

# Software Detection of Currency

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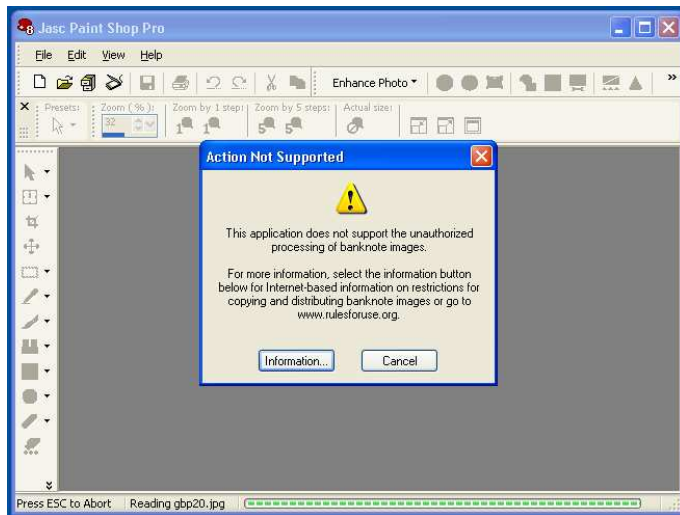
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<http://www.cl.cam.ac.uk/users/sjm217/>

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## Background

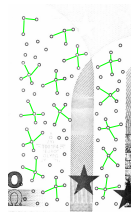
- ▶ New image processing software incorporates code to prevent images of currency being processed
- ▶ Includes Adobe Photoshop, JASC Paintshop Pro, HP printer Drivers, Canon scanner software
- ▶ Details of the detection algorithm not publicly known, even by the authors of software which uses it
- ▶ Code seems to have been produced by Digimarc, on behalf of the G10 Central Bank Counterfeit Deterrence Group (27 banks)

rulesforuse.org



## The EURion Constellation

Markus Kuhn, Computer Laboratory, University of Cambridge, 2002–02–08



Modern colour photo-copying machines refuse to copy many of the more recent banknotes, such as the pound, mark or euro. But how do they decide, what is a banknote? They search for a simple geometric pattern, consisting of five 1 mm large circles that appears on many more recent banknotes, usually in yellow, but often also in green or orange. The circles are particularly well visible in the blue channel, can be easily detected with a matched filter and tested for the presence of the characteristic constellation.

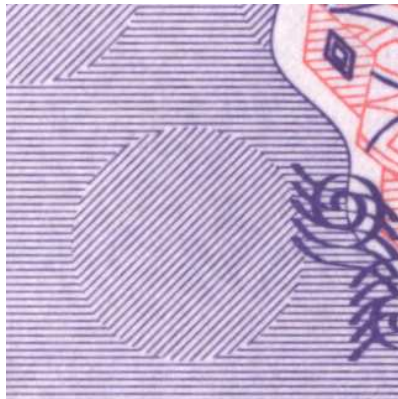
## Strongly Detected Regions (1)



## Strongly Detected Regions (2)



## Strongly Detected Regions (2)

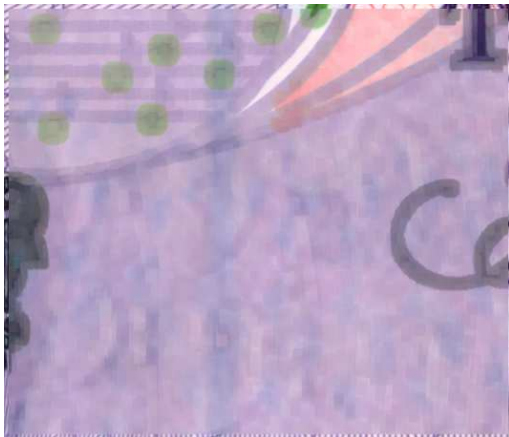


## Strongly Detected Regions (2)



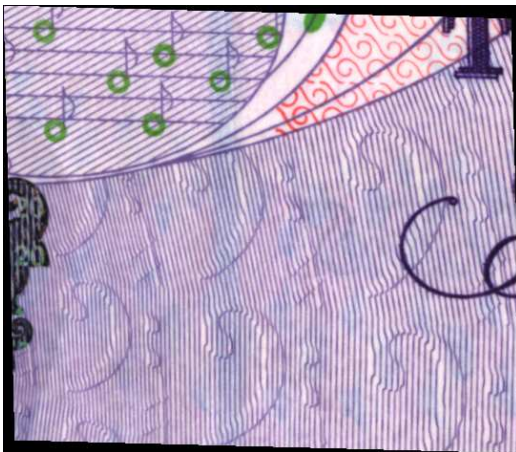


## Midpoint Filtering



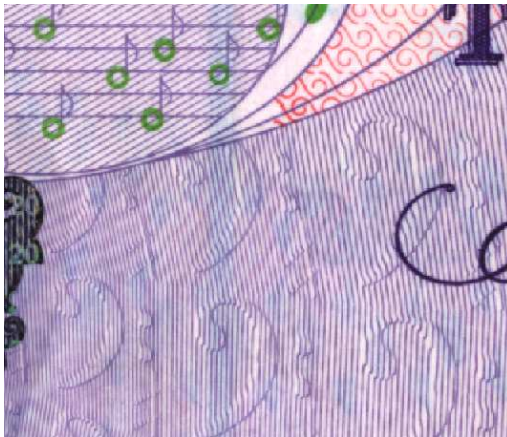
CM\_midpoint(10)

# Shearing



CM\_shearing(2.6)

# Resampling



CM\_sampledownup(0.8, 1/0.8)

# Wavelet Compression



CM\_waveletcompression(0.5)

For more information...

Results of other tests and further details:

<http://www.cl.cam.ac.uk/users/sjm217/projects/currency/>

Contact:

<http://www.cl.cam.ac.uk/users/sjm217/>