

## User Manual

void ImageFusion(char* input1, char* input2, char* MaskImage, char* output, int dx[], int dy[], int a, double b1, int DX1, int DY1, double EPS)	Image fusion. reference: a=3, b1=4, DX1=-68, DY1=-99, EPS=1, input1="ImageFusion1.jpg", input2="ImageFusion2.jpg", MaskImage="Mask.png", output="output.jpg". int dx[] = {0, 0, -1, 1}; int dy[] = {-1, 1, 0, 0};
void DES_Encrypt(char *PlainFile, char *Key, char *CipherFile)	DES encryption function, supporting multiple files. PlainFile is the file name of the original file, Key is the key character, and CipherFile is the encrypted file name.
void DES_Decrypt(char *CipherFile, char *Key, char *PlainFile)	DES decryption function, supporting multiple files. CipherFile is the file name of the encrypted file, Key is the key character, and PlainFile is the decrypted file name.
void FileWrite(char* BMP, char* TXT)	Write the image steganography file and write the text file into the image. Supports 32-bit BMP images. BMP is the file name of the image to be written, and TXT is the text file name of the image to be written.
void FileWriteOut(char* BMP, char* TXT)	Write the image steganography file and extract the text file from the image. Supports 32-bit BMP images. BMP is the image file name to be written, and TXT is the text file name where the information is saved after writing the image.
void Watershed2(char* input, char* inputMarqueurs, char* output, int r, unsigned char R, unsigned char G, unsigned char B)	The watershed algorithm for image segmentation. inputMarqueurs is the annotated image of the input image. R=230, G=0, B=0, r=1. Supports 24 bit BMP images.
void EcrireImage1(char* input, char* output, uint32_t rayon)	Image segmentation. rayon=5. Supports PNG images.
void EcrireImage2(char*	Image segmentation. rayon=5.

input, char* inputMarqueurs, char* output, uint32_t rayon)	Supports PNG images.
void EcrireLPECouleur1(char* input, char* inputMarqueurs, char* output, uint32_t rayon)	Image segmentation. rayon=5. Supports PNG images.
void Watershed1(char* input, char* inputMarqueurs, char* output, uint32_t rayon)	The watershed algorithm for image segmentation. inputMarqueurs is the annotated image of the input image. rayon=5. Supports PNG images.
void EcrireImage3(char* input, char* inputMarqueurs, char* output, uint16_t rayon)	Image segmentation. rayon=1. Supports PNG images.
void EcrireImageCouleursAleatoires(char* input, char* inputMarqueurs, char* output, uint8_t r, uint8_t g, uint8_t b, uint16_t rayon)	Image segmentation. rayon=1. Supports PNG images.
void Watershed(char* input, char* inputMarqueurs, char* output, uint8_t r, uint8_t g, uint8_t b, uint8_t a, uint16_t rayon)	The watershed algorithm for image segmentation. inputMarqueurs is the annotated image of the input image. a is generally 255, and rayon=1. Supports PNG images.
double CharacterRecognition(char* TargetImage, char* TemplateFileGroup[])	Character matching, supports BMP images, and the return value is the sequence number of the template file matched to the target image. If the return value is 2, it indicates that the image matches the template with sequence number 2 (starting from zero). reference : TemplateFileGroup[]={ "0.txt", "1.txt", "2.txt", "3.txt", "4.txt", "5.txt", "6.txt", "7.txt", "8.txt", "9.txt" };
double CharacterRecognition1(char* TargetImage, char*	Character matching, supports BMP images, and the return value is the sequence number of the template

TemplateFileGroup[])	file matched to the target image. If the return value is 2, it indicates that the image matches the template with sequence number 2 (starting from zero). reference : TemplateFileGroup[]={ "0.txt", "1.txt", "2.txt", "3.txt", "4.txt", "5.txt", "6.txt", "7.txt", "8.txt", "9.txt" };
void CharacterSegmentation(char* input, string OutputFolder, int YHistogramValleyMaxPixelNumber, int XHistogramValleyMaxPixelNumber, double SubImgBlackPixelPercentage, int SingleNumberImgBoundary, int Infinite, double NumberImageBlackPixelPercentage )	Character segmentation. Supports BMP images. OutputFolder is the folder where the results are output, such as "output". The file name for the output results is composed of: X coordinate in the top left corner - Y coordinate in the top left corner - X coordinate in the bottom right corner - Y coordinate in the bottom right corner, YHistogramValleyMaxPixelNumber is the minimum number of black pixels in the valley of the Y-direction histogram, YHistogramValleyMaxPixelNumber=0, XHistogramValleyMaxPixelNumber is the minimum number of black pixels in the valley of the X-direction histogram, XHistogramValleyMaxPixelNumber=4, SubImgBlackPixelPercentage is the percentage of black pixels in a subgraph that is considered a number, SubImgBlackPixelPercentage=0.001, SingleNumberImgBoundary is the edge fill width of a single digital image, SingleNumberImgBoundary=5, Infinite is considered infinite , Infinite=249480 , NumberImageBlackPixelPercentage is the number of black pixels in a

	<p>single digital image that exceeds all digital images, NumberImageBlackPixelPercentage=0.35.</p>
<pre>void CharacterSegmentation(char* input, char*      output,      int BoundaryRemoveGap,      int BinaryGap, int YHistogramValleyMaxPixelNumber, double SubImgBlackPixelPercentage, int Infinite,          int XHistogramValleyMaxPixelNumber, double NumberImageBlackPixelPercentage , int SingleNumberImgBoundary)</pre>	<p>Character segmentation. Supports BMP images.</p> <p>BinaryGap is the global threshold for image binarization , BinaryGap=135, BoundaryRemoveGap is the distance where all edges are set to white, BoundaryRemoveGap=7, Infinite is considered infinite, Infinite=249480 , SingleNumberImgBoundary is the edge fill width of a single digital image, SingleNumberImgBoundary=5, YHistogramValleyMaxPixelNumber is the minimum number of black pixels in the valley of the Y-direction histogram , YHistogramValleyMaxPixelNumber=0, XHistogramValleyMaxPixelNumber is the minimum number of black pixels in the valley of the X-direction histogram , XHistogramValleyMaxPixelNumber=4, SubImgBlackPixelPercentage is the percentage of black pixels in a subgraph that is considered a number , SubImgBlackPixelPercentage=0.001, NumberImageBlackPixelPercentage is the number of black pixels in a single digital image that exceeds all digital images , NumberImageBlackPixelPercentage=0.35.</p> <p>Reference: output="output".</p>
<pre>void CodeEncoding(std::string input, char*      output,      int width, int height, int margin, int eccLevel, int stride_bytes, int comp, int a)</pre>	<p>QR code encoding. input is the string to be encoded, and output is the file name of the generated QR code image.</p> <p>Margin: The margin around the barcode</p>

	<p>ECC: Error correction level, [0-8]  a=1: AZTEC  a=2: CODABAR  a=3: CODE_39  a=4: CODE_93  a=5: CODE_128  a=6: DATA_MATRIX  a=7: EAN_8  a=8: EAN_13  a=9: ITF  a=10: MAXICODE  a=11: PDF_417  a=12: QR_CODE  a=13: RSS_14  a=14: RSS_EXPANDED  a=15: UPC_A  a=16: UPC_E  a=17: UPC_EAN_EXTENSION  Reference: margin=10, eccLevel=-1, stride_bytes=0, comp=1.</p>
std::string CodeDecoding(char* input, int req_comp, int a)	<p>QR code decoding. input is the file name of the input QR code image, and returns the decoding result.  a=1: Lum  a=2: RGB  a=3: BGR  a=4: RGBX  a=5: XRGB  a=6: BGRX  a=7: XBGR  Reference: req_comp=4, a=4.</p>