# ArcSoft Face Detection

开发指导文档



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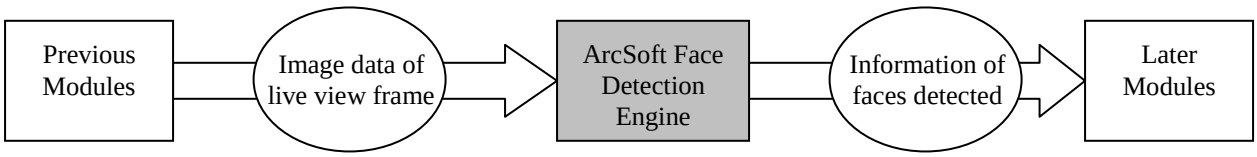
# Chapter 1: 概述

虹软人脸检测引擎工作流程图：




## 1.1. 运行环境

- Windows

## 1.2. 系统要求

- 64 位系统， Windows7 以上

## 1.3. 依赖库

- None

# Chapter 2: 结构与常量

## 2.1. 基本类型

```
typedef MInt32 AFD_FSDK_OrientPriority;
typedef MInt32 AFD_FSDK_OrientCode;
```

所有基本类型在平台库中有定义。 定义规则是在 ANSIC 中的基本类型前加上字母“M”同时将类型的第一个字母改成大写。例如“long” 被定义成“MLong”

## 2.2. 数据结构与枚举

### 2.2.1. AFD_FSDK_FACERES

**描述**

检测到的脸部信息

**定义**

```
typedef struct{
    MRECT     * rcFace;
    MLong     nFace;
    AFD_FSDK_OrientCode    * lfaceOrient;
} AFD_FSDK_FACERES, * LPAFD_FSDK_FACERES;
```

**成员变量**

| | |
|---|---|
| rcFace | 人脸矩形框信息 |
| nFace | 人脸个数 |
| lfaceOrient | 人脸角度信息 |

### 2.2.2. AFD_FSDK_VERSION

**描述**

SDK 版本信息

**定义**

```
 typedef struct
 {
    MInt32 lCodebase;
```

```
    MInt32 lMajor;
    MInt32 lMinor;
    MInt32 lBuild;
    MPChar Version;
    MPChar BuildDate;
    MPChar CopyRight;
} ArcSoft_Face_Detection_Version;
```

**成员描述**

| | |
|---|---|
| lCodebase | 代码库版本号 |
| lMajor | 主版本号 |
| lMinor | 次版本号 |
| lBuild | 编译版本号，递增 |
| Version | 字符串形式的版本号 |
| BuildDate | 编译时间 |
| CopyRight | copyright |

## 2.2.3. AFD_FSDK_OrientPriority

**描述**

定义脸部检测角度的优先级

**定义**

```
enum _AFD_FSDK_OrientPriority{
    AFD_FSDK_OPF_0_ONLY           = 0x1,
    AFD_FSDK_OPF_90_ONLY          = 0x2,
    AFD_FSDK_OPF_270_ONLY         = 0x3,
    AFD_FSDK_OPF_180_ONLY         = 0x4,
    AFD_FSDK_OPF_0_HIGHER_EXT     = 0x5
};
```

**成员描述**

| | |
|---|---|
| AFD_FSDK_OPF_0_ONLY | 检测 0 度方向 |
| AFD_FSDK_OPF_90_ONLY | 检测 90 度方向 |
| AFD_FSDK_OPF_270_ONLY | 检测 270 度方向 |
| AFD_FSDK_OPF_180_ONLY | 检测 180 度方向 |
| AFD_FSDK_OPF_0_HIGHER_EXT | 检测 0， 90， 180， 270 四个方向,0 度更优先 |

## 2.2.4. AFD_FSDK_OrientCode

**描述**

定义检测结果中的人脸角度

**定义**

```
enum _AFD_FSDK_OrientCode{
    AFD_FSDK_FOC_0   = 0x1,
    AFD_FSDK_FOC_90  = 0x2,
    AFD_FSDK_FOC_270 = 0x3,
    AFD_FSDK_FOC_180 = 0x4,
    AFD_FSDK_FOC_30  = 0x5,
    AFD_FSDK_FOC_60  = 0x6,
    AFD_FSDK_FOC_120 = 0x7,
    AFD_FSDK_FOC_150 = 0x8,
    AFD_FSDK_FOC_210 = 0x9,
    AFD_FSDK_FOC_240 = 0xa,
    AFD_FSDK_FOC_300 = 0xb,
    AFD_FSDK_FOC_330 = 0xc
};
```

**成员描述**

| | |
|---|---|
| AFD_FSDK_FOC_0 | 0 度 |
| AFD_FSDK_FOC_90 | 90 度 |
| AFD_FSDK_FOC_270 | 270 度 |
| AFD_FSDK_FOC_180 | 180 度 |
| AFD_FSDK_FOC_30 | 30 度 |
| AFD_FSDK_FOC_60 | 60 度 |
| AFD_FSDK_FOC_120 | 120 度 |
| AFD_FSDK_FOC_150 | 150 度 |
| AFD_FSDK_FOC_210 | 210 度 |
| AFD_FSDK_FOC_240 | 240 度 |
| AFD_FSDK_FOC_300 | 300 度 |
| AFD_FSDK_FOC_330 | 330 度 |

## 2.2.5. 支持的颜色格式

**描述**

颜色格式及其对齐规则

**定义**

| | |
|---|---|
| ASVL_PAF_I420 | 8-bit Y 层，之后是 8-bit 的 2x2 采样的 U 层和 V 层 |
| ASVL_PAF_YUYV | Y0, U0, Y1, V0 |
| ASVL_PAF_RGB24_B8G8R8 | BGR24, B8G8R8 |

# Chapter 3: API 说明

## 3.1. AFD_FSDK_InitialFaceEngine

**原型**

```
MRESULT AFD_FSDK_InitialFaceEngine(
       MPChar                          AppId,
       MPChar                          SDKKey,
       MByte                           *pMem,
       MInt32                          lMemSize,
       MHandle                         *pEngine,
       AFD_FSDK_OrientPriority         iOrientPriority,
       MInt32                          nScale,
       MInt32                          nMaxFaceNum
);
```

**描述**

初始化脸部检测引擎

**参数**

| | | |
|---|---|---|
| AppId | [in] | 用户申请 SDK 时获取的 App Id |
| SDKKey | [in] | 用户申请 SDK 时获取的 SDK Key |
| pMem | [in] | 分配给引擎使用的内存地址 |
| lMemSize | [in] | 分配给引擎使用的内存大小 |
| pEngine | [out] | 引擎 handle |
| iOrientPriority | [in] | 期望的脸部检测角度的优先级 |
| nScale | [in] | 用于数值表示的最小人脸尺寸 有效值范围[2,50] 推荐值 16 |
| nMaxFaceNum | [in] | 用户期望引擎最多能检测出的人脸数 有效值范围[1,100] |

**返回值**

成功返回 MOK，否则返回失败 code。失败 codes 如下所列:

| | |
|---|---|
| MERR_INVALID_PARAM | 参数输入非法 |
| MERR_NO_MEMORY | 内存不足 |

## 3.2. AFD_FSDK_StillImageFaceDetection

**原型**

```
MRESULT AFD_FSDK_StillImageFaceDetection(
```

```
    MHandle         hEngine,
    LPASVLOFFSCREEN pImgData,
    LPAFD_FSDK_FACERES     pFaceRes
);
```

**描述**

根据输入的图像检测出人脸位置，一般用于静态图像检测

**参数**

| | | |
|---|---|---|
| hEngine | [in] | 引擎 handle |
| pImgData | [in] | 带检测图像信息 |
| pFaceRes | [out] | 人脸检测结果 |

**返回值**

成功返回 MOK，否则返回失败 code。

## 3.3. AFD_FSDK_UninitialFaceEngine

**原型**

```
MRESULT AFD_FSDK_UninitialFaceEngine(
       MHandle       hEngine
);
```

**描述**

销毁引擎，释放相应资源

**参数**

| | | |
|---|---|---|
| hEngine | [in] | 引擎 handle |

**返回值**

成功返回 MOK，否则返回失败 code。失败 codes 如下所列:

| | |
|---|---|
| MERR_INVALID_PARAM | 参数输入非法 |

## 3.4. AFD_FSDK_GetVersion

**原型**

```
const AFD_FSDK_Version * AFD_FSDK_GetVersion(
       MHandle       hEngine
```

```
);
```

**描述**

获取 SDK 版本信息

**参数**

| | | |
|---|---|---|
| `hEngine` | `[in]` | 引擎 handle |

# Chapter 4: 示例代码

注意,使用时请替换申请的 **APPID SDKKEY**，并设置好文件路径和图像尺寸

```
#include <stdio.h>
#include <stdlib.h>
#include <stdint.h>
#include <Windows.h>
#include "arcsoft_fsdk_face_detection.h"
#include "merror.h"

#pragma comment(lib,"libarcsoft_fsdk_face_detection.lib")

#define WORKBUF_SIZE        (40*1024*1024)
#define INPUT_IMAGE_PATH "sample.bmp"
#define APPID       ""                  //APPID
#define SDKKey      ""                  //SDKKey

bool readBmp24(const char* path, uint8_t **imageData, int *pWidth, int *pHeight)
{
	if (path == NULL || imageData == NULL || pWidth == NULL || pHeight == NULL)
	{
		return false;
	}
	FILE *fp = fopen(path, "rb");
	if (fp == NULL)
	{
		return false;
	}
	fseek(fp, sizeof(BITMAPFILEHEADER), 0);
	BITMAPINFOHEADER head;
	fread(&head, sizeof(BITMAPINFOHEADER), 1, fp);
	*pWidth = head.biWidth;
	*pHeight = head.biHeight;
	int biBitCount = head.biBitCount;
	if (24 == biBitCount)
	{
		int lineByte = ((*pWidth) * biBitCount / 8 + 3) / 4 * 4;
		*imageData = (uint8_t *)malloc(lineByte * (*pHeight));
		uint8_t * data = (uint8_t *)malloc(lineByte * (*pHeight));
		fseek(fp, 54, SEEK_SET);
		fread(data, 1, lineByte * (*pHeight), fp);
		for (int i = 0; i < *pHeight; i++)
		{
			for (int j = 0; j < *pWidth; j++)
			{
				memcpy((*imageData) + i * (*pWidth) * 3 + j * 3, data +
(((*pHeight) - 1) - i) * lineByte + j * 3, 3);
			}
		}
		free(data);
	}
	else
	{
```

```
                fclose(fp);
                return false;
        }
        fclose(fp);
        return true;
}
int main()
{
        /* 初始化引擎和变量 */
        MRESULT nRet = MERR_UNKNOWN;
        MHandle hEngine = nullptr;
        MInt32 nScale = 16;
        MInt32 nMaxFace = 10;
        MByte *pWorkMem = (MByte *)malloc(WORKBUF_SIZE);
        if (pWorkMem == nullptr)
        {
                return -1;
        }
        nRet = AFD_FSDK_InitialFaceEngine(APPID, SDKKey, pWorkMem, WORKBUF_SIZE,
&hEngine, AFD_FSDK_OPF_0_HIGHER_EXT, nScale, nMaxFace);
        if (nRet != MOK)
        {
                return -1;
        }
        /* 打印版本信息 */
        const AFD_FSDK_Version * pVersionInfo = nullptr;
        pVersionInfo = AFD_FSDK_GetVersion(hEngine);
        fprintf(stdout, "%d %d %d %d\n", pVersionInfo->lCodebase, pVersionInfo-
>lMajor, pVersionInfo->lMinor, pVersionInfo->lBuild);
        fprintf(stdout, "%s\n", pVersionInfo->Version);
        fprintf(stdout, "%s\n", pVersionInfo->BuildDate);
        fprintf(stdout, "%s\n", pVersionInfo->CopyRight);

        /* 读取静态图片信息，并保存到ASVLOFFSCREEN结构体 （以ASVL_PAF_RGB24_B8G8R8格式
为例） */
        ASVLOFFSCREEN offInput = { 0 };
        offInput.u32PixelArrayFormat = ASVL_PAF_RGB24_B8G8R8;
        offInput.ppu8Plane[0] = nullptr;
        readBmp24(INPUT_IMAGE_PATH, (uint8_t**)&offInput.ppu8Plane[0],
&offInput.i32Width, &offInput.i32Height);
        if (!offInput.ppu8Plane[0])
        {
                fprintf(stderr, "Fail to ReadBmp(%s)\n", INPUT_IMAGE_PATH);
                AFD_FSDK_UninitialFaceEngine(hEngine);
                free(pWorkMem);
                return -1;
        }
        else
        {
                fprintf(stdout, "Picture width : %d , height : %d \n",
offInput.i32Width, offInput.i32Height);
        }
        offInput.pi32Pitch[0] = offInput.i32Width * 3;

        /* 人脸检测 */
        LPAFD_FSDK_FACERES   FaceRes = nullptr;
```

```
	nRet = AFD_FSDK_StillImageFaceDetection(hEngine, &offInput, &FaceRes);
	if (nRet != MOK)
	{
		fprintf(stderr, "Face Detection failed, error code: %d\n", nRet);
	}
	else
	{
		fprintf(stdout, "The number of face: %d\n", FaceRes->nFace);
		for (int i = 0; i < FaceRes->nFace; ++i)
		{
			fprintf(stdout, "Face[%d]: rect[%d,%d,%d,%d], Face
orient: %d\n", i, FaceRes->rcFace[i].left, FaceRes->rcFace[i].top, FaceRes-
>rcFace[i].right, FaceRes->rcFace[i].bottom, FaceRes->lfaceOrient[i]);
		}
	}

	/* 释放引擎和内存 */
	nRet = AFD_FSDK_UninitialFaceEngine(hEngine);
	if (nRet != MOK)
	{
		fprintf(stderr, "UninitialFaceEngine failed , errorcode is %d \n",
nRet);
	}
	free(offInput.ppu8Plane[0]);
	free(pWorkMem);
	return 0;
}
```