B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

Programme: B.E.   **Semester: VII**

Branch: Electronics and Communication Engineering   **Duration: 3 hrs.**

Course Code: 22EC7PE3SW   **Max Marks: 100**

Course: Steganography and Digital Watermarking

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

<div style="writing-mode: vertical-rl">Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.</div>

			UNIT - I	CO	PO	Marks
1	a)		Interpret the importance of digital watermarking and Steganography with relevant examples	CO 3	PO 2	**06**
	b)		Illustrate the relationship between the encryption and watermark based copy control.	CO 2	PO 1	**06**
	c)		Investigate on a watermarking system, which is using code division to embed integer messages, which are represented as sequences of 8 bits.	CO 3	PO 2	**08**
			OR			
2	a)		Examine the properties of watermarking systems typically associated with Detection	CO 2	PO 1	**06**
	b)		Suppose a simple informed detector is mapped into a communications model, analyse this configured watermarking system.	CO 3	PO 2	**06**
	c)		Investigate a watermarking system where block based, Blind embedding and correlation coefficient detection are used.	CO 3	PO 2	**08**
			UNIT - II			
3	a)		Illustrate of the problem associated with a fixed linear correlation embedding strategy in a watermarking system.	CO 2	PO 1	**06**
	b)		What is a message error? When does it occur? Explain how it can be protected with relevant examples?	-	-	**06**
	c)		Investigate on the Fragility of a Fixed Normalized Correlation Strategy for Informed Embedding in a watermarking system.	CO 3	PO 1	**08**
			OR			
4	a)		What is scalar watermarking systems? Differentiate Watermark-to-Noise Ratio (WNR) and Document-to-Watermark Ratio (DWR).	CO 2	PO 1	**06**
	b)		Investigate on Informed Coding and Informed Embedding in a System using Normalized Correlation Detection	CO 3	PO 2	**06**

				CO 3	PO 2	08
		c)	Investigate on examining the difference between Random-Work and Random-Watermark False Positive Behaviors.	CO 3	PO 2	08
			UNIT - III			
5		a)	Describe the three basic types of phenomena namely sensitivity, masking, and pooling w.r.t a perceptual model	--	--	06
		b)	Examine the basic design of an embedder that uses perceptual shaping with a block diagram.	CO 2	PO 1	06
		c)	Illustrate with a block diagram the basic design of an informed detector that inverts perceptual shaping.	CO 2	PO 1	08
			OR			
6		a)	Define robust watermark. How does it differ from secure watermarks?	CO 2	PO 1	06
		b)	Describe the effects of four major types of volumetric distortion on watermark detection	CO 2	PO 1	06
		c)	Investigate on the Effect of Perceptually Shaped Embedding on Detection Using Normalized Correlation	CO 3	PO 2	08
			UNIT - IV			
7		a)	Describe pathological distortions in the security of watermarking systems	CO 2	PO 1	06
		b)	With respect to the gradient descent attack, illustrate how a local gradient is used to find a short path out of the detection region	CO 2	PO 1	06
		c)	Enumerate different security requirements for a watermarking system in detail.	CO 2	PO 1	08
			OR			
8		a)	In the context of preventing the unauthorized embedding, illustrate the procedure of embedding a watermark using suitable diagrams.	CO 2	PO 1	06
		b)	Enumerate different approaches of localization with respect to content authentication methods	CO 2	PO 1	06
		c)	Illustrate restricting watermarking operations in security requirements with atleast two case scenarios.	CO 2	PO 1	08
			UNIT - V			
9		a)	Enumerate the basic building blocks of any steganographic algorithm in detail.	CO 2	PO 1	06
		b)	Illustrate the extracting algorithm for model based steganography with a diagram	CO 2	PO 1	06
		c)	Discuss any four significant steganalysis algorithm in detail with relevant examples	--	--	08
			OR			
10		a)	Summarize the LSB Embedding and the Histogram Attack steganalysis algorithm in detail	CO 2	PO 1	06
		b)	Examine the Cachin's definition (Information theoretic foundation) of steganographic security in detail.	--	--	06
		c)	Enumerate the practical steganographic methods in detail with relevant examples	CO 2	PO1	08

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