ArcSoft Face Detection

开发指导文档

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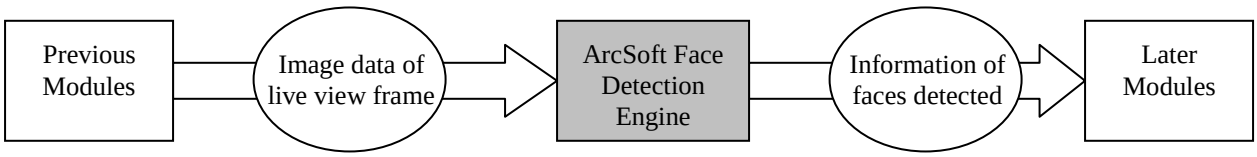
Chapter 1: 概述

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

- 32 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{
    MLong     nFace;
    MRECT     * rcFace;
    AFD_FSDK_OrientCode    * lfaceOrient;
} AFD_FSDK_FACERES, * LPAFD_FSDK_FACERES;
```

成员变量

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

2.2.2. AFD_FSDK_Face3Dangle

描述

检测到的脸部角度信息

定义

```
typedef struct {
    MInt32 nFace;
```

```
    MFloat* rollAngle;
    MFloat* yawAngle;
    MFloat* pitchAngle;
    MInt32* status;
} AFD_FSDK_Face3Dangle, *LPAFD_FSDK_Face3Dangle;
```

成员变量

nFace	人脸个数
rollAngle	人脸横滚角 roll
yawAngle	人脸偏航角 yaw
pitchAngle	人脸俯仰角 pitch
status	人脸角度检测成功标志位，0 正常，其他值错误

2.2.3. 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

2.2.4. 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

2.2.5. 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

2.2.6. 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_FaceAngleDetect

原型

```
MRESULT AFD_FSDK_FaceAngleDetect(
       MHandle hEngine,
       LPASVLOFFSCREEN pImgData,
       LPAFD_FSDK_FACERES pFaceRes,
       LPAFD_FSDK_Face3Dangle pFace3Dangle
);
```

描述

根据输入的图像和人脸框，得到人脸角度信息

参数

hEngine	[in]	引擎 handle
pImgData	[in]	带检测图像信息
pFaceRes	[in]	输入人脸信息
pFace3Dangle	[out]	人脸角度检测结果

返回值

成功返回 MOK，否则返回失败 code。

3.4. 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

3.5. 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 "arcsoft_fsdk_face_detection.h"
#include "merror.h"

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

#define WORKBUF_SIZE        (30*1024*1024)
#define APPID       ""                  //APPID
#define SDKKey      ""                  //SDKKey

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);
	printf("%d %d %d %d\n", pVersionInfo->lCodebase, pVersionInfo->lMajor,
pVersionInfo->lMinor, pVersionInfo->lBuild);
	printf("%s\n", pVersionInfo->Version);
	printf("%s\n", pVersionInfo->BuildDate);
	printf("%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） imagedata为BGR原始数据 */
	ASVLOFFSCREEN offInput = { 0 };
	offInput.u32PixelArrayFormat = INPUT_IMAGE_FORMAT;
	offInput.i32Width = INPUT_IMAGE_WIDTH;
	offInput.i32Height = INPUT_IMAGE_HEIGHT;
	offInput.ppu8Plane[0] = imagedata;
	 if (ASVL_PAF_I420 == offInput.u32PixelArrayFormat) {
	 offInput.pi32Pitch[0] = offInput.i32Width;
	 offInput.pi32Pitch[1] = offInput.i32Width/2;
```

```
        offInput.pi32Pitch[2] = offInput.i32Width/2;
        offInput.ppu8Plane[1] = offInput.ppu8Plane[0] + offInput.pi32Pitch[0] *
offInput.i32Height;
        offInput.ppu8Plane[2] = offInput.ppu8Plane[1] + offInput.pi32Pitch[1] *
offInput.i32Height/2;
    } else if (ASVL_PAF_NV12 == offInput.u32PixelArrayFormat) {
        offInput.pi32Pitch[0] = offInput.i32Width;
        offInput.pi32Pitch[1] = offInput.i32Width;
        offInput.ppu8Plane[1] = offInput.ppu8Plane[0] + (offInput.pi32Pitch[0] *
offInput.i32Height);
    } else if (ASVL_PAF_NV21 == offInput.u32PixelArrayFormat) {
        offInput.pi32Pitch[0] = offInput.i32Width;
        offInput.pi32Pitch[1] = offInput.i32Width;
        offInput.ppu8Plane[1] = offInput.ppu8Plane[0] + (offInput.pi32Pitch[0] *
offInput.i32Height);
    } else if (ASVL_PAF_YUYV == offInput.u32PixelArrayFormat) {
        offInput.pi32Pitch[0] = offInput.i32Width*2;
    } else if (ASVL_PAF_I422H == offInput.u32PixelArrayFormat) {
        offInput.pi32Pitch[0] = offInput.i32Width;
        offInput.pi32Pitch[1] = offInput.i32Width / 2;
        offInput.pi32Pitch[2] = offInput.i32Width / 2;
        offInput.ppu8Plane[1] = offInput.ppu8Plane[0] + offInput.pi32Pitch[0] *
offInput.i32Height;
        offInput.ppu8Plane[2] = offInput.ppu8Plane[1] + offInput.pi32Pitch[1] *
offInput.i32Height;
    } else if (ASVL_PAF_LPI422H == offInput.u32PixelArrayFormat) {
        offInput.pi32Pitch[0] = offInput.i32Width;
        offInput.pi32Pitch[1] = offInput.i32Width;
        offInput.ppu8Plane[1] = offInput.ppu8Plane[0] + (offInput.pi32Pitch[0] *
offInput.i32Height);
    } else if (ASVL_PAF_RGB24_B8G8R8 == offInput.u32PixelArrayFormat) {
        offInput.pi32Pitch[0] = offInput.i32Width*3;
    } else {
        printf("unsupported Image format: 0x%x\r\n",offInput.u32PixelArrayFormat);
        AFD_FSDK_UninitialFaceEngine(hEngine);
        free(pWorkMem);
              return -1;
    }

       /* 人脸检测 */
       LPAFD_FSDK_FACERES   FaceRes = nullptr;
       AFD_FSDK_Face3Dangle face3dAngle = { 0 };
       nRet = AFD_FSDK_StillImageFaceDetection(hEngine, &offInput, &FaceRes);
       if (nRet != MOK)
       {
              printf("Face Detection failed, error code: %d\n", nRet);
       }
       else
       {
              printf("The number of face: %d\n", FaceRes->nFace);
              for (int i = 0; i < FaceRes->nFace; ++i)
              {
                     printf("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]);
              }
```

```
		if(FaceRes->nFace > 0)
		{
			nRet = AFD_FSDK_FaceAngleDetect(hEngine, &offInput, FaceRes,
&face3dAngle);
			if(nRet != MOK)
			{
				printf("AFD_FSDK_FaceAngleDetect failed, error
code: %d\n", nRet);
			}
			else
			{
				for (int i = 0; i < face3dAngle.nFace; ++i)
				{
					printf("Face[%d]: roll:%f, yaw:%f, pitch:%f\n",
i, face3dAngle.rollAngle[i], face3dAngle.yawAngle[i], face3dAngle.pitchAngle[i]);
				}
			}
		}
	}
	/* 释放引擎和内存 */
	nRet = AFD_FSDK_UninitialFaceEngine(hEngine);
	if (nRet != MOK)
	{
		printf("UninitialFaceEngine failed , errorcode is %d \n", nRet);
	}
	free(pWorkMem);
	return 0;
}
```