Further, the LL sub-band is decomposed into appropriate size blocks. In various blocks of LL sub-band, the components of the watermark image that are achieved by applying SSVD are inserted. The proposed method display good robustness against various attacks. The proposed technique exploits stability property of singular values and the localization and spatio frequency property of DWT. The correlation coefficient value close to 1 and PSNR value above 30 dB is achieved.

Sheth and Nath [8] proposed a new secured digital Watermarking method for the validation of data based on the combination of discrete wavelet transform (DWT) and discrete cosine transform (DCT) methods along with cryptographic method known as Arnold Transform. The proposed method is efficient and secure. The proposed method has been implemented in MATLAB environment.The proposed method provides good robustness and perception transparency to the original and watermarked image against various types of attacks like noise, cropping and scaling. It is found that in terms of Peak Signal Noise Ratio (PSNR), Mean Square Error (MSE), and Similarity Factor (SF), the proposed method is DCT-superior to LSB and DCT methods.

Pardhu and Perli [9] proposed a secured algorithm for inserting digital watermarks into images. The proposed technique shows that the watermark is imperceptible in the domain. The watermark is inserted in a multi-resolution way in the DCT and DWT domain of an image. Once the watermark is extracted in the decoding phase from the watermarked image, various performance measures like correlation coefficient and peak signal to mean noise ratio (PSNR) are calculated. To check the robustness of the proposed technique various types of attacks have been applied to the watermarked image.

Furqan and Kumar [10] proposed a robust and blind digital image watermarking technique for copyright protection based on the combination of both DWT and SVD techniques. Initially, the original image is decomposed into 4 sub-bands using 2-D DWT, and then SVD is applied to each band by modifying their singular values. Different types of technologies have been developed so as to protect copyright material from illegal duplication, such as key-based cryptographic technique, digital watermarking etc. In digital image watermarking, by using an algorithm a signature or copyright message is embedded secretly in the image. The watermarked image is subjected to different attacks like rotation, cropping, adding noise, blurring, compression, the originally embedded watermark image is extracted from all the bands and are compared on the basis of their PSNR and PSNR values.

Makbol and EeKhoo [11] proposed a secure and robust digital image watermarking technique for copyright protection. The proposed method uses the integer wavelet transform (IWT) and singular value decomposition (SVD). In this scheme, the grey-image watermark pixels values are inserted directly into the singular values of the 1-level IWT decomposed sub-bands. The experimental results show the effectiveness of the proposed technique in terms of imperceptibility, robustness, and capacity due to the IWT and SVD properties.

Dejun *et al.,* [12] proposed a robust digital image watermarking method based on discrete wavelet transform (DWT) and singular value decomposition (SVD). In this scheme, the singular values of small blocks of the low-frequency approximation sub-band (LL) of the DWT domain are modified to insert the watermark into the cover image. The experimental results show the robustness of image watermarking against various types of attacks.

Santhi and Thangavelu [13] proposed another Singular Value Decomposition and Discrete Wavelet Transform based procedure for concealing watermark in full frequency band of color images (DSFW). They measured the watermarked image quality and extracted watermark using various parameters like peak signal to noise ratio (PSNR) and normalized correlation respectively. The algorithm proposed by them shows the robustness of watermarked image against various attacks, for example, salt and pepper noise, Gaussian noise, JPEG compression and cropping. A good PSNR value of 36dB was found.

Tao *et al.,* [14] analysed and reviewed the different watermarking techniques in spatial and transform domains. In this scheme, different techniques using discrete wavelet transform and singular value decomposition in transform domain have been reviewed. Further, the analysis of the watermarking techniques has been represented in the form of tables taking into consideration various factors of image watermarking such as capacity, security, imperceptibility, robustness and false positive. In this scheme, various attack techniques were used in order to assess the digital watermarking system.

III. PROPOSED SYSTEMS

The proposed watermarking scheme is based on lifting wavelet transform (LWT) and singular value decomposition (SVD). The proposed work is focused on enhancing the robustness of watermark by working in the frequency domain and thereby improving the imperceptibility of the watermark. The image is decomposed first into four frequency bands: LL, LH, HL, and HH bands. LL depicts the low-frequency band and gives the approximate details, LH depicts the middle frequency band and gives the vertical details, HL band depicts the middle frequency band and gives the horizontal details, HH band depicts the high frequency and it gives the diagonal details of the image. In this scheme, HH band is selected to insert the watermark since this band contains the finer details and contributes inconsiderably to the image energy. The fundamental model of Digital Image Watermarking comprises of two sections:
1. Watermark embedding 2. Watermark extraction.