```cpp
#pragma once
#include "ImageProcessing.h"
#include "ConversionNotSupportedException.h"

namespace Vision
{
    class Conversion :
        public ImageProcessing
    {
    public:
        /*! Enumerator which indicates the colorspace used*/
        enum ColorSpace
        {
            CIE_lab,    /*!< CIE La*b* colorspace */
            CIE_XYZ,    /*!< CIE XYZ colorspace */
            RI,         /*!< Redness Index colorspace */
            RGB,        /*!< RGB colorspace */
            Intensity,  /*!< Grayscale colorspace */
            None        /*!< none */
        };
        ColorSpace OriginalColorSpace;  /*!< The original colorspace*/
        ColorSpace ProcessedColorSpace; /*!< The destination colorspace*/

        Conversion();
        Conversion(const Mat &src);
        ~Conversion();

        void Convert(ColorSpace convertFrom, ColorSpace convertTo, bool chain = false);
        void Convert(const Mat &src, Mat &dst, ColorSpace convertFrom, ColorSpace convertTo, bool chain = false);

    private:

        /*!< Conversion matrix used in the conversion between RGB and CIE XYZ*/
        float XYZmat[3][3] =
        {
            { 0.412453, 0.357580, 0.180423 },
            {0.212671, 0.715160, 0.072169 },
            {0.019334, 0.119194, 0.950227 }
        };

        float whitePoint[3] = { 95.047e-3, 100e-3, 108.883e-3 }; /*!< Natural whitepoint in XYZ colorspace D65 */
```

```
42          //float whitePoint[3] = { 96.42, 100.00, 82.49 }; /*!< Natural whitepoint in XYZ colorspace D50 according to Matlab */
43
44          void Lab2RI(float *O, float *P, int nData);
45          void RGB2XYZ(uchar *O, float *P, int nData);
46          void XYZ2Lab(float *O, float *P, int nData);
47          void RGB2Intensity(uchar *O, uchar *P, int nData);
48          inline float f_xyz2lab(float t);
49      };
50  }
```