

Recognising Geometric Patterns - Example 17

Peter Fletcher, 20th November 2009.

The problem

Figure 1 shows an image containing two overlapping Hnests. An Hnest consists of three lines (forming an 'H' shape) and two smaller Hnests nested within it (except in the case of the smallest Hnests).



Figure 1: the original image.

The following pages show the results of the program.

The results of the program

The program successfully finds the two Hnests and all their component Hnests.

Figure 2 shows the result of the program. The long narrow red and blue rectangles show all the lines identified by the program. Each green rectangle shows the position of one Hnest (the green rectangle is positioned in the central region of the Hnest).

The parts of one top-level Hnest are highlighted in the figure by black arrows. There are five parts: three lines (forming an 'H' shape), and two smaller Hnests (the arrows pointing towards the bottom-right). The black dots indicate the connections between the parts.

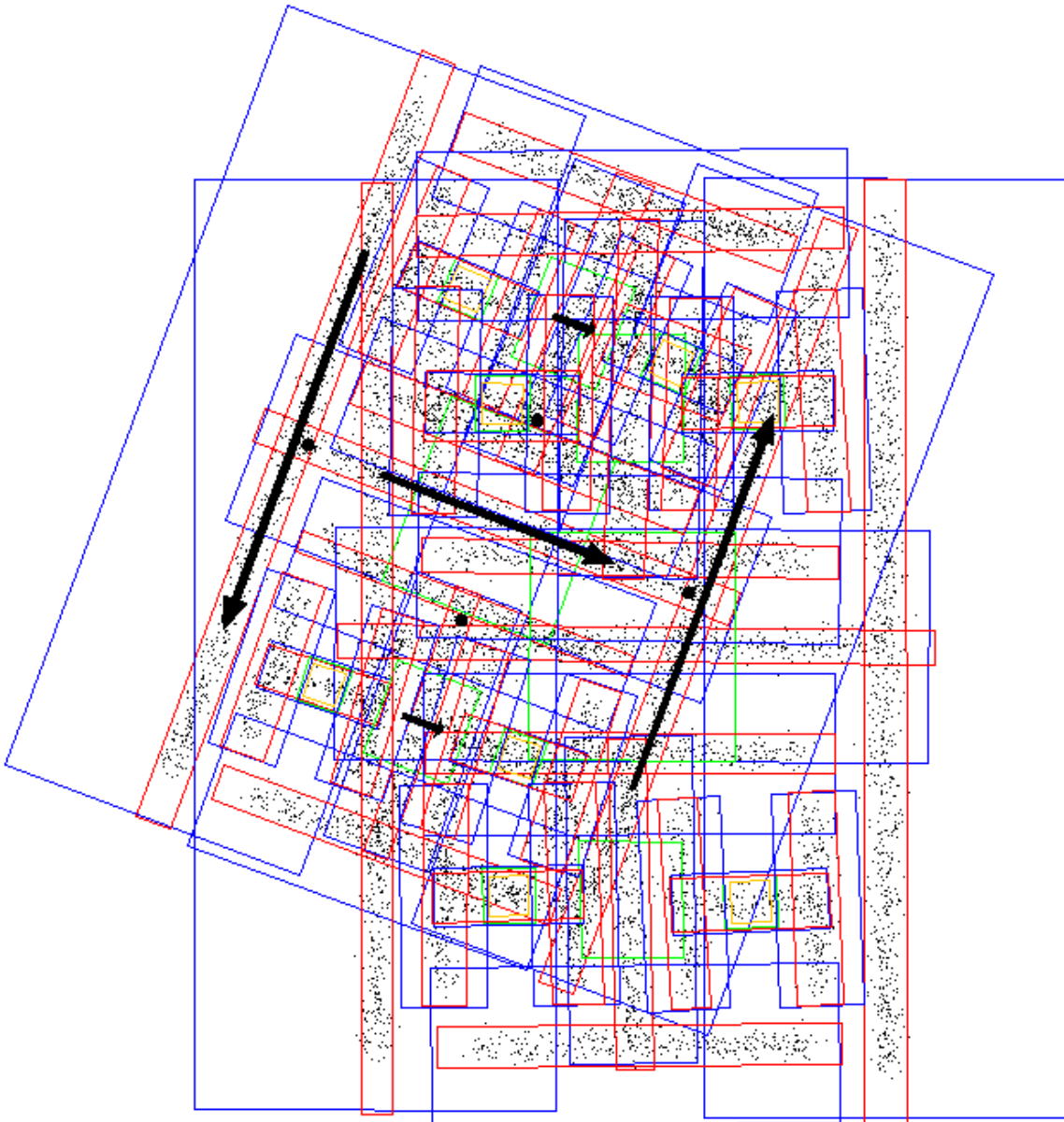


Figure 2: One top-level Hnest found.

Figure 3 shows the parts of the other top-level Hnest, in the same way.



Figure 3: The other top-level Hnest found.

Figures 4–7 show the second-level Hnests, which are parts of the top-level Hnests in figures 2 and 3.

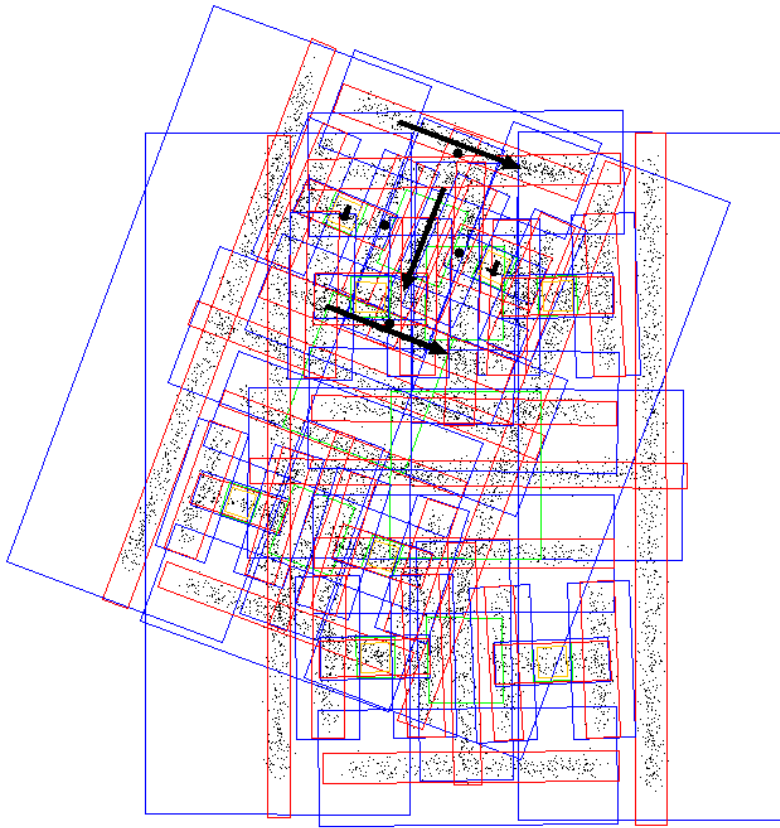


Figure 4: A second-level Hnest, part of the Hnest in figure 2.



Figure 5: Another second-level Hnest, part of the Hnest in figure 2.

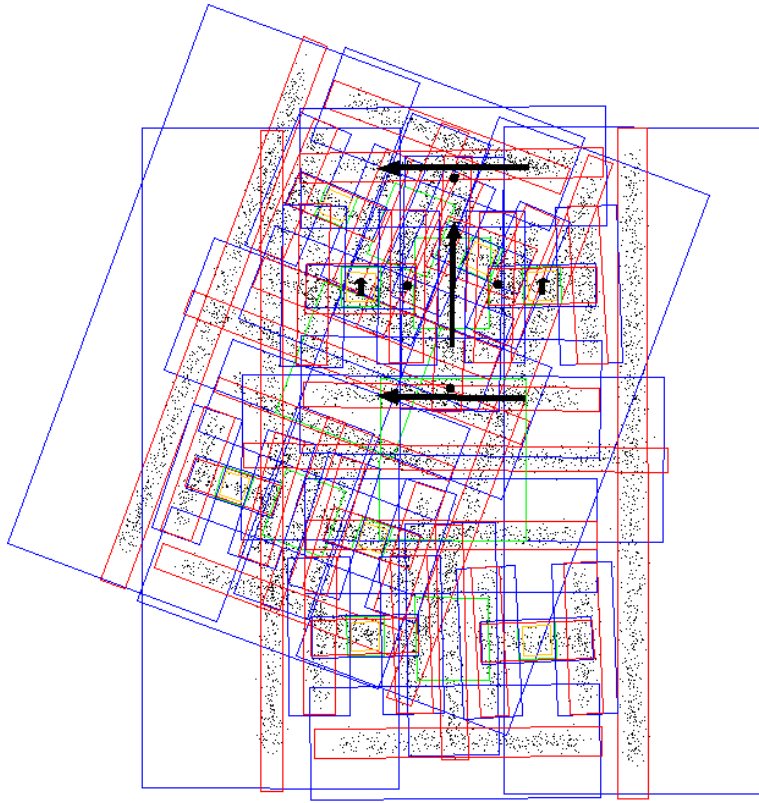


Figure 6: another second-level Hnest, part of the Hnest in figure 3.

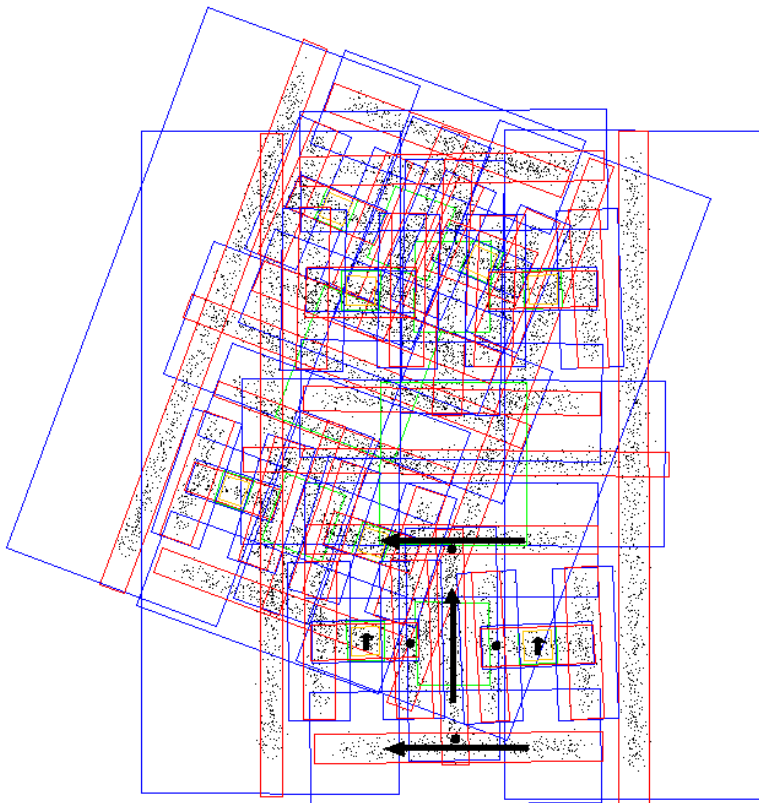


Figure 7: another second-level Hnest, part of the Hnest in figure 3.

Figure 8 shows a third-level Hnest, which is part of the Hnest in figure 4. Because this is at the lowest level it has only four parts: three lines (forming an 'H') and a 'dummy' symbol (marked by an orange rectangle), taking the place of the two component Hnests that would normally be present.

There are seven other third-level Hnests, components of the Hnests in figures 4–7.

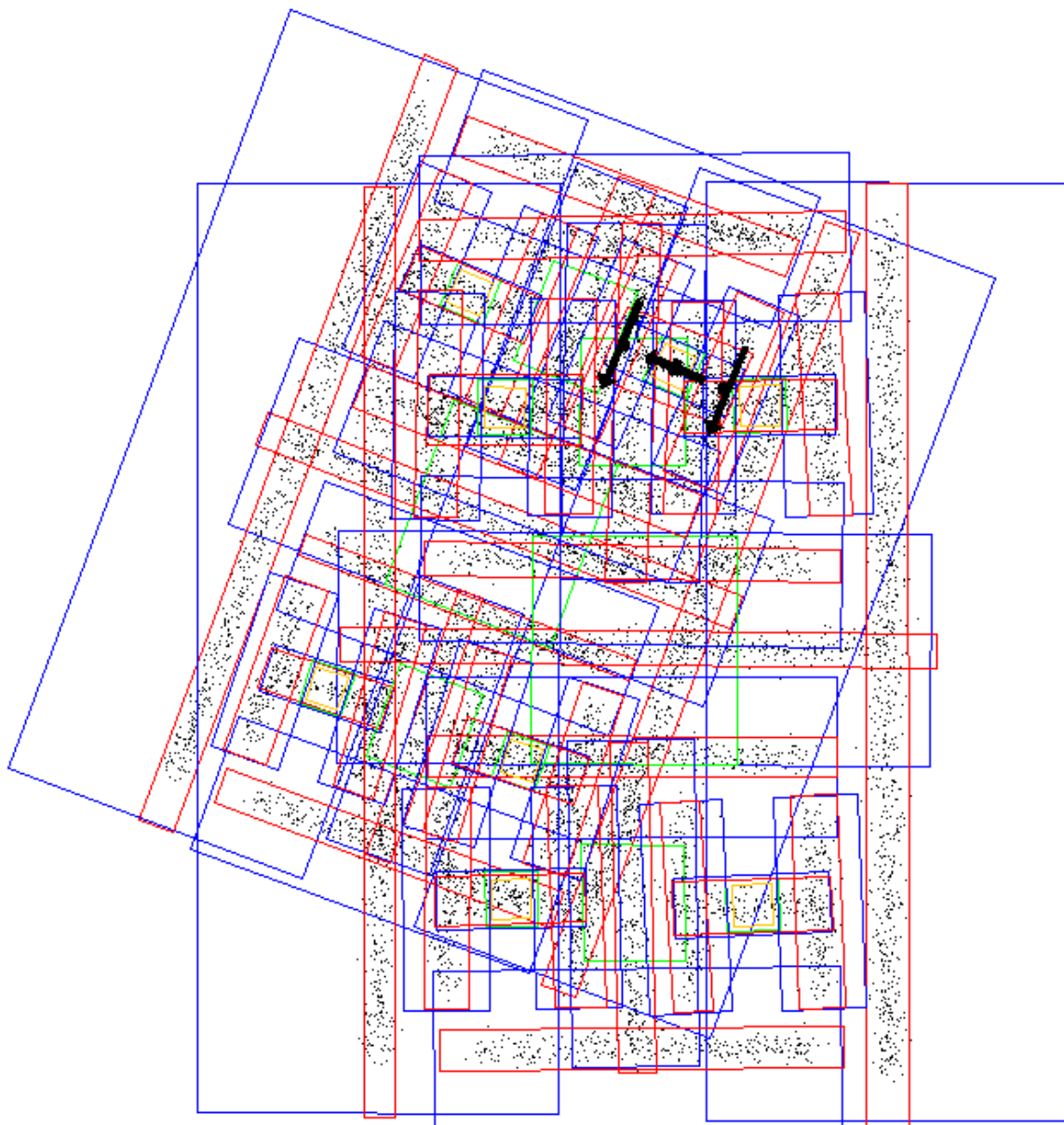


Figure 8: a third-level Hnest.