

ArcSoft Face Recognition

开发指导文档



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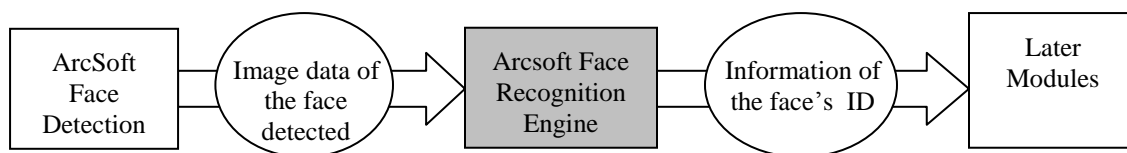
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1. 概述

虹软人脸识别引擎工作流程图：



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

2. 结构与常量

2.1. 基本类型

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

2.2.1. AFR_FSDK_FACEINPUT

功能描述

脸部信息

定义

```
typedef struct{
    MRECT          rcFace;
    MInt32         lOrient;
} AFR_FSDK_FACEINPUT, *LPAFR_FSDK_FACEINPUT;
```

成员变量

rcFace	脸部矩形框信息
lOrient	脸部旋转角度

2.2.2. AFR_FSDK_FACEMODEL

功能描述

脸部特征信息

定义

```
typedef struct{
    MByte          *pbFeature;
    MInt32         lFeatureSize;
} AFR_FSDK_FACEMODEL, *LPAFR_FSDK_FACEMODEL;
```

成员变量

pbFeature	提取到的脸部特征
lFeatureSize	特征信息长度

2.2.3. AFR_FSDK_VERSION

功能描述

引擎版本信息.

定义

```
typedef struct{
    MInt32          lCodebase;
    MInt32          lMajor;
    MInt32          lMinor;
    MInt32          lBuild;
    MInt32          lFeatureLevel;
    MPChar          Version;
    MPChar          BuildDate;
    MPChar          CopyRight;
} AFR_FSDK_VERSION, *LPAFR_FSDK_VERSION;
```

成员变量

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
lFeatureLevel	特征库版本号
strVersion	字符串形式的版本号
strBuildDate	编译时间
strCopyRight	Copyright

2.3. 枚举

2.3.1. AFR_FSDK_ORIENTCODE

功能描述

基于逆时针的脸部方向枚举值

定义

```
enum AFR_FSDK_ORIENTCODE{
    AFR_FSDK_FOC_0          = 0x1,
    AFR_FSDK_FOC_90         = 0x2,
    AFR_FSDK_FOC_270        = 0x3,
```

```

        AFR_FSDK_FOC_180      = 0x4,
        AFR_FSDK_FOC_30       = 0x5,
        AFR_FSDK_FOC_60       = 0x6,
        AFR_FSDK_FOC_120      = 0x7,
        AFR_FSDK_FOC_150      = 0x8,
        AFR_FSDK_FOC_210      = 0x9,
        AFR_FSDK_FOC_240      = 0xa,
        AFR_FSDK_FOC_300      = 0xb,
        AFR_FSDK_FOC_330      = 0xc
    };

```

成员变量

AFR_FSDK_FOC_0	0 度
AFR_FSDK_FOC_90	90 度
AFR_FSDK_FOC_270	270 度
AFR_FSDK_FOC_180	180 度
AFR_FSDK_FOC_30	30 度
AFR_FSDK_FOC_60	60 度
AFR_FSDK_FOC_120	120 度
AFR_FSDK_FOC_150	150 度
AFR_FSDK_FOC_210	210 度
AFR_FSDK_FOC_240	240 度
AFR_FSDK_FOC_300	300 度
AFR_FSDK_FOC_330	330 度

2.3.2. 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

3. API Reference

3.1. AFR_FSDK_InitialEngine

原型

```
MRESULT AFR_FSDK_InitialEngine(  
    MPChar      AppId,  
    MPChar      SDKKey,  
    Mbyte       *pMem,  
    MInt32      lMemSize,  
    MHandle     *phEngine  
);
```

功能描述

初始化引擎

参数

AppId	[in]	用户申请 SDK 时获取的 id
SDKKey	[in]	用户申请 SDK 时获取的 id
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
phEngine	[out]	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
MERR_NO_MEMORY	内存不足

3.2. AFR_FSDK_ExtractFRFeature

原型

```
MRESULT AFR_FSDK_ExtractFRFeature (  
    MHandle      hMemMgr,  
    MHandle      hEngine,  
    LPASVLOFFSCREEN pInputImage,  
    LPAFR_FSDK_FACEINPUT pFaceRes,  
    LPAFR_FSDK_FACEMODEL pFaceModels
```



```
);
```

功能描述

获取脸部特征

参数

hEngine	[in]	引擎 handle
pInputImage	[in]	输入的图像数据
pFaceRes	[in]	已检测到到的脸部信息
pFaceModels	[out]	提取的脸部特征信息

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

3.3. AFR_FSDK_FacePairMatching

原型

```
MRESULT AFR_FSDK_FacePairMatching(  
    MHandle          hEngine,  
    AFR_FSDK_FACEMODEL *reffeature,  
    AFR_FSDK_FACEMODEL *probefeature,  
    MFloat           *pfSimilScore  
);
```

功能描述

脸部特征比较.

参数

hEngine	[in]	引擎 handle
reffeature	[in]	已有脸部特征信息
probefeature	[in]	被比较的脸部特征信息
pfSimilScore	[out]	相似程度数值

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

3.4. AFR_FSDK_UninitialEngine

原型

```
MRESULT AFR_FSDK_UninitialEngine(  
    MHandle          hEngine  
);
```

功能描述

结束引擎

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. AFR_FSDK_GetVersion

原型

```
const AFR_FSDK_VERSION * AFR_FSDK_GetVersion(MHandle          hEngine);
```

参数

hEngine [in] 引擎 handle

功能描述

获取引擎版本信息

参数

None

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_recognition.h"
#include "merror.h"

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

#define WORKBUF_SIZE      (40*1024*1024)
#define INPUT_IMAGE1_PATH "sample1.bmp"
#define INPUT_IMAGE2_PATH "sample2.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 = AFR_FSDK_InitialEngine(APPID, SDKKey, pWorkMem, WORKBUF_SIZE,
&hEngine);
    if (nRet != MOK)
    {
        return -1;
    }
    /* 打印版本信息 */
    const AFR_FSDK_Version * pVersionInfo = nullptr;
    pVersionInfo = AFR_FSDK_GetVersion(hEngine);
    fprintf(stdout, "%d %d %d %d %d\n", pVersionInfo->lCodebase, pVersionInfo-
>lMajor, pVersionInfo->lMinor, pVersionInfo->lBuild, pVersionInfo->lFeatureLevel);
    fprintf(stdout, "%s\n", pVersionInfo->Version);
    fprintf(stdout, "%s\n", pVersionInfo->BuildDate);
    fprintf(stdout, "%s\n", pVersionInfo->CopyRight);

    /* 读取第一张静态图片信息, 并保存到ASVLOFFSCREEN结构体 (以
ASVL_PAF_RGB24_B8G8R8格式为例) */
    ASVLOFFSCREEN offInput1 = { 0 };
    offInput1.u32PixelFormat = ASVL_PAF_RGB24_B8G8R8;
    offInput1.ppu8Plane[0] = nullptr;
    readBmp24(INPUT_IMAGE1_PATH, (uint8_t*)&offInput1.ppu8Plane[0],
&offInput1.i32Width, &offInput1.i32Height);
    if (!offInput1.ppu8Plane[0])
    {
        fprintf(stderr, "fail to ReadBmp(%s)\n", INPUT_IMAGE1_PATH);
        AFR_FSDK_UninitialEngine(hEngine);
        free(pWorkMem);
        return -1;
    }
    offInput1.pi32Pitch[0] = offInput1.i32Width * 3;
    AFR_FSDK_FACEMODEL faceModels1 = { 0 };
    {
        AFR_FSDK_FACEINPUT faceInput;
        //第一张人脸信息通过face detection\face tracking获得
        faceInput.lOrient = AFR_FSDK_FOC_0; //人脸方向
        //人脸框位置
        faceInput.rcFace.left = 346;
    }
}

```

```

        faceInput.rcFace.top = 58;
        faceInput.rcFace.right = 440;
        faceInput.rcFace.bottom = 151;
        //提取第一张人脸特征
        AFR_FSDK_FACEMODEL LocalFaceModels = { 0 };
        nRet = AFR_FSDK_ExtractFRFeature(hEngine, &offInput1, &faceInput,
&LocalFaceModels);
        if (nRet != MOK)
        {
            fprintf(stderr, "fail to Extract 1st FR Feature, error
code: %d\n", nRet);
        }
        /* 拷贝人脸特征结果 */
        faceModels1.lFeatureSize = LocalFaceModels.lFeatureSize;
        faceModels1.pbFeature = (MByte*)malloc(faceModels1.lFeatureSize);
        memcpy(faceModels1.pbFeature, LocalFaceModels.pbFeature,
faceModels1.lFeatureSize);
    }
    /* 读取第二张静态图片信息, 并保存到ASVLOFFSCREEN结构体 (以
ASVL_PAF_RGB24_B8G8R8格式为例) */
    ASVLOFFSCREEN offInput2 = { 0 };
    offInput2.u32PixelFormat = ASVL_PAF_RGB24_B8G8R8;
    offInput2.ppu8Plane[0] = nullptr;
    readBmp24(INPUT_IMAGE2_PATH, (uint8_t*)&offInput2.ppu8Plane[0],
&offInput2.i32Width, &offInput2.i32Height);
    if (!offInput2.ppu8Plane[0])
    {
        fprintf(stderr, "fail to ReadBmp(%s)\n", INPUT_IMAGE2_PATH);
        free(offInput1.ppu8Plane[0]);
        AFR_FSDK_UninitialEngine(hEngine);
        free(pWorkMem);
        return -1;
    }
    offInput2.pi32Pitch[0] = offInput2.i32Width * 3;
    AFR_FSDK_FACEMODEL faceModels2 = { 0 };
    {
        AFR_FSDK_FACEINPUT faceInput;
        //第二张人脸信息通过face detection\face tracking获得
        faceInput.lOrient = AFR_FSDK_FOC_0; //人脸方向
        //人脸框位置
        faceInput.rcFace.left = 122;
        faceInput.rcFace.top = 76;
        faceInput.rcFace.right = 478;
        faceInput.rcFace.bottom = 432;
        //提取第二张人脸特征
        AFR_FSDK_FACEMODEL LocalFaceModels = { 0 };
        nRet = AFR_FSDK_ExtractFRFeature(hEngine, &offInput2, &faceInput,
&LocalFaceModels);
        if (nRet != MOK)
        {
            fprintf(stderr, "fail to Extract 2nd FR Feature, error
code: %d\n", nRet);
        }
        /* 拷贝人脸特征结果 */
        faceModels2.lFeatureSize = LocalFaceModels.lFeatureSize;
        faceModels2.pbFeature = (MByte*)malloc(faceModels2.lFeatureSize);
    }

```

```
        memcpy(faceModels2.pbFeature, LocalFaceModels.pbFeature,
faceModels2.lFeatureSize);
    }
    /* 对比两张人脸特征, 获得比对结果 */
    MFloat fSimilScore = 0.0f;
    nRet = AFR_FSDK_FacePairMatching(hEngine, &faceModels1, &faceModels2,
&fSimilScore);
    if (nRet == MOK)
    {
        fprintf(stdout, "fSimilScore = %f\n", fSimilScore);
    }
    else
    {
        fprintf(stderr, "FacePairMatching failed , errorcode is %d \n",
nRet);
    }
    /* 释放引擎和内存 */
    nRet = AFR_FSDK_UninitialEngine(hEngine);
    if (nRet != MOK)
    {
        fprintf(stderr, "UninitialFaceEngine failed , errorcode is %d \n",
nRet);
    }
    free(offInput1.ppu8Plane[0]);
    free(offInput2.ppu8Plane[0]);
    free(faceModels1.pbFeature);
    free(faceModels2.pbFeature);
    free(pWorkMem);
    return 0;
}
```

5. 其他说明

此版本为免费开放的标准版本(为保证最优体验, 建议注册人脸数小于 1000), 若有定制升级需求, 请联系我们。