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Abstract **This report summarizes the work done on segmentation method & relevant SW prototype of the Fresh WP2**

Keyword List WP2, image segmentation

Relevant SW prototype



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SEGMENTATION METHOD & RELEVANT SW PROTOTYPE

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SEGMENTATION METHOD & RELEVANT SW PROTOTYPE

1. INTRODUCTION

The basic analysis is done on the pixels level. This function gives the first informations used by the segmentation tools.

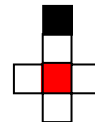
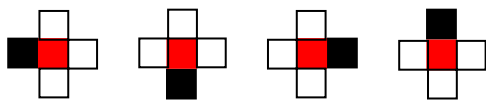
2. CONNECTED PIXELS

2.1. CONNECTED NEIGHBOURS

There is two possibilities for the connexion definition.

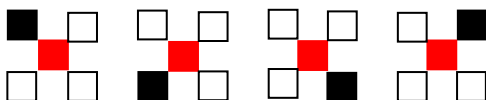
It is the relative position between the two neighbours which determine if they belong to the same block or not.

In the two cases, the following rules must be cheked.
 A neighbour must be horizontally or vertically aligned.



The distance between the neighbours can be a parameter.

A second rule with a distance parameter too, can be add to the first one.
 This case allows a neighbour aligned in a diagonal line.



The results are the blocks of connected pixels, inside the selection area of the choosed segmentation tool.
 These blocks will be the source of each tool processing:

- Assigment to a layer.
- Inclusion in a group with other blocks.
- Etc.

2.2. RECURSIVE SEARCH

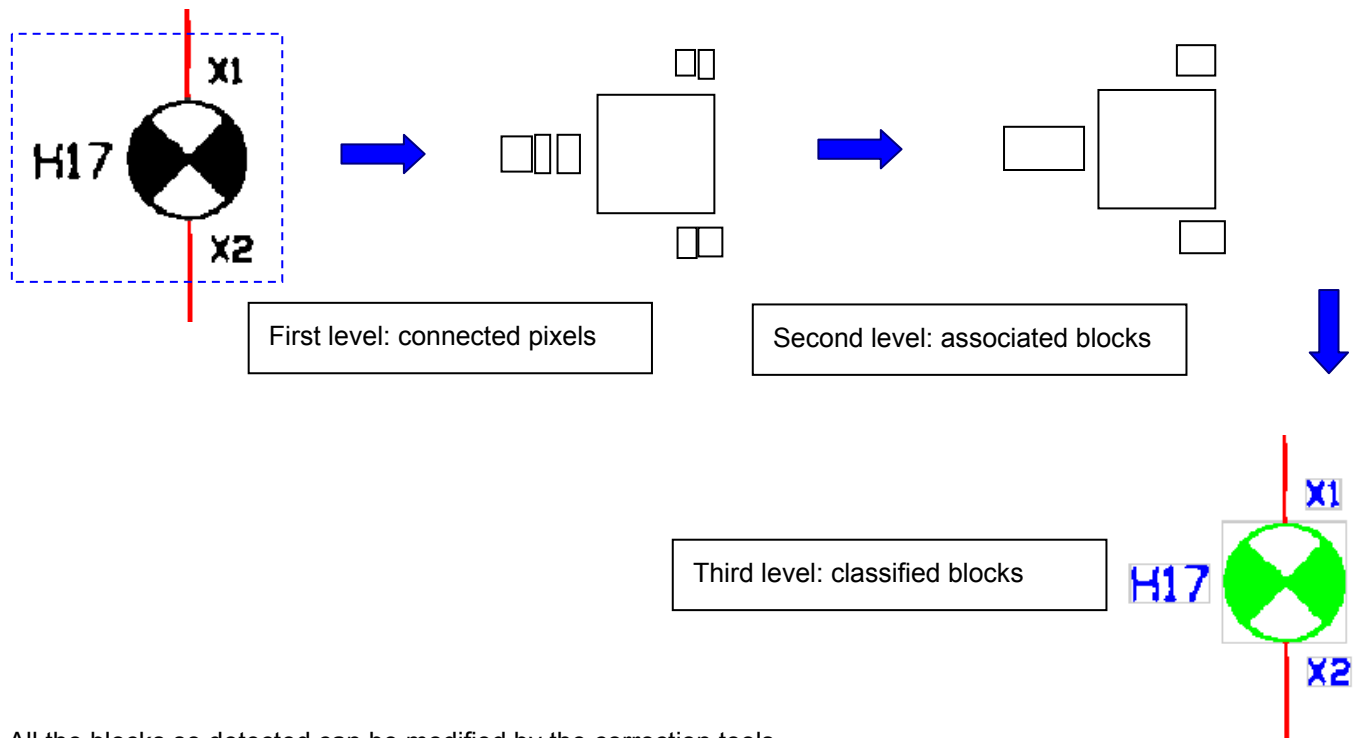
The first pixel found which don't belong to a block, search its neighbours. For each one, always in the same order, the process is repeated until no more neighbour could be found.
 Finally all the neighbours pixels are included in a 'TConnex' object.

Tconnex
 Size (left, top, right, bottom)
 Pixels list

3. BLOCKS ASSOCIATION

When the operator select an area in the picture, any blocks of connected pixels may be detected. At this step of the analyse, there is no link between all of them.

Each segmentation tool have its own association rules, one of them can group and classify automatically the blocks it has found.



All the blocks so detected can be modified by the correction tools.

4. WORDS DETECTION

In the electricals documents, the text has some different orientations. Frequently horizontal and vertical.

Two near neighbours words can have different orientations.

Therefore it is sometime difficult to group exactly all the characters of each word.

The first analyse made on a character block, is the measure of its height on width ratio. This value gives a first indication on a possible word orientation, and thus on the position of the next characters to associate.

Some erroneous values can come from the connected characters. To obtain the better results, different possibilities are compared, horizontal and vertical associations around a same character, and the better rate is kept.

5. CUTTING OF THE CONNECTED CHARACTERS

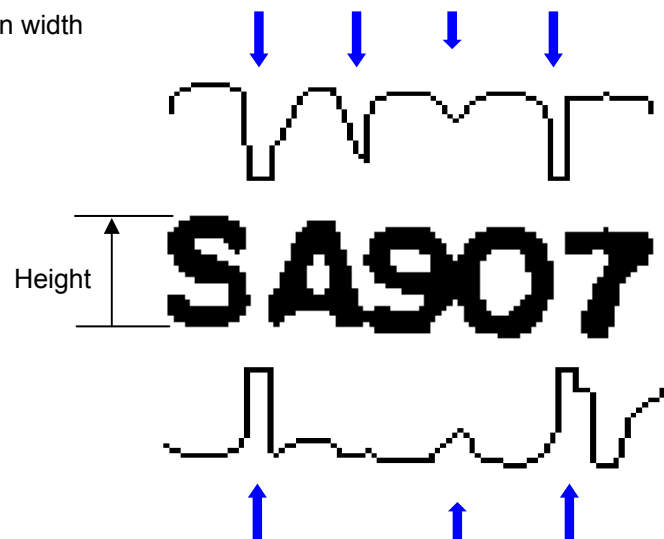
A word block can contain some connected characters. Its height gives an indication on the mean width of each included characters.

But the used fonts can have constant width for each character or not.

In the first case the position of the following character is easy to find, but in the second case, each character has a specific width.

The contour see from the bottom and from the top gives an indication on the contour of each character.

These informations, associated with the calculated mean width allow to propose to the user any solutions to cut a word.



We can expect that the characters recognition can improve this method. Indeed, a high confidence rate can validate each cut position.

It must be evaluated with the 'Recognition of textual' task results.

6. CONCLUSION

We have available today all the main tools to realize the complete document segmentation. According to the specials document difficulties, the user can easily choose the most adapted tool, automatic or manual.