Proposal for bank-notes neutralization criteria

Forewords:

Until now the requirement is that every banknote in the container covered by the neutralization system, after separation of each note, if necessary, must be neutralized to at least XX% by area on each face.

This definition is not sufficient in theory.

This banknote is compliant with 20% area criteria.



But we can cut the dyed part



The upper part can be exchange by a national bank.

Or we burn the dyed part.



Or assemble to un-dyed part from two banknotes:



One enhancement could be find in Swedish requirement that impose that at least two edges of the note must be destroyed by at least 60% like that:



But we can do the same cutting, burning ...

If we divide a banknote in four quadrants we can specifies that the four quadrants must be partially dyed or destroyed:



So the criteria should be at least 20% of each quadrant must be neutralized.

This criteria is sufficient for visual examination. But may be not for a machine. Sensors are not on the edges but more on the center of the note (to be confirmed).

If we have a single sensor machine, among the 3 samples before the second one is perhaps the easiest to detect.

The following will apply if the notes can still be read by a machine.

So we can define a grid with different zones having more or less weight like this one:

1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	2	2	2	2	2	2	2	2	2	2	2	2	2	1
1	2	3	3	3	3	3	3	3	3	3	3	3	2	1
1	2	3	4	4	4	4	4	4	4	4	4	3	2	1
1	2	3	4	5	5	5	5	5	5	5	4	3	2	1
1	2	3	4	5	6	6	6	6	6	5	4	3	2	1
1	2	3	4	5	6	7	7	7	6	5	4	3	2	1
1	2	3	4	5	6	6	6	6	6	5	4	3	2	1
1	2	3	4	5	5	5	5	5	5	5	4	3	2	1
1	2	3	4	4	4	4	4	4	4	4	4	3	2	1
1	2	3	3	3	3	3	3	3	3	3	3	3	2	1
1	2	2	2	2	2	2	2	2	2	2	2	2	2	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

The total of points on this grid is 553.

Applying this grid to the 3 samples we obtain these scores: 296 for the first, 267 for the second, 91 for the last.

For the first two there is at least 50 points per quadrant (30% of the maximum of points per quadrant)

For the third one the best quadrant totalizes only 30 points.

A rule with this grid could be: the minimum amount of point for a quadrant if at least 30% of the total of points for a quadrant.

This type of grid can be more sophisticated, have different size and resolution.

1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

For a reading machine with 3 sensors it could be a grid like this one:

Computing process can be done by software.

For banknotes partially destroyed (by fire or chemicals) that can't be read by a machine or rejected by a machine criteria of at least 10% of each quadrant and at least 20% of the full area is sufficient. The banknote must be manipulated to eliminate burned parts.



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