影像去交錯電路的設計與實現

The design and implementation of image de-interlacing algorithm

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開發工具：Verilog、FPGA
測試環境：Design Compiler 、Modelsim

一、簡介：

The interlaced video comprises two types of fields in the sequence, one is the odd and another is the even field. The de-interlacing process is to convert the interlaced video into the non-interlaced form as shown in Fig. 1.

The simplest method is intra-field interpolation, which use the existing pixels in the field to generate the empty lines. For instance, the empty lines can be filled via line doubling, which is quite easy to be implemented but the resulting image is not good enough in visual quality.

To solve the quality problem, we implement the image de-interlacing algorithm. As the direction of edge is considered, the de-interlaced image has a better quality than merely doubling the existing lines.
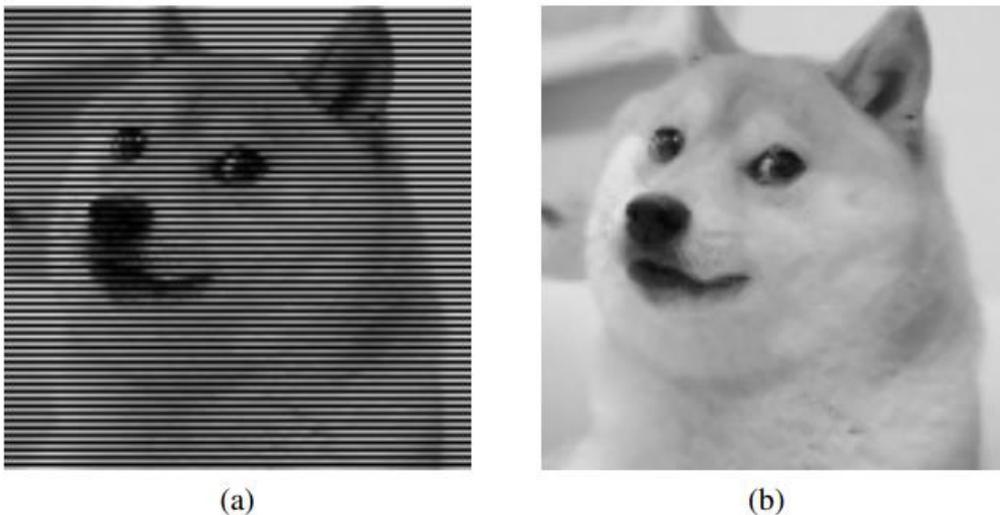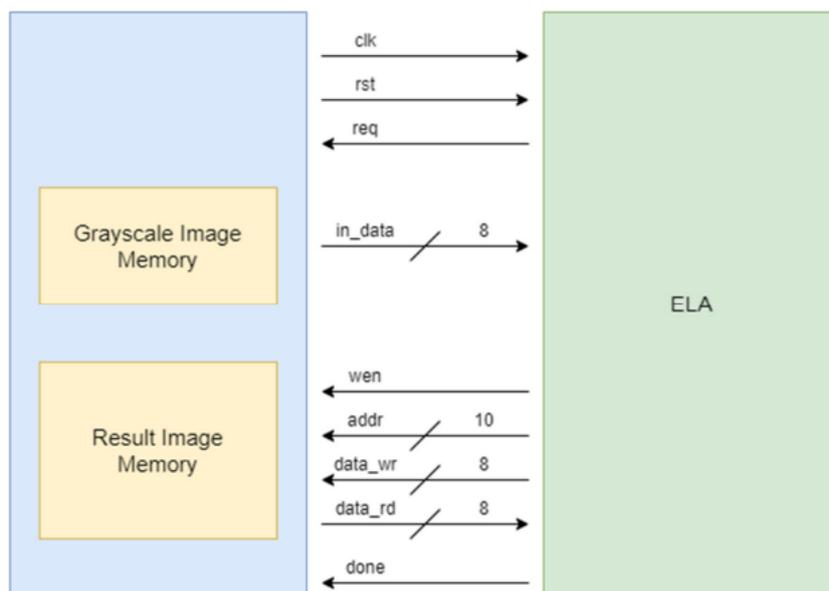

(a)   (b)

Fig. 1. The odd field (non-black row) of an interlaced video sequence (a) and the complete frame after de-interlacing (b).

以下為系統架構圖：

二、測試結果：

影像去交錯電路的輸入端 (interlaced video)：

影像去交錯電路的輸出端 (complete frame after de-interlacing)：