

Fig. 2 - Example of the application of the DCT of block size  $N = 16$  with zonal sampling to a Landsat image.

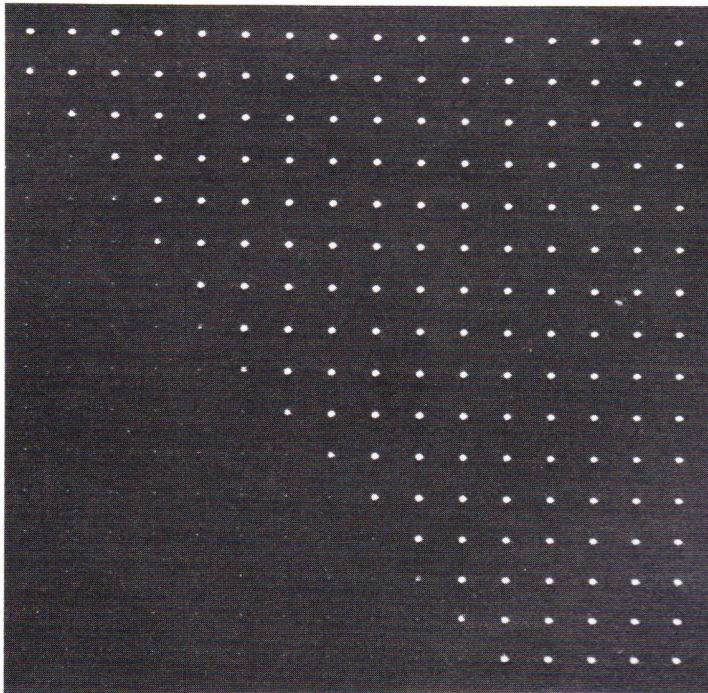


Fig. 3 - Image obtained after the application of the DCT of block size  $N = 16$  to the original image of Figs. 1 and 2.



The application of the DCT (again through the FCT algorithm) to another class of images is shown in Figs. 4 - 6. Fig. 4 is the original image of the Old Bridge and the Arno River in Florence. Fig. 5 is the reconstructed image after the application of threshold sampling to a block size transformation  $N = 32$ . The obtained compression ratio is  $CR = 42.63\%$ . For this block size Fig. 6 shows the transformed image: it again confirms the energy concentration property of the DCT.

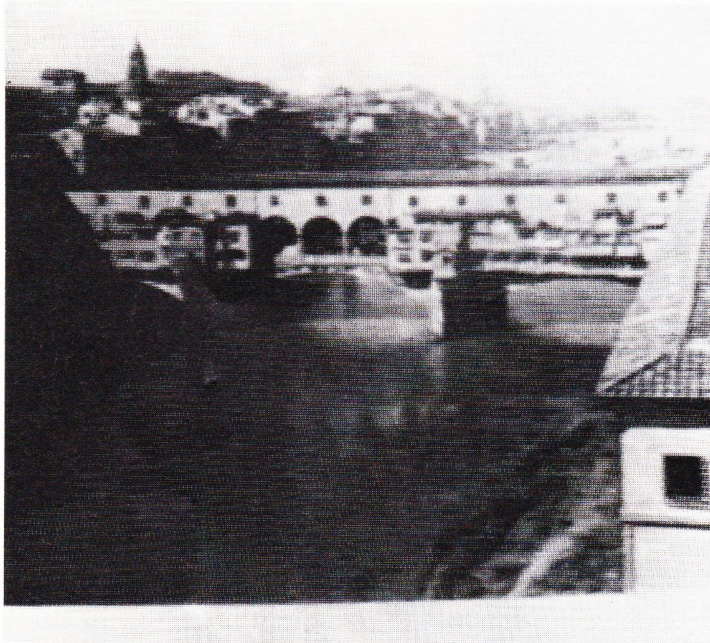


Fig. 4 - Original image of the Old Bridge and the Arno River in Florence.

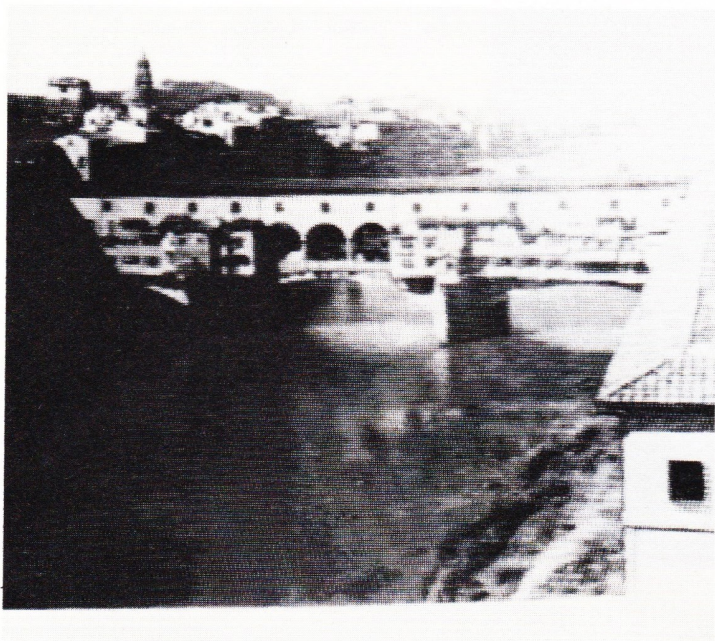


Fig. 5 - Reconstructed image after the application of the DCT of block size  $N = 32$  with threshold sampling (obtained  $CR = 42.63\%$ ).



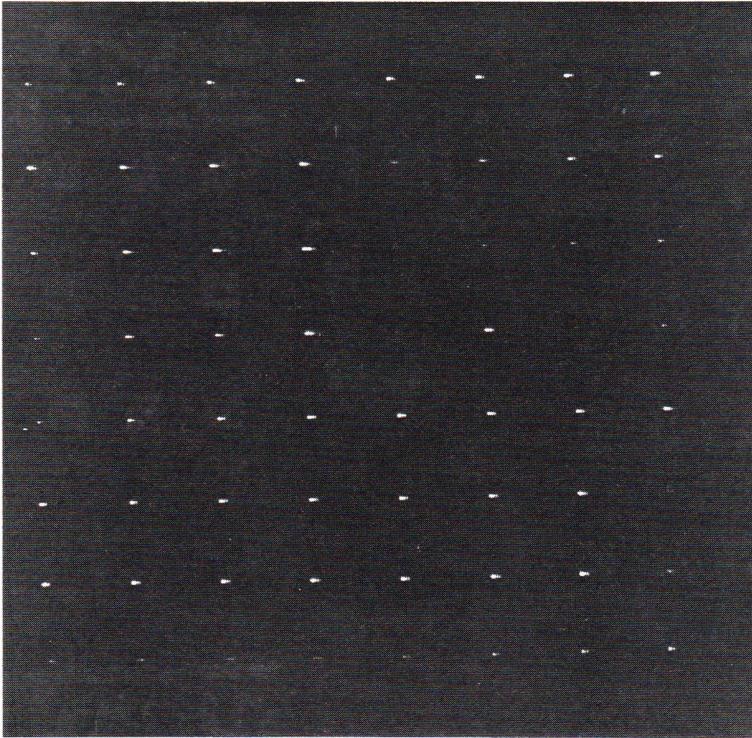


Fig. 6 - Image obtained after the application of the DCT of block size  $N = 32$  to the image of Fig. 4.

#### CONCLUSIONS

The application of the DCT to the image data compression operation and the obtained results have been discussed. Both threshold and zonal samplings have been considered and also a comparison of the performance of DCT and FFT algorithms has been presented. A better efficiency is achieved by the DCT with the threshold sampling method. Even if the results have been obtained without considering in detail the problem of efficient means of identification and coding of the selected transformed coefficients, some efficient techniques are available, for example [8], for universal coding that should confirm, and hopefully even improve, the performance of the data compression techniques presented in this paper.

The obtained quantitative and qualitative results have shown the feasibility of the application of the DCT (in particular through its fast algorithm) to the image data compression, achieving a good reduction of the overall data, a negligible level of image reconstruction error and an acceptable computational complexity.

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## REFERENCES

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