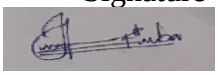
MES COLLEGE OF ENGINEERING, KUTTIPPURAM
DEPARTMENT OF COMPUTER APPLICATIONS
20MCA246 – MAIN PROJECT

PRO FORMA FOR THE APPROVAL OF THE FOURTH SEMESTER MAIN PROJECT

(Note: All entries of the pro forma for approval should be filled up with appropriate and complete information. Incomplete
Pro forma of approval in any respect will be rejected.)

Main Project Proposal No : 1 *(Filled by the Department)*	Academic Year : 2021-2022 Year of Admission: 2020

1.Title of the Project : Data Security Using SVD Based Digital Watermarking Technique
2.Name of the Guide : K P Balachandran
3.Number of the Student : 1
4.Student Details (in BLOCK LETTERS)

	Name	Roll Number	Signature
1.	HIBA NAFEESATH	20	

Date:

Approval Status : Approved / Not Approved

Signature of
Committee Members

Comments of The Mini Project Guide Dated Signature

Initial Submission :

First Review :

Second Review :

Comments of The Project Coordinator Dated Signature

Initial Submission:

First Review :

Second Review :

Final Comments : Dated Signature of HOD

DATA SECURITY USING SVD BASED DIGITAL WATERMARKING TECHNIQUE

20-HIBA NAFEESATH

Introduction:

Illegal misuse of copyright information such as forgery, manipulation and duplication is not uncommon. To prevent this digital watermarking techniques are widely used thus increasing the robustness and imperceptibility properties in a digital multimedia. The main objective of developing a digital image watermarking technique is to satisfy both imperceptibility and robustness requirements.Digital watermarking appears as an efficient means of securing multimedia contents such as copyright protection and authentication. In this paper a hybrid scheme using Singular Value Decomposition (SVD) and Discrete Wavelet Transform (DWT) is being proposed. SVD and DWT are matrix based operations, this hybrid method prevents convolution which would otherwise consume a lot of resources. Computation of a larger set of data occurs faster due to the use of SVD. The watermarking scheme proposed is blind and uses a signature based authentication mechanism at the decoder which improves security. The method is subjected to various attacks and is evaluated in terms of PSNR and correlation values. A simple digital watermarking algorithm based on discrete wavelet transform and singular value decomposition has been proposed in this paper. This proposed method helps to understand basic concept of digital watermarking. Experimental results demonstrate the effectiveness of the proposed method. One of the major advantages of the proposed scheme is the robustness of the technique on wide set of attacks.

Objectives:

The main objective of developing a digital image watermarking technique is to satisfy both imperceptibility and robustness requirements.The objective of this project is to develop a watermarking scheme which is based on cascading DWT with SVD. DWT decomposes the image into four frequency bands: LL band which represents low frequency, HL and LH representing middle frequency and HH represents high frequency band. LL band gives approximate details. In this proposal, we select LL band to embed the watermark because it contributes significantly to the robustness of an image. Thus it can survive certain image processing operations like noise addition, intensity manipulation, etc. In this SVD based watermarking scheme, instead of embedding the watermark directly on the wavelet coefficients SVD transformation is applied to the whole image and then the singular values of the host image are modified to embed the watermark.

Problem Definition:

To tackle with copyright issues, digital watermarking comes out as suitable solution. Digital watermarking is process of inserting watermark information into host image. Watermark is the copyright information which protects digital data from the illegal replication and distribution. Watermark can be inserted into digital data by various methods as reported in literature. These methods mainly classified into two categories called transform domain and spatial domain. In spatial domain, watermark is inserted inside the digital content by modifying pixel values. Least significant bit is one of the spatial domain has been presented in history. At transform domain, digital data is represented in terms of frequencies. In this paper, transform domain method is employed. This paper combines discrete wavelet transform and singular value decomposition. The Adoption of above technique increases robustness of watermarking method. Discrete Wavelet Transform is a transform that is used in numerical as well as functional analysis. In this transform, the wavelets are sampled with the discrete values. The main advantage of this transform over Fourier Transform is that it captures both frequency and location information. In Discrete Wavelet Transform, signal energy concentrates to specific wavelet coefficients. This characteristic is useful for compressing images.

Basic functionalities:

Transform domain based techniques are mostly preferred over spatial domain based techniques due to higher robustness property of the transform based techniques. DWT provides better spatial localization, frequency spread and gives multiresolution characteristics of an image. There are three fundamental factors which determine the quality of the watermarking scheme: Imperceptibility, Robustness and Security. SVD is an important tool in linear algebra and is used due to its attractive mathematical properties which helps in preserving superior image quality.

The singular value of the image represents the essential algebraic image properties.

Tools / Platform, Hardware and Software Requirements:

Hardware specification:The selection of hardware is very important in the existence and proper working of any software. Then selection hardware, the size and capacity requirements are also important.

- Processor : Intel Pentium Core i3 and above
- Primary Memory : 4 GB RAM and above
- Storage : 500 GB hard disk and above
- Display : VGA Colour Monitor
- Key Board : Windows compatible
- Mouse : Windows compatible

Software specification: One of the most difficult tasks is selecting software for the system, once the system requirements is found out then we have to determine whether a particular software package fits for those system requirements. The application requirement:

- Front end : Python Django
- Back end : SQLite
- Operating system : windows 7 and above
- IDE : Visual Studio Code
- Others : HTML,CSS