CHAPTER 2
LITERATURE REVIEW

J.J.K. O’Ruanaidh et al (1997), has outlined the theory of integral transform invariants and showed that this can be used to produce watermarks that are resistant to translation, rotation and scaling. The importance of invertibility of the invariant representation was emphasised. One of the significant points is the novel application of the Fourier-Mellin transform to digital image watermarking [5].

S.M. Smith et al (1997) had described new structure preserving noise filter, closely related to the SUSAN feature detectors. Without needing to formulate a rigid model of the image, only those sections of the local image structure which are part of the same region” as each pixel are used to form an estimate of that pixel's original brightness. Quantitative and qualitative results show the SUSAN noise filter to be better at reducing noise (whilst minimizing degradation of the underlying image) than other filters tested [26].

The author had described a new principle which allows image edges, lines, corners and junctions to be accurately and quickly found, and also a related method for reducing noise whilst preserving image structure. The localization of the features is independent of the mask size used, and noise suppression is shown to be good. Connectivity of edges and lines at junctions is good. SUSAN noise reduction has been shown to be superior to the other methods tested.

P. Bas et al (2002) had presented a new approach for watermarking of digital images providing robustness to geometrical distortions. The weaknesses of classical watermarking methods to geometrical distortions are firstly outlined. Geometrical distortions can be decomposed into two classes: global transformations such as rotations and translations and local transformations such as the Stir Mark attack. An overview of existing self-synchronizing schemes is then presented. Thesis schemes can use periodical properties of the mark, invariant properties of transforms, template insertion, or information provided by the original image to counter geometrical distortions[16].
M.Y. Wu et al. (2003), In this, author have developed a robust object-based watermarking algorithm using the scale-invariant feature transform (SIFT) features in conjunction with a new data embedding method based on Discrete Cosine Transform (DCT). The message is embedded in DCT spaces of randomly generated blocks in the selected object region. To recognize the object region after being distorted, its SIFT features are registered in advance. In the detection scheme, we firstly detect the object region by using feature matching. The transformation parameters are then calculated, and the message can be detected. Experimental results demonstrated that our proposed algorithm is very robust to geometrical distortions such as JPEG compression, scaling, rotation, shearing, aspect ratio change, image filtering, and so on [23].

Y. Xin et al. (2004) had given views on Tchebichef moments which are discrete orthogonal moments and present a number of advantages over moments of continuous orthogonal basis. The implementation of Tchebichef moments does not involve any numerical approximation since the basis set is orthogonal in the discrete domain of the image coordinate space. A new geometric invariant blind image watermarking method based on algebraic invariants is proposed with the introduction of the invariant Tchebichef moments. The watermark is generated randomly independent to the original image and embedded by modifying the invariant Tchebichef moments of the original image. ICA is utilized by watermark detector which can extract the watermarks blindly not merely just detect them. The mathematical description has been shown about the invariant moment sand the simulation is also performed. The approach proposed in this paper with stands rotation, scaling and translation by being invariant to these transformations. This avoids the need for an exhaustive search for an embedded watermark in a complicated multi-dimensional space. The computation aspects of the proposed watermarking system are also described. Experimental results show that the proposed image watermarking technique is robust against attacks performed by Stirmark, such as geometric distortions, filtering, additive noise, JPEG compression[13].

Matthew Elliott et al. (2006) had focused on invisibility, recoverability, and robustness, in applying watermarking. All of these are intricately linked. The less the image is affected, the easier it is to remove the watermark; recoverability is heavily reliant on robustness, for the watermark must still be present even after morphological attacks. Attacks may be accidental or
intentional, but all images that are digitally watermarked may be subject to attack. Most attacks are attempts to alter the image in order to destroy the watermark while preserving the image. Since watermarks may be hidden copyrights, this is extremely undesirable. In order to address the issue of robustness, we decided to allow the user to use seven different morphological attacks to see how the extracted watermark is affected. The morphological attacks that are provided in the GUI are image scaling and cropping, as well as Gaussian low-pass (blur) filtering, unsharp contrast-enhancement filtering, averaging filtering, and circular averaging filtering. These attacks can be used to alter a watermarked image. The watermark can then be extracted and compared to the original watermark, allowing the user to evaluate the method’s performance with respect to alterations. This allows the user to consider robustness in terms of recoverability, and how each of the methods stand up to various changes in the image [29].

Aree Ali Mohammed (2009) had proposed watermark in a frequency domain is invisible to human eyes and very robust to various attacks, such as image compression, image filtering, geometric transformations and noises. In frequency domain, the non-blind watermarking scheme is more robust than semi-blind scheme [38].

Deepa Satish Khadtare et al (2011) had given views on interest points Digital watermarking technique is a process of embedding an unperceptive signature or a copyright message such as a logo into a digital image. The advantages of watermarking are its imperceptibility and robustness. In order to protect original data, watermarking is first consideration direction for digital information copyright. In addition, to achieve high quality image, the algorithm maybe cannot run on embedded system because the computation is very complexity. In this paper, we propose a novel Discrete wavelet transform (DWT) based watermarking techniques algorithm which efficient inserts watermarking on digital image and very easy to implement on digital signal processor. The implementation work is carried on Black fin DSP processor. In further, we select a general and cheap digital signal processor which is made by analog device company to fit watermarking application. The experimental results show that the video frame quality by watermarking insertion can achieve an average of 38dB after undergoing image processing, geometric transformation attacks, video frame watermarking attacks can be accepted inhuman vision and the extracted watermark is still recognizable [40].
In this thesis, interest points in K-harris feature point detection are employed in the video watermarking. Applying K-harris method to video watermarking is beneficial to locate the embedding frame index and coordinates, which improves the robustness resisting against both spatial and temporal attacks efficiently. The quantization scheme realizes the blind extraction meeting the requirement for video watermarking. The experimental results (in chapter 4) show that the proposed scheme preserves not only the high perceptual quality, but also is robust against various attacks. The key idea of the proposed algorithm is the combination of the K-harris feature point detection algorithm and watermarking algorithm, the performance of K-harris detection scheme influences the performance of the whole scheme greatly.

Watermarking is a copy protection system that allows tracking back illegally produced copies of the protected multimedia content. Compared with other copy protection systems like Digital Rights Management, the main advantage of watermarking is that the watermark is embedded permanently in visual data of the content but at the cost of slight loss in fidelity.