

ArcSoft Face Detection

开发指导文档

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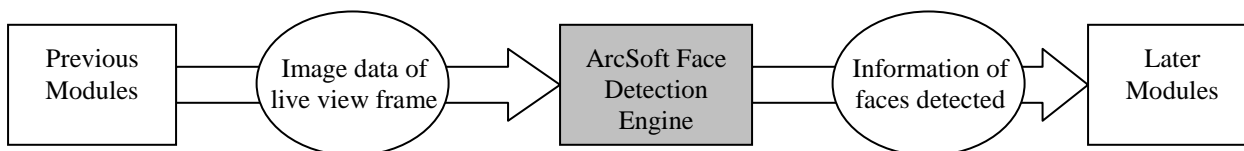
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Chapter 1: 概述

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{  
    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.u32PixelFormat = 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;
}
```