



北京交通大学

图像处理与机器学习 基础实验

实验一 图像显示



实验一 图像显示与存储

➤ 实验数据

-- 源图像：CMU等大学Face Detection/Recognition 收集的公开数据库

-- 格式： * .raw

FILE1.raw	FILE10.raw	FILE11.raw	FILE12.raw	FILE13.raw
FILE14.raw	FILE15.raw	FILE16.raw	FILE17.raw	FILE18.raw
FILE19.raw	FILE2.raw	FILE20.raw	FILE21.raw	FILE22.raw
FILE23.raw	FILE24.raw	FILE25.raw	FILE26.raw	FILE27.raw





实验一 图像显示与存储

➤ 格式: *.raw

1. width , height , gray , gray

width x height ↑

2. gray levels: 0 – 255

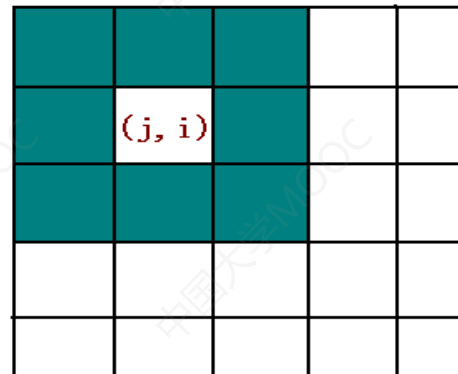
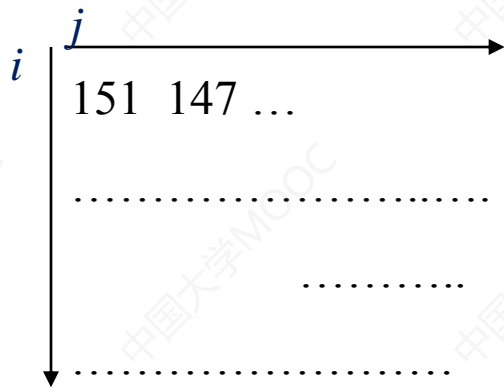
typedef unsigned char BYTE ;

➤ *.raw 图像格式：

1. width , height , gray ,

384, 384, 151, 147,

gray



$i: 0 \dots \text{height} - 1, \quad j: 0 \dots \text{width} - 1$

$(j, i) \text{ gray level } \text{image}[i \times \text{width} + j]$



实验一 图像显示与存储

➤ 格式: * .raw

➤ bb.lst 显示多幅图像

20

D:\\ImgPro\\bb\\ (图像所在的路径)

FILE1.raw	FILE10.raw	FILE11.raw	FILE12.raw	FILE13.raw
FILE14.raw	FILE15.raw	FILE16.raw	FILE17.raw	FILE18.raw
FILE19.raw	FILE2.raw	FILE20.raw	FILE21.raw	FILE22.raw
FILE23.raw	FILE24.raw	FILE25.raw	FILE26.raw	FILE27.raw

```
void CMYIMGPROView::OnFileOpen()
```

```
{  
    // TODO: 在此添加命令处理程序代码  
}
```

```
void CMYIMGPROView::OnKeyDown(UINT nChar, UINT nRepCnt, UINT nFlags)
```

```
{  
    // TODO: 在此添加消息处理程序代码和/或调用默认值
```

```
    CView::OnKeyDown(nChar, nRepCnt, nFlags);  
}
```

```
void CImgProView::OnFileOpen()
```

```
{
```

```
// TODO: Add your command handler code here
```

```
CFileDialog MyFDlg(TRUE, NULL, NULL, OFN_HIDEREADONLY, NULL, NULL );
```

```
MyFDlg.m_ofn.lpstrFilter = "(*.lst;*.raw)\0*.lst;*.raw\0";
```

```
MyFDlg.m_ofn.lpstrInitialDir = "D:\\imgPro\\bb";
```

```
if( MyFDlg.DoModal() == IDOK )
```

```
{
```

```
    CString SFName;
```

```
    SFName = MyFDlg.GetPathName( ); //full name with path
```

```
    char *fnstr;
```

```
    fnstr = SFName.GetBuffer(4); //read the name from string
```

打开

← → 1 Computer DATA (D:) ImgPro bb 搜索"bb"

组织 ▾

新建文件夹



Computer

视频

图片

文档

下载

音乐

桌面

Acer (C:)

DATA (D:)

网络

名称

日期

类型

大

bb

2016/9/14 17:37

MASM Listing

FILE

2010/6/8 16:35

RAW 文件

FILE1

2005/11/30 18:36

RAW 文件

FILE2

2005/11/30 18:36

RAW 文件

FILE3

2005/11/30 18:36

RAW 文件

FILE4

2005/11/30 18:36

RAW 文件

FILE5

2005/11/30 18:36

RAW 文件

文件名(N): FILE1

所有文件(*.*)

打开(O)

取消


```
FILE *fpLst;
int n;

int len;
len = strlen( fnstr );
if( !strcmp( fnstr+len-3, "raw" ) ) //single raw image
{
    fnum = 0;
    char *ptr;
    ptr = fnstr+len-3;
    while( *ptr != '\\')
        ptr--;
    *ptr = 0;
    strcpy( directory, fnstr); //Directory

    fnames = new char[500];
    strcpy( fnames, ptr+1); //image name
}
```

```
else //list file
{
    fpLst = fopen( fnstr, "rb");
    fscanf( fpLst, "%3d", &fnum);
    fscanf( fpLst, "%s", directory); //directory

    fnames = new char[fnum*100];
    for( n=0; n<fnum; n++)
        fscanf( fpLst, "%s", fnames+n*100); // image names

    fclose(fpLst);
}
```

20

D:\\imgPro\\bb

FILE1.raw	FILE2.raw	FILE3.raw
FILE7.raw	FILE8.raw	FILE9.raw
FILE13.raw	FILE14.raw	FILE15.ra
FILE19.raw	FILE20.raw	

```
if( !strcmp( fnstr+len-3, "raw" ) ) //single raw image
{
    fnum = 0;
    char *ptr;
    ptr = fnstr+len-3;
    while( *ptr != '\\')
        ptr--;
    *ptr = 0;
    strcpy( directory, fnstr); //Directory

    fnames = new char[500];
    strcpy( fnames, ptr+1); //image name
}
else //list file
{
    fpLst = fopen( fnstr, "rb");
    fscanf( fpLst, "%3d", &fnum);
    fscanf( fpLst, "%s", directory); //directory

    fnames = new char[fnum*100];
    for( n=0; n<fnum; n++)
        fscanf( fpLst, "%s", fnames+n*100); // image names

    fclose(fpLst);
}

findex = 0;
readImg( findex);
```

Go to open the image file

```
void CImgProView::readImg(int findex)
```

```
{
```

```
    char fullName[120];
```

```
    sprintf_s(fullName, "g
```

```
    FILE* fpImg;
```

```
    fpImg = fopen(fullName
```

```
    if (fpImg == 0)
```

```
    {
```

```
        AfxMessageBox("Can
```

```
        return;
```

```
    }
```

```
    CString sFTitle;
```

```
    sFTitle.Format("%s", 1
```

```
    CImgProDoc* pDoc;
```

```
    pDoc = GetDocument();
```

```
    pDoc->SetTitle(sFTitle
```

```
    CString sFTitle;
```

```
    sFTitle.Format("%s", frames + findex * 100);
```

```
    CImgProDoc* pDoc;
```

```
    pDoc = GetDocument();
```

```
    pDoc->SetTitle(sFTitle
```

```
    fread(&width, sizeof(
```

```
    fread(&height, sizeof
```

```
    if (image)
```

```
        delete image;
```

```
    image = new BYTE[width
```

```
    fread(image, sizeof(B
```

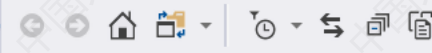
```
    fclose(fpImg);
```

```
    ////////// add process
```

```
    if (outImg)
```

```
        delete outImg;
```

```
}
```



搜索解决方案资源管理器(Ctrl+;)

imgPro"(1个项目/共 1

```
image = new BYTE[width * height];
```

```
fread(image, sizeof(BYTE), width * height, fpImg);
```

```
fclose(fpImg);
```

```
////////// add processing function here //////////
```

```
if (outImg)
```

```
    delete outImg;
```

```
outImg = new BYTE[width * height];
```

```
binarize(image, width, height, outImg);
```

```
////////////////////////////////////////
```

```
OnInitialUpdate();
```

```
CRect ClientRect;
```

```
GetClientRect(&ClientRect);
```

```
InvalidateRect(&ClientRect);
```

```
void CImgProView::readImg( int findex)
{
```

Get the full name of image including directory

```
char fullName[120];
sprintf( fullName, "%s\\%s", directory, fnames+findex*100);
```

```
FILE *fpImg;
fpImg = fopen( fullName, "rb");
if( fpImg==0 )
{
    AfxMessageBox( "Cannot open the image file", MB_OK, 0 );
    return;
}
```

```
CString sFTitle;
sFTitle.Format( "%s", fnames+findex*100 );
```

```
CImgProDoc* pDoc;
pDoc = GetDocument();
pDoc->SetTitle( sFTitle );
```

```
fread( &width, sizeof(int), 1, fpImg);  
fread( &height, sizeof(int), 1, fpImg);
```

```
if( image )  
    delete image;
```

```
image = new BYTE[width*height];
```

```
fread( image, sizeof(BYTE), width*height, fpImg);  
fclose(fpImg);
```

```
//////// add processing function here //////////////////////////////////////
```

Codes for processing image

```
////////////////////////////////////
```

```
OnInitialUpdate();  
CRect ClientRect;  
GetClientRect( &ClientRect );  
InvalidateRect( &ClientRect );
```

```
fread( &width, sizeof(int), 1, fpImg);  
fread( &height, sizeof(int), 1, fpImg);
```

```
if( image )  
    delete image;
```

```
image = new BYTE[width*height];
```

```
fread( image, sizeof(BYTE), width*height, fpImg);  
fclose(fpImg);
```

```
OnInitialUpdate();  
CRect ClientRect;  
GetClientRect( &ClientRect );  
InvalidateRect( &ClientRect );
```

Update window

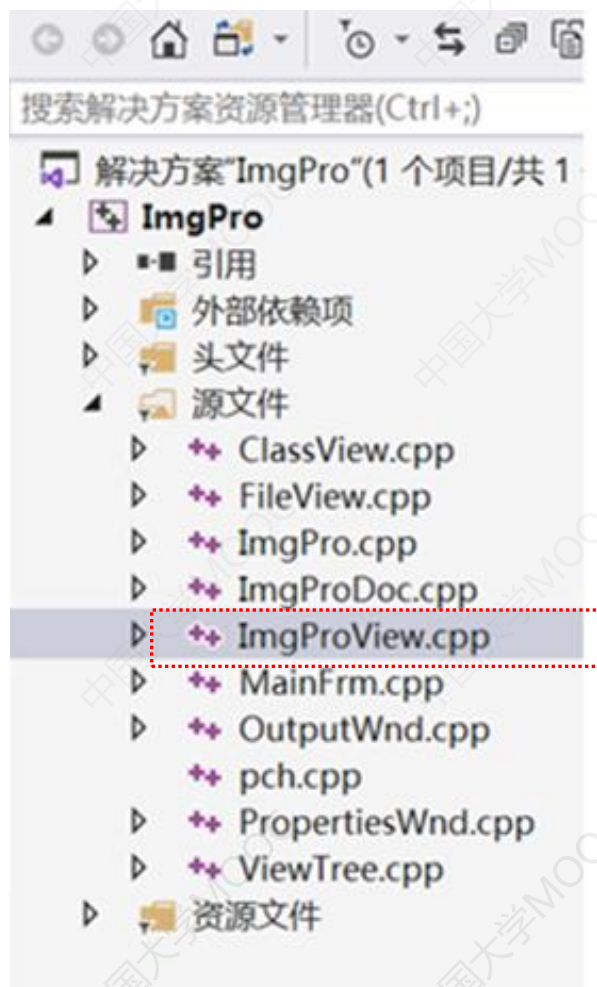
→ OnDraw()

```
void CImgProView::OnDraw(CDC* pDC )
{
    CImgProDoc* pDoc = GetDocument();
    ASSERT_VALID(pDoc);
    if (!pDoc)
        return;

    if (image == 0)
        return;

    int i, j;
    BYTE gray;
    for (i = 0; i < height; i++)
    {
        for (j = 0; j < width; j++)
        {
            gray = image[i * width + j];
            pDC ->SetPixel(j, i, RGB(gray, gray, gray));
        }
    }
}
```

Show image on the screen




```
57
58 void CImgProView::OnDraw(CDC* /*pDC*/)
59 {
60     CImgProDoc* pDoc = GetDocument();
61     ASSERT_VALID(pDoc);
62     if (!pDoc)
63         return;
64
65     if (image == 0)
66         return;
67
68     int i, j;
69     BYTE gray;
70     for (i = 0; i < height; i++)
71     {
72         for (j = 0; j < width; j++)
73         {
74             gray = image[i * width + j];
75             pDC->SetPixel(j, i, RGB(gray,
76             //show outImg if processed
```

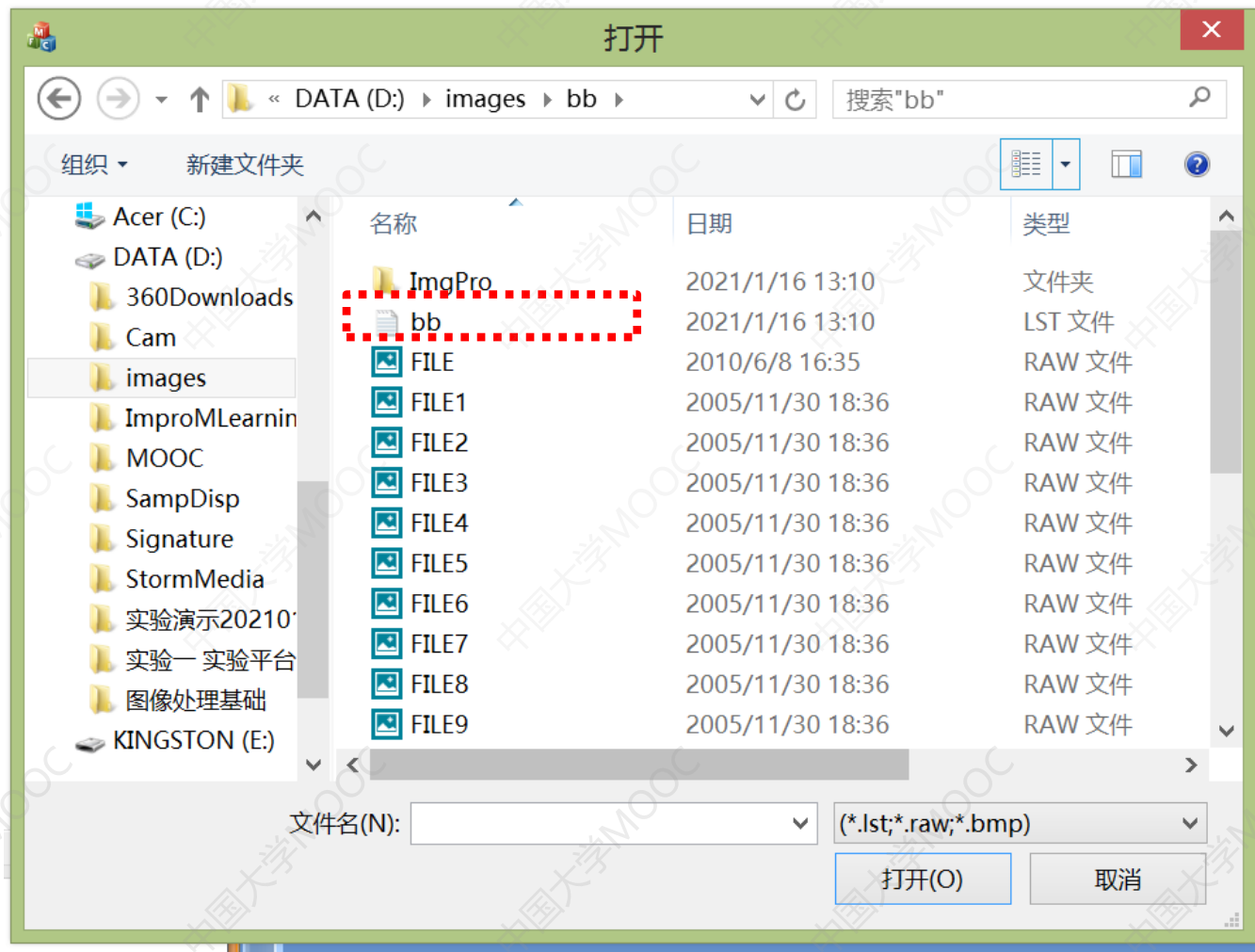
```
void CImgProView::OnDraw(CDC* pDC )
{
    CImgProDoc* pDoc = GetDocument();
    ASSERT_VALID(pDoc);
    if (!pDoc)
        return;

    if (image == 0)
        return;

    int i, j;
    BYTE gray;
    for (i = 0; i < height; i++)
    {
        for (j = 0; j < width; j++)
        {
            gray = image[i * width + j];
            pDC->SetPixel(j, i, RGB(gray, gray, gray));
```

```
void CImgProView::OnKeyDown(UINT nChar, UINT nRepCnt, UINT nFlags)
{
    // TODO: Add your message handler code here and/or call default

    if( nChar == VK_NEXT )
    {
        if( findex < fnum )
        {
            findex++;
            readImg( findex );
        }
    }
    if( nChar == VK_PRIOR )
    {
        if( findex > 0 )
        {
            findex--;
            readImg( findex );
        }
    }
    CView::OnKeyDown(nChar, nRepCnt, nFlags);
}
```





实验一 图像显示

➤ bb.lst 显示多幅图像

需要修改

20

D:\\ImgPro\\bb\\ (图像所在的路径)

FILE1.raw	FILE10.raw	FILE11.raw	FILE12.raw	FILE13.raw
FILE14.raw	FILE15.raw	FILE16.raw	FILE17.raw	FILE18.raw
FILE19.raw	FILE2.raw	FILE20.raw	FILE21.raw	FILE22.raw
FILE23.raw	FILE24.raw	FILE25.raw	FILE26.raw	FILE27.raw



实验一 图像显示

运行实验平台、显示图像。





谢 谢

本课程所引用的一些素材为主讲老师多年的教学积累，来源于多种媒体及同事和同行的交流，难以一一注明出处，特此说明并表示感谢！