dynamically in the dynamicStrings hash map keys mentioned above and set new values.

The relevant messages to change are as given below.

String name	Description
TISFlowPleaseCaptureCheckFront TISFlowPleaseCaptureImage	The label caption at the top of the capture screen when capturing the front side of the check or other document.

String name	Description
TISFlowPleaseCaptureCheck TISFlowPleaseCaptureImageBack	The label caption at the top of the capture screen when capturing the back side of the check or other document. With combined front and back capture, this message is displayed after successful capture of the front.
TISSuccessfulReadingTitle	With combined front and back capture, the title of the message that is displayed after successful capture of the front.
TISFlowPleaseCaptureTheBarcode	The label caption at the top of the capture screen when capturing a bar code.

Change the text indicators

You can also change the text style and background in the XML - mbck_camera_layout.xml.

- @+id/txtIndicator: Indicators dynamic and static. TextView when not in capture mode.
- @+id/txtHoldIndicator: Capture mode TextView.

In the localization files, change the relevant string.

String name	Description
TISFlowIndicatorAlign	Indicator to hold the device flat over the check.
TISFlowIndicatorDown	Indicator to move the device towards the bottom of the check.
TISFlowIndicatorLeft	Indicator to move the device left.
TISFlowIndicatorRight	Indicator to move the device right.
TISFlowIndicatorTop	Indicator to move the device towards the top of the check.
TISFlowIndicatorRotateLeft	Indicator to rotate the device left (check is at an angle).
TISFlowIndicatorRotateRight	Indicator to rotate the device right (check is at an angle).
TISFlowIndicatorZoomIn	Indicator to move closer to the check (check is too far from the frame).
TISFlowIindicatorZoomOut	Indicator to move away from the check (check is exceeding the frame).
TISFlowIndicatorLight	Indicator to turn on the flash (there is not enough light).
TISFlowIndicatorHold	Indicator to hold the camera when the check is found, before the picture is taken.
TISFlowScanBarcode	Indicator to move the device towards the bar code.
TISFlowPleaseCaptureCreditCard TISFlowIndicatorScanCreditCard	Indicator to align with the credit card boundaries.
TISFlowInvalidRotation	Indicator that phone and document do not have the same orientation.

Change countdown image view

In mbck_camera_layout.xml, change the custom view that inherits from ImageView. You can modify android:id="@+id/counter".

You can change the colors and style in the colors.xml file.

String name	Description
counter_background	Use to change the circle background color.
camera_counter_color	Use to change the text color.
counter_border_color	Use to change the circle border color. Can get color as a resource (not with #some color).
countDownStartValue	Use to set the number from which the countdown starts when the counter for taking a still image is displayed. Default value: 2.
countDownStopValue	Use to set the number at which the countdown stops when the counter for taking a still image is displayed. The countDownStopValue must be lower than countDownStartValue. Default: 0.
counterTextSize	Use to change the counter size.
counterFont	Use to change the counter font with one of the following values: • BOLD_ITALIC • BOLD, ITALIC • NORMAL

DebugRectView

Optionally, you can allow the Library to draw the rectangle over the check on video processing. The rectangle is the frame that the algorithm finds over the check.

Use app:showCurrentRectangleFound = true in com.topimagesystems.ui.DebugRectView from the XML file.

Camera overlay color

You can change the color of the outside capture frame with the value camera_overlay_color located in color.xml file.

You can also change dynamic capture colors in the color.xml file.

String name	Description
validRectFillColor	Fill color for a valid rectangle frame
validRectStrokeColor	Stroke color for a valid rectangle frame

String name	Description
invalidRectFillColor	Fill color for an invalid rectangle frame
invalidRectStrokeColor	Stroke color for an invalid rectangle frame
grid_line_color	The grid color

Rectangle check frame

When the Library goes into capture mode, there is an option to draw a green rectangle over the check frame. You can set this in com.topimagesystems.ui.CheckBounderiesView with the value drawGreenRectangle="true".

Custom view

The custom view allows you to switch between the mobiFlow classic view and any other UI you wish.

The view contains two XML files: custom_mbck_camera_layout.xml and custom_mbck_camera_manager_layout.xml.

There are other elements that do not exist in the classic view.

- bannerTop – LinearLayout: Allows you to change the color of the top banner.
- bannerBottom - LinearLayout: Allows you to change the color of the bottom of the banner.

Guidelines popup

customStaticTxtIndicator: Static text indicator if further details required guideline, the text will disappear after the capture has started.

Additional functionality in Custom view

You can add UI elements with additional functionality to the custom camera layout (the layout XML file custom_mbck_camera_layout.xml, see Custom view). An element can be added directly to the XML with a unique ID.

The following code is an example of adding a button:

```
<Button
android:id="@+id/customExtraButton"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_alignParentTop="true"
android:layout_centerHorizontal="true"
android:text="extra button" />
```

For information on adding functionality to your new element, or any other UI elements, see UI events.

Info screen configuration

The default guidelines popup is displayed when the user has difficulties capturing the document after a certain time (customizable).

The popup animates from the top of the screen to the center, in landscape mode.

You can change the text in the integer.xml file.

String name	Description
info_screen_text	The text in the instructions screen

You can also change the animation speed, which is set to 600 milliseconds by default.

String name	Description
customLongAnimation	600

The whole view can be modified in the XML layout-land: info_screen.xml.

Start a new activity that is not part of the Library

Declare the activity name you want to launch in the strings.xml file. The class name should include the full path: package name + class name, as in the following example:

```
<string name=" TISCallingAppActivityName">com.topimagesystems.ui.InfoScreenActivity</
string>
```

The Library will load the activity from the string.xml entry at runtime. The trigger to open the activity is the onClick method from mbck_camera_layout.xml with the method startCallingAppActivity(android:onClick="startCallingAppActivity").

Note The activity class must be under the mobiFlow project.

Open a new package name `src` folder and add the activity class to run.

Leveler configuration

To draw the leveler on every sensor movement, you must disable android:hardwareAccelerated in the cameraController activity.

Copy the following manifest to your calling application:

```
<activity
android:name="com.topimagesystems.controllers.imageanalyze.CameraController"
android:configChanges="keyboardHidden|orientation|screenSize"
android:hardwareAccelerated="true" >
</activity>
```

Configure levelerUI

You can change the leveler parameters and location in the mbck_camera_layout.xml file.

In the XML file, you can configure the following three custom images:

Image	Description
com.topimagesystems.ui.OneUnitLeveler	One unit leveler inherited from ImageView.
com.topimagesystems.ui.TwoUnitsLeveler	Horizontal image and vertical image inherited from ImageView.
com.topimagesystems.ui.ScaleLeveler	Horizontal image and vertical image inherited from ImageView and contains scale units.

For TwoUnitsLeveler and ScaleLeveler images, you must specify their location and docking of in the XML file: left/right for portrait leveler and top/bottom for horizontal leveler.

To disable the leveler, add android:visibility="gone"; the leveler with then not be displayed on the screen.

OneUnitLeveler

The parameters are declared in the attr.xml file. You can change the height and the width, as for any Android ImageView, with layout_width and layout_height.

Leveler parameters

Parameter	Description	Applies to
isFadeOutEnable	True/false fading enable/disable	All leveler types
isDraggingEnable	True/false dragging enable/disable	All leveler types
levelerThickness	Leveler border width (stroke width)	OneUnitLeveler
userColorsInScale	Boolean Customize scale leveler and set its colors – can be set to multi colors if set to true or single color if set to false.	ScaleLeveler
scaleUnitGap	The distance between the leveler's units. The number of units is dynamically calculated accordingly.	ScaleLeveler

TwoUnitsLeveler and Scale Leveler

The leveler height and width are set relative to the capturing frame size (inside red/green boundaries) and determined at run time with the calculation of the screen resolution and the document captured. For this reason, the layout_width and layout_height will only set the container size, not the image size.

```
levelerLocation: set the leveler location can receive:top,bottom,left,right
levelerLocation="left"
   android:layout_width="100dp"
   android:layout_height="wrap_content"
levelerLocation="top"
```

```
   android:layout_width="wrap_content"
   android:layout_height="100dp"
levelerLocation="right"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
levelerLocation="bottom"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
```

To change the size of the leveler, do the following:

- paddingLeftAndRight: For a vertical image, start "x" dp right/left to the frame size (makes the leveler smaller).
- paddingTopAndBottom: For a horizontal image start "x" dp from the bottom/top of the screen (makes the leveler smaller).

Captions and messages

Localization files (strings.xml) are available in the resources. You can change the captions and messages used in the Library during the process. By default, English is provided, but you can support different languages in your application if required.

The relevant messages are as follows.

Message Name	Description
TISFlowPleaseCaptureCheckFront	Caption displayed when capturing the front face of the image/check.
TISFlowPleaseCaptureCheckBack	Caption displayed when capturing the back side of the image/check.
TISFlowCancel	The Cancel button shows in the error messages.
TISFlowOK	The OK button shows in the error messages.
TISFlowPleaseCaptureBarcode	Instruction for the user to capture the bar code in Static capture, when bar code capture is enabled.
TISFlowDigitalRowNotInScope (Checks only)	Message when the digital row is not within the length in the settings.
TISFlowCancelCaptureBotton	The Cancel button caption shows on the capture screen.
TISFlowPreparingForServerLocating Boundaries	Instruction message displayed for notification OCRNotificationStatusLocatingBounderies.
TISFlowPreparingForServerBinarizing	Instruction message displayed for notification OCRNotificationStatusImageBinarazing.
TISFlowPreparingForServerCropping	Instruction message displayed for notification OCRNotificationStatusImageCropping.
TISFlowErrorReading	Title for all error messages.
TISFlowErrorReadingCheck	Message when mobiFlow failed to read the digital row, recapture of the front is necessary.
TISFlowErrorReadingImageContrast	Message when there are contrast issues in detecting colors for the digital row reading.

Message Name	Description
TISFlowErrorReadingImageGeneral TISFlowErrorReadingCheckGeneral	General message about failure to validate the image; issued if a more specific message does not apply.
TISFlowErrorNoValidBoundingBox	Message when the rectangle of the image was not detected by the Library. Message when the bounding box of the image was not detected by the Library.
TISFlowErrorIQACornerData	Message when one of the corners of the check is missing and over the accepted threshold.
TISFlowErrorIQAEdgeData	Message when one of the edges of the check is missing and over the accepted threshold.
TISFlowErrorIQASkew	Message when the check is skewed over the accepted threshold.
TISFlowErrorIQADarkness	Message when the image is too dark over the accepted threshold.
TISFlowErrorIQANumSpots	Message when the image has too much noise and the number of spots per square inch exceeds the accepted threshold.
TISFlowErrorFileTooSmall	Message when the file generated by the Library is too small, below the minimum accepted threshold.
TISFlowErrorMinImageDimensions	Message when the image is not within the dimensions or aspect ratio that is expected.
TISFlowErrorUnknown	Message about IQA validation failure, issued if a more specific message does not apply.
TISErrorBlurFail	Message when the image is detected as blurry.
TISFlowWarningMICRDetectedOnCheckBack (Checks only)	Message when the MICR was detected while the user tried to capture the back of the check (meaning they were capturing the front of the check instead of the back).
TISFlowWarningMicrInterrupted (Checks only)	Message when the recognition of the MICR detects that there is something interrupting the MICR recognition, such as stains or the signature.
TISFlowMultiCaptureTitle	Title of the message for multi-capture.
TISMultiCaptureShouldContinueCapture	Message to check whether the user wants to capture another document.
TISFlowFinish	The caption on the button to finish multi-capture.
TISFlowCapture	The caption on the button to continue and capture another document.
TISFlowCancel	The caption of the Cancel button on alerts.

Chapter 4

Reporting issues

To report issues to Kofax, you must reproduce the issue on the mobiFlow Showcase app, setting the debug mode ON.

When the debug mode is ON, images and logs are saved on the device for debugging purposes. These images and logs can be sent to the Kofax Support Team to enable them to investigate any issues or bugs that you may encounter. In debug mode, every image that is captured is saved, even if you receive an error message after the capture.

To access these images and logs, you need a program on your computer that can explore the file system of your device when it is connected to the computer via USB. An example of such an app is iFunbox, which can be downloaded from the Internet for free.

To access these images and logs, you need an app on the device that can explore the file system. An example of such an app is ES File Explorer, which can be downloaded from the Google Play Store.

The images are saved on the device under the relevant user application (if using the Showcase app, this will be TISShowcase) in a folder named DEBUG under the Documents folder.

```
<user application>/TISShowcase/Documents/DEBUG
```

The images are saved on the device under the root folder in a folder named .mobiflow (`<root>/.mobiflow`) and the log file is saved in a folder named .debugmobiflow (`<root>/.debugmobiflow/log.txt`). These two folders are hidden, so you will need to go on the app you are using to browse the file system and enable viewing of hidden folders.

As there is only one log file, it grows with every capture. Therefore it is important to delete it before logging something that you want to report. Make sure the log contains only the data from the relevant capture you had issues with.

For every capture, all five images for the front and five for the back are saved, depending on which images you decided to output (see Handle the session results).

When reporting an issue, please send the following to Kofax:

- The log file containing only the issue you are reporting.
- All relevant images regarding the issue.
- A detailed description of the issue and step-by-step instructions on how to reproduce.
- Information about the device or devices and the operating system of the device relevant to the issue.
- Information about the Showcase or SDK version relevant to the issue.
- The configuration of all the parameters in the Showcase or SDK where the issue occurs.

If the issue is related to difficulties in capture, and you were not able to capture the document, you can take a picture of the document with your native camera app on the device and send it to the Support Team

instead. It would also be very helpful if you can scan the document on a proper scanner and send a copy that the Support Team can print and test themselves.

Chapter 5

Guidelines for successful capture

To ensure successful and optimal capture from the mobiFlow library, you should include the following guidelines in your application’s instructions, which should be followed before the user starts the capture process. These guidelines are not mandatory, and a document can still be captured even if the guidelines are not followed, but following them will ensure optimal capture and the best result.

Contrast

The document should be positioned on a background with a different color. Strong visual contrast near the document’s boundaries is particularly advised. For documents with multiple colors around the boundaries, the document background should be a different color from any color on the document’s boundaries.

Background homogeneity

The background should be clean and homogenous. In particular, strong lines on the background that do not belong to the document should be avoided. It is best to have the surface around the document clear of any objects about 6” (15 cm) from each side of the document.

Lighting

Strong direct sunlight or artificial lighting on the document is not recommended. In particular, having strong light on one part of the document and shade over another part should be avoided at all times. Such a situation can result in an unusable black and white image of the part that is not in the shade.

Shooting and rotation angles

The phone's camera should be positioned as flat as possible relative to the document's surface. Moreover, the in-plane rotation of the camera should be similar to that of the document, that is, the picture should be taken in landscape. The document should be positioned in the center of the screen, within the displayed frame and as close as possible to the frame sides.

Taking the picture

When the HOLD STILL message appears, device should be held still over the document until the countdown is over and the still picture is taken. Moving or shaking during this process may result in a blurry image and leads to a failure or an unclear black and white image.

Checks only: Digital row (MICR)

Make sure that the digital row is clean and the signature is not stretching over it. Ensure that all the digits and special characters are readable.