**Paper No: PU-ECE- 03**

**Design of Robust Image Watermarking Technique Based on Shearlet Transform and QR Matrix Decomposition**

Sivakannan Subramania, L. Omprakash Narayananb, C. Kamalanathanc, Sunitha Pandad & **Bhaskara Sreenivase**

a. Department of Electronics & Communication Engineering, MVJ College of Engineering, Bangalore, 560067, Karnataka, India

b. Orion Business Innovation, Chennai 600041, Tamilnadu, India

c,d.Department of Electronics & Communication Engineering, GITAM School of Technology, GITAM University, Bangalore 561203

e. Department of Electronics & Communication Engineering, School of Engineering, Presidency University, Bangalore 560 064

**Abstract**

Watermarking is the method by which a watermark image related to the original cover image is embedded into the cover image. Images have become an important part in digital media. Thus it is important to secure the image data and prevent its illegal duplication. Image watermarking aims at serving this purpose. Wavelet technique is commonly used technique to embed watermark on the cover image in transform domain. The watermark data and cover image are not distorted after applying transform; hence this technique is used widely in this field. The upgraded version of wavelet technique is shearlet transform, thus upgraded version improves the presentation of multidimensional data and transform is mainly based on multidirectional and multi-resolution. The shearlet transform overcome the drawback of wavelet’s edge presentation of image which is the main characteristic of shearlet and hence the host image is modelled with different texture. There are two characteristics of watermark, namely, Imperceptibility and robustness. Imperceptibility is achieved using Shearlet transform, whereas robustness and security improvement is achieved using QR decomposition. Analyzing the experiments undergone on the various attack of host image with distinct texture characteristics and thus the result shows that this technique has a good resistance to attacks and provides a efficient transparency and high robustness.

**Keywords:**

[Image watermarking](https://www.tandfonline.com/keyword/Image+Watermarking), [Discrete Shearlet Transform](https://www.tandfonline.com/keyword/Discrete+Shearlet+Transform), [QR decomposition](https://www.tandfonline.com/keyword/QR+Decomposition), [Shearlabs](https://www.tandfonline.com/keyword/Shearlabs), [Imper-ceptibility](https://www.tandfonline.com/keyword/Imper-ceptibility)

**Publication Details:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Journal Name** | **Vol.** | **Month & Year** | **Page No.** | **Publisher** | **Scimago Ranking** |
| Journal of Inter Disciplinary Mathematics | 23(1) | April, 2020 | 163-174 | Francis & Taylor | Q4 |